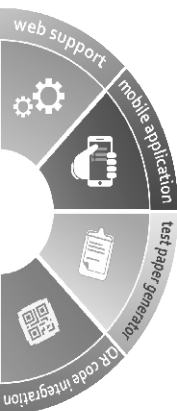


# MATHEMATICS

## Teacher's Manual (Class 6)



- ◆ Learning Tips
- ◆ Maths Lab Activity
- ◆ Model Test Paper
- ◆ MCQs



Chapter

1

Number System

Exercise 1.1

1. Write the following numbers in words, in the Indian System of Numeration :
  - (a) 17,40,308  
Seventeen lakh forty thousand three hundred eight.
  - (b) 4,35,007  
Four lakh thirty-five thousand and seven
  - (c) 2,70,01,003  
Two crore seventy lakh one thousand and three.
  - (d) 40,83,85, 012  
Forty crore eighty-three lakh forty-five thousand and twelve.
2. Write the following numbers in words, in the International System of Numeration :
  - (a) 8,405,316  
Eight million four hundred five thousand three hundred sixteen.
  - (b) 135,022  
One hundred thirty five thousand and two.
  - (c) 7,509,463,112  
Seven billion five hundred nine million four hundred sixty-three thousand one hundred twelve.
  - (d) 497,051,008  
Four hundred ninety seven million, fifty one thousand and Eight.
3. Arrange the following numbers in ascending order :  
3,84,651; 98,432; 4,27,554; 3,21,157  
Number having more number of digits is greater.  
5-digit numbers are 98,432, 92,354 and 6-digit numbers are :  
3,84,651; 4,27,554; 3,21,157

Thus, ascending order is :

$$92,354 < 98,432 < 3,21,157 < 3,84,651 < 4,27,554.$$

4. Arrange the following numbers in descending order :

9,40,09,581; 9,50,09,481; 9,05,04,518; 90,05,20,184

Number having more number of digits is greater.

8-digit Numbers are :

9,40,09,581; 9,50,09,481; 9,05,04,518; 9,48,10,095

Also,  $950,09,481 > 948,10,095 > 9,40,09,581 > 9,05,04,518$

So, descending order is :

$$90,05,20,184 > 9,50,09,481 > 9,48,10,095 > 9,40,09,581 > 9,05,04,518$$

5. Write the following numbers in their expanded form :

(a)  $8453765 = 8000000 + 400000 + 50000 + 3000 + 700 + 60 + 5$

(b)  $57062319 = 50000000 + 7000000 + 60000 + 2000 + 300 + 10 + 9$

(c)  $40010809 = 40000000 + 10000 + 800 + 9$

6. Write the following numbers in words :

(a) 13,45,609

Thirteen lakh forty five thousand six hundred nine

(b) 9,99,99,999

Nine crore ninety nine lakh ninety nine thousand nine hundred ninety nine

(c) 57,06,895

Fifty seven lakh six thousand Eight hundred ninety five.

7. Write the following numbers in words :

(a) 578,346

Five hundred seventy eight thousand three hundred forty six.

(b) 7,952,346

Seven Million nine hundred forty six.

(c) 2,235,678

Two million three hundred thirty five thousand six hundred seventy eight.

8. Find the difference between the largest six-digit number and the smallest seven-digit number.

Smaller seven digit no. = 1000000

Largest six digit no. = -999999

So, difference = 1

9. Find the difference between the place value and the face value of the digit 2 in the number 84235.

84235

Place value of 2 = 200

Face value of 2 = 2

Differences = 198

10. Find the difference of the place values of two 8's in 98378234.

98378234

Place value of first 8 = 8000000

Place value of second 8 = 8000

Difference = 7992000

11. Write the smallest and the greatest numbers using each of the following digits only once.

(a) Greatest no. using digits 4, 5, 3, 8, 0, 7 as 9 is 9875430.

Smallest no. using digits 4, 5, 3, 8, 0, 7 and 9 is 3045789

(b) 1, 2, 3, 4, 6, 8, 0

Greatest no. using digits 1, 2, 3, 4, 6, 8 and 0 is 8643210

Smallest no. using digits 1, 2, 3, 4, 6, 8 and 0 is 1023468.

(c) 2, 3, 5, 6, 0, 9

Greatest no. using digits 2, 3, 5, 6, 0 and 9 is 965320.

Smallest no. using digit 2, 3, 5, 6, 0 and 9 is 203569

(d) 1, 3, 5, 7, 9

Greatest no. using digits 1, 3, 5, 7 and 9 is 97531.

Smallest no. using digits 1, 3, 5, 7 and 9 is 13579.

(e) 2, 4, 6, 8, 0

Greatest no. using digits 2, 4, 6, 8 and 0 is 86420.

Smallest no. using digits 2, 4, 6, 8 and 0 is 20468.

(f) 9, 0, 0, 7, 1, 3

Greatest no. using digits 9, 0, 0, 7, 1 and 3 is 973100

Smallest no. using digits 9, 0, 0, 7, 1 and 3 is 100379.

12. Make six-digit numbers using the digits 3, 4, 5, 0, 6, 7.

- (a) (i) 7,60,543 : Seven lakh sixty thousand five hundred forty-three  
(ii) 6,75,034 : Six lakh seventy-five thousand thirty-four (iii)  
5,76,430 : Five lakh seventy-six thousand four hundred thirty  
(iv) 3,74,056 : Three lakh seventy-four thousand fifty-six (v)  
4,57,360 : Four lakh fifty-seven thousand three hundred sixty.  
(b) (i) Ascending order : 374056; 457360; 576430; 675034;  
760543 (ii) Descending order : 760543; 675034; 576430;  
457360; 374056

### Exercise 1.2

1. Round off the following numbers to the nearest tens, hundreds and thousands and complete the table.

- |                      |                      |
|----------------------|----------------------|
| (b) 5020, 5000, 5000 | (c) 2350, 2300, 2000 |
| (d) 6670, 6700, 7000 | (e) 8460, 8500, 8000 |
| (f) 5250, 5200, 5000 | (g) 7320, 7300, 7000 |
| (h) 3970, 4000, 4000 | (i) 1460, 1500, 1000 |
| (j) 4740, 4700, 5000 |                      |

2. Estimate the value of the following to the nearest ten :

- (a)  $252 + 749$

Here, 252 rounded to nearest ten is 250

and, 749 rounded to nearest ten is 750.

So,  $250 + 750 = 1000$

- (b)  $364 - 273$

Here, 364 rounded to nearest ten is 360

and 273 rounded to nearest ten is 270.

So,  $360 - 270 = 90$

- (c)  $1794 - 1237$

Here, 1794 rounded to nearest ten is 1790

and 1237 rounded to nearest ten is 1240.

So,  $1790 - 1240 = 550$

- (d)  $232 \times 657$

Here, 232 rounded to nearest ten is 230

and 657 rounded to nearest ten is 660

So,  $230 \times 660 = 151800$

(e)  $479 - 363$

Here, 479 rounded to nearest ten is 480  
and 363 rounded to nearest ten is 360.

So,  $480 - 360 = 120$

(f)  $176 \times 199$

Here, 176 rounded to nearest ten is 180  
and 199 rounded to nearest ten is 200.

So,  $180 \times 200 = 36000$

(g)  $637 \div 78$

Here, 637 rounded to nearest ten is 640  
and 78 rounded to nearest ten is 80.

So,  $640 \div 80 = 8$

(h)  $993 \div 29$

Here, 993 rounded to nearest ten is 990  
and 29 rounded to nearest ten is 30.

So,  $990 \div 30 = 33$

(i)  $1298 - 723$

Here, 1298 rounded to nearest ten is 1300  
and 723 rounded to nearest ten is 720.

So,  $1300 - 720 = 580$

(j)  $2798 \div 43$

Here, 2798 rounded to nearest ten is 2800  
and 43 rounded to nearest ten is 40.

So,  $2800 \div 40 = 70$

3. Estimate each sum to the nearest hundred :

(a)  $5580 + 2295$

Here, 5580 rounded to nearest hundred is 5600  
and 2295 rounded to nearest hundred is 2300.

So,  $5600 + 2300 = 7900$

(b)  $370 + 295$

Here, 370 rounded to nearest hundred is 400  
and 295 rounded to nearest hundred is 300.

So,  $400 + 300 = 700$

(c)  $567 + 739$

Here, 567 rounded to nearest hundred is 600

and 739 rounded to nearest hundred is 700.

So,  $600 + 700 = 1300$

- (d)  $273 + 1999$

Here, 273 rounded to nearest hundred is 300

and 1999 rounded to nearest hundred is 2000.

So,  $300 + 2000 = 2300$

- (e)  $8940 + 198$

Here, 8940 rounded to nearest hundred is 8900

and 198 rounded to nearest hundred is 200.

So,  $8900 + 200 = 9100$

4. Estimate the value to the nearest thousand :

- (a)  $25873 - 20677$

Here, 25873 rounded to nearest thousand is 26000

and 20677 rounded to nearest thousand is 21000.

So,  $26000 - 21000 = 5000$

- (b)  $5613 - 3075$

Here, 5613 rounded to nearest thousand is 6000

and 3075 rounded to nearest thousand is 3000.

So,  $6000 - 3000 = 3000$

- (c)  $35846 - 23910$

Here, 35846 rounded to nearest thousand is 36000

and 23910 rounded to nearest thousand is 24000.

So,  $36000 - 24000 = 12000$

- (d)  $5739 - 2651$

Here, 5739 rounded to nearest thousand is 6000

and 2651 rounded to nearest thousand is 3000.

So,  $6000 - 3000 = 3000$

- (e)  $8479 - 5643$

Here, 8479 rounded to nearest thousand is 8000

and 5643 rounded to nearest thousand is 6000.

So,  $8000 - 6000 = 2000$

5. Estimate the product by rounding off to the nearest hundred :

- (a)  $792 \times 265$

Here, 792 rounded to nearest hundred is 800

and 265 rounded to nearest hundred is 300.

So,  $800 \times 300 = 24000$

(b)  $476 \times 134$

Here, 476 rounded to nearest hundred is 500

and 134 rounded to nearest hundred is 100.

So,  $500 \times 100 = 5000$

(c)  $261 \times 173$

Here, 261 rounded to nearest hundred is 300.

and 173 rounded to nearest hundred is 200.

So,  $300 \times 200 = 60000$

(d)  $896 \times 247$

Here, 896 rounded to nearest hundred is 900

and 247 rounded to nearest hundred is 200.

So,  $900 \times 200 = 180000$

**6. Estimate the quotient for the following :**

Here, it is not mentioned that to which place we have to round off a number so, we may round to nearest hundred for a three-digit number, nearest ten to two-digit number and nearest thousand to a four-digit number.

(a)  $29 \div 9$

Here, 29 rounded to nearest ten is 30

and 9 rounded to nearest one is 10.

So,  $30 \div 10 = 3$

(b)  $478 \div 48$

Here, 478 rounded to nearest hundred is 500

and 48 rounded to nearest ten is 50.

So,  $500 \div 50 = 10$

(c)  $556 \div 8 = 69.5$  (rounded to nearest ten)  
 $= 70$  (round off value)

(d)  $1876 \div 192$

Here, 1876 rounded to nearest thousand is 2000

and 192 rounded to nearest hundred is 200.

So,  $2000 \div 200 = 10$

(e)  $285 \div 37$

Here, 285 rounded to nearest hundred is 300

and 37 rounded to nearest ten is 40.

So,  $300 \div 40 = 7.5$  (rounded to nearest)  
 $= 8$

(f)  $1989 \div 63$

Here, 1989 rounded to nearest thousand is 2000  
and 63 rounded to nearest ten is 60.

So,  $2000 \div 60 = 33.33$   
 $= 33$  (rounded value)

7. 425 fruits were distributed equally among 17 students. How many fruits did each student get? Estimate the answer.

Total number of fruits = 425

and Number of students = 17

So, The number of fruits to get each student =  $425 \div 17 = 25$

hence, the required number of fruits to get each student are 25.

### Exercise 1.3

1. Write the in Roman numerals for :

(a)  $45 = 40 + 5 = (50 - 10) + 5 = XLV$

(b)  $92 = 90 + 2 = (100 - 10) + 2$

(c)  $68 = 60 + 8 = 50$

(d)  $105 = 100 + 5 = CV$

(e)  $375 = 300 + 50 + 10 + 10 + 5 = CCCLXXV$

(f)  $549 = 500 + 40 + 9 = 500 + (50 - 10) + 9 = DXLIX$

(g)  $174 = 100 + 50 + 10 + 10 + 4 = CLXXIV$

(h)  $299 = 200 + 90 + 9 = 200 + (100 - 10) + 9$   
 $= CCXCIX$

(i)  $601 = 500 + 100 + 1 = DCI$

(j)  $835 = 500 + 100 + 100 + 100 + 10 + 10 + 10 + 5$   
 $= DCCCXXXV$

(k)  $1759 = 1000 + 500 + 100 + 100 + 50 + 9$   
 $= MDCCLIX$

(l)  $2090 = 1000 + 1000 + 90$   
 $= 1000 + 1000 + (100 - 10)$   
 $= MMXC$

2. Write the following in Hindu-Arabic numerals :

$$\begin{aligned} \text{(a) CDXXX} &= (500 - 100) + 10 + 10 + 10 \\ &= 400 + 30 \\ &= 430 \end{aligned}$$

$$\begin{aligned} \text{(b) MCMV} &= 1000 + (1000 - 100) + 5 \\ &= 1000 + 900 + 5 \\ &= 1905 \end{aligned}$$

$$\begin{aligned} \text{(c) CLV} &= 100 + 50 + 5 \\ &= 155 \end{aligned}$$

$$\begin{aligned} \text{(d) LXXVII} &= 50 + 10 + 10 + 5 + 2 \\ &= 77 \end{aligned}$$

$$\begin{aligned} \text{(e) DLXIX} &= 500 + 50 + 10 + (10 - 9) \\ &= 500 + 50 + 10 + 9 \\ &= 569 \end{aligned}$$

$$\begin{aligned} \text{(f) CDXXXIX} &= 400 + 30 + 9 \\ &= 439 \end{aligned}$$

$$\begin{aligned} \text{(g) CCXLII} &= 100 + 100 + (50 - 12) + 2 \\ &= 200 + 40 + 2 \\ &= 242 \end{aligned}$$

$$\begin{aligned} \text{(h) CLXVII} &= 100 + 50 + 10 + 5 + 2 \\ &= 167 \end{aligned}$$

3. Arrange in ascending order :

$$\text{(a) XXI} < \text{XXIV} < \text{XXXI} < \text{XL} < \text{XLV}$$

$$\text{(b) CDXLV} < \text{DXXIX} < \text{DXLIV} < \text{DXCIX}$$

4. Arrange in descending order :

$$\text{(a) LVIII} > \text{XLIX} > \text{XXXVIII} > \text{XXXII}$$

$$\text{(b) DCXXXV} > \text{CDXXIX} > \text{CCCLIV} > \text{CXLI}$$

### Mental Ability

A. 1. (c) 2. (d) 3. (a) 4. (a) 5. (a) 6. (b) 7. (b) 8. (c) 9. (a) 10. (a)

B. 1. (two hundred) 2. ten thousand 3. twenty three 4. 100000 5. 1100759 6. 10 7. 10 8. 9999999 9. 365 10. V.

C. 1. F 2. F 3. T 4. F 5. T

## Higher Order Thinking Skills (HOTS)

1. Write all natural numbers between 40 and 90. How many of these have 2 in their one's place? Find the sum of all such numbers. Is your result 310?

All natural numbers between 40 and 90 are :

41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58,  
59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76,  
77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89

∴ Number which have 2 in their one's place are :

42, 52, 62, 72, 82

So, Sum of these numbers  $= 42 + 52 + 62 + 72 + 82 = 310$

Yes, the result is 310.

- ## 2. Puzzle :

A 5-digit number is represented by ABCDE where each letter is a digit. If we add the digit 1 in front of ABCDE we get  $1\text{ ABCDE}$ .

The product  $\overline{1\ ABCDE}$  and 3 is the six digit number  $\overline{ABCDE\ 1}$ . What is the value of  $\overline{ABCDE}$ ?

$$\begin{array}{cccccc} 1 & A & B & C & D & E \\ \times & & & & & 3 \end{array}$$

A	B	C	D	E	1
---	---	---	---	---	---

	4	2	8	5	7
1	A	B	C	D	E
×					3

A	B	C	D	E	I
---	---	---	---	---	---

4      2      8      5      7

$\therefore$  The required values of ABCDE are

$$\left\{ \begin{array}{l} A \rightarrow 4 \\ B \rightarrow 2 \\ C \rightarrow 8 \\ D \rightarrow 5 \\ E \rightarrow 7 \end{array} \right.$$

1. Fill in the blanks :

(a)  $(452 + 325) + 501 = \mathbf{1278}$

(b)  $5000 + 323 = \mathbf{4823} + 500$

(c)  $(5 \times 6) + (5 \times 4) = \mathbf{5} \times (6 + 4)$

(d)  $45234 + 0 = \mathbf{45234}$

2. Find the sum by suitable arrangement :

(a)  $715 + 250 + 335 = (715 + 335) + 250$   
 $= 1050 + 250$   
 $= 1300$

(b)  $829 + 106 + 244 + 121$   
 $= (829 + 121) + (106 + 244)$   
 $= 950 + 350$   
 $= 1300$

(c)  $488 + 761 + 512 + 239$   
 $= (488 + 512) + (761 + 239)$   
 $= (1000) + (1000)$   
 $= 2000$

(d)  $222 + 333 + 667 + 778.$   
 $= (222 + 778) + (333 + 667)$   
 $= (1000) + (1000)$   
 $= 2000$

3. Replace each \* by the correct digit in the given sums :

(a) 
$$\begin{array}{r} 8\ 5\ 3\ 6\ 9\ 8 \\ + 4\ 3\ 2\ 8\ 7\ 5 \\ \hline 1\ 2\ 8\ 6\ 5\ 7\ 3 \end{array}$$

(b) 
$$\begin{array}{r} 6\ 2\ 5\ 7 \\ + 4\ 7\ 2\ 3 \\ \hline 1\ 0\ 9\ 8\ 0 \end{array}$$

(c) 
$$\begin{array}{r} 3\ 7\ 2\ 5 \\ + 4\ 3\ 2\ 8 \\ \hline 8\ 0\ 5\ 3 \end{array}$$

4. State which property the following represent.

(a)  $170 + (228 + 140) = (170 + 288) + 140$   
 Associative property.

(b)  $123 \times 1 = 1 \times 123$

Multiplicative identity.

(c)  $60 + 0 = 60 = 0 + 60$

Additive Identity.

(d)  $a \times b = b \times a$

Commutative property.

(e)  $6 \times (2 + 7) = (6 \times 2) + (6 \times 7)$

Distributive property over addition.

(f)  $16 \times 12 - 16 \times 8 = 16 \times (12 - 8)$

Distributive property over subtraction.

5. Find the difference between the new number and the original number if the digits 6 and 8 are interchanged in the number 28,436.

Original number = 28,436

By interchanging the digits 6 on 8.

New number = 26,438

$$\begin{array}{r} \therefore \text{Required difference} = 28,436 \\ - 26,438 \\ \hline 1,998 \end{array}$$

So, the required difference is 1,998.

6. Write down the smallest 6-digit number and the largest 6-digit number and find their sum.

The smallest 6-digit number = 100000

and the largest 6-digit number = 999999

$$\begin{array}{r} \therefore \text{Required Sum} = 999999 \\ + 100000 \\ \hline 1099999 \end{array}$$

7. Tom deposited ₹ 1,00,000 in his bank account. Later he withdrew ₹ 2568, ₹ 5897 and ₹ 8640 for various purposes. How much money is left in his bank account?

Total deposited money by the Tom in his bank account = ₹ 1,00,000

The total of withdraw money = ₹ 2560

+ ₹ 5897

+ ₹ 8640

₹ 17105

∴ Left money in his bank account

$$\begin{array}{r}
 = ₹ 100000 \\
 - ₹ 17105 \\
 \hline
 ₹ 82895
 \end{array}$$

So, the left money in bank account is ₹ 82,895.

8. Complete the following magic squares :

(a)

		10
7	9	11

Let us first find out the sum of II row numbers. We get

$$7 + 9 + 11 = 27$$

So, the sum of numbers in all the rows, columns and diagonals will be 27.

In the III column, we have two numbers 10 and 11. So the third number will be

$$27 - (10 + 11) = 27 - 21 = 6$$

Similarly, the I diagonal will have the third number as,

$$27 - (9 + 6) = 27 - 15 = 12$$

Now, the top row has two numbers 12 and 10.

∴ Third number of this row =  $27 - (12 + 10) = 27 - 22 = 5$

Similarly, the third number of I column

$$= 27 - (12 + 7) = 27 - 19 = 8$$

and the third number of II Column

$$= 27 - (5 + 9) = 27 - 14 = 13$$

So, The complete magic square will be,

12	5	10
7	9	11
8	13	6

(b)

		15	4
	11	10	
12	7		
13		3	16

Let us first find out the sum of the numbers along the diagonal.

$$13 + 7 + 10 + 4 = 34$$

We know that, the sum of numbers in all the rows and columns will be 34.

In the IV row we have three numbers 13, 3 and 16. So the fourth number will be,

$$34 - (13 + 3 + 16) = 34 - 32 = 2$$

Now, the fourth number of top row will be,

$$34 - (14 + 15 + 4) = 34 - 33 = 1$$

∴ The fourth number of other diagonal will be,

$$34 - (1 + 11 + 16) = 34 - 28 = 6$$

The fourth number of II row will be,

$$34 - (12 + 7 + 6) = 34 - 25 = 9$$

Now, the fourth number of IV column will be,

$$34 - (9 + 4 + 16) = 34 - 29 = 5$$

In the last, the fourth number of II row will be,

$$34 - (5 + 10 + 11) = 34 - 26 = 8$$

So, The complete magic square will be as shown below.

1	14	15	4
8	11	10	5
12	7	6	9
13	2	3	16

9. Find the products by suitable arrangement :

(a)  $125 \times 372 \times 8$

(b)  $345 \times 50 \times 2 \times 8$

$$= 125 \times 8 \times 372$$

$$= 1000 \times 372$$

$$= 372000$$

$$= (345 \times 8) \times (50 \times 2)$$

$$= 2760 \times 100$$

$$= 276000$$

$$\begin{aligned} \text{(c)} \quad & 1234 \times 4 \times 1 \times 25 \\ &= (1234 \times 1) \times (4 \times 25) \\ &= 1234 \times 100 \\ &= 123400 \end{aligned}$$

- 10.** Use distributive property over addition and subtraction for multiplication and simplify the following :

$$\begin{aligned} \text{(a)} \quad & 75 \times 71 + 29 \times 75 \\ &= 75 \times (71 + 29) \\ &= 75 \times 100 \\ &= 7500 \\ &\text{(Distributive property over addition)} \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad & 135 \times 105 \\ &= (100 + 35) \times (100 + 5) \\ &= 100 \times 100 + 100 \times 5 + 35 \times 100 + 35 \times 5 \\ &= 10000 + 500 + 3500 + 175 \\ &= 14175 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad & 393 \times 435 - 35 \times 393 \\ &= 393 \times (435 - 35) \text{(Distributive property over subtraction)} \\ &= 393 \times 400 \\ &= 157200 \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad & 250 \times 8 + 25 \times 9 \times 10 \\ &= 250 \times 8 + 250 \times 9 \\ &= 250 \times (8 + 9) \text{(Distributive property over addition)} \\ &= 250 \times 17 = 4250 \end{aligned}$$

$$\begin{aligned} \text{(e)} \quad & 3845 \times 5 \times 782 + 769 \times 25 \times 218 \\ &= (3845 \times 5) \times 782 + (769 \times 25) \times 218 \\ &= 19225 \times 782 + (769 \times 25) \times 218 \\ &= 19225 \times (782 + 218) \text{(Distributive property over addition)} \\ &= 19225 \times 1000 \\ &= 19225000 \end{aligned}$$

- 11.** Find the following products :

$$\text{(a)} \quad \text{Smallest 5-digit number} = 10000$$

and largest 2-digit number = 99

∴ Required multiplication =  $99 \times 10000 = 990000$ .

(b) Smallest 6-digit number = 100000

and Smallest 3-digit number = 100

∴ The required multiplication =  $100000 \times 100$   
 $= 10000000$

12. Find the number which when divided by 59 gives the quotient 212 and remainder 32.

Here, we have to find the Divident.

We know that,

$$\begin{aligned}\text{Dividend} &= (\text{Divisor} \times \text{Quotient}) + \text{Remainder} \\ &= 59 \times 212 + 32 \\ &= 12540\end{aligned}$$

So, the required number is 12540.

13. The bus fare from A to B for adults is ₹ 25 and for children it is ₹ 12. If a total of 2012 adults and 560 children travelled in the bus on its trips, how much was the total money collected?

The cost of an adult ticket = ₹ 25

and the cost of a child ticket = ₹ 12.

Total number of adults = 2012

and total number of children = 560

So, The required total money collected

$$\begin{aligned}&= ₹ (2012 \times 25 + 560 \times 12) \\ &= ₹ (50300 + 6720) \\ &= ₹ 57020\end{aligned}$$

Hence, The total money collection is ₹ 27020.

14. A dealer sold 75 pencils everyday for 16 days and 90 pencils everyday for 14 days. He still had 2 dozen pencils left. How many pencils did he have to start with?

$$\begin{aligned}\text{Total number of pencils by the dealer} &= 75 \times 16 + 90 \times 14 \\ &= 75 \times 16 + 90 \times 14 \\ &= 1200 + 1260 \\ &= 2460\end{aligned}$$

Number of remaining pencils after sell =  $2 \times 12 = 24$

$$\therefore \text{Total number of pencils in all} = 2460 + 24 \\ = 2484$$

So, The required number of pencils are 2484.

**15.** Find the values of the following :

$$\begin{aligned} \text{(a)} \quad & 768 + (420 \div 42) \\ & = 768 + 10 \\ & = 778 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad & 1110 \div (2157 - 2147) \\ & = 1110 \div (10) \\ & = 1110 \div 10 = 111 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad & (639 \div 639) + (4250 \div 425) \\ & = (1) + (10) \\ & = 11 \end{aligned}$$

**16.** What is the largest 3-digit number divisible by 12?

According to question,

$$\begin{array}{r} 83 \\ 12 \overline{)999} \\ \underline{-96} \phantom{00} \\ 39 \\ \underline{-36} \phantom{00} \\ 3 \end{array}$$

$$\begin{aligned} \text{So, the required number} &= 999 - 3 \\ &= 996 \end{aligned}$$

Hence, the required number is 996.

**17.** Find a. If  $(a \div 11)$  gives quotient 5 and remainder 1.

Here, Dividend =  $a$

Divisor = 11

Quotient = 5

and Remainder = 1

We know that,

Dividend = (Divisor  $\times$  Quotient) + Remainder

$$a = (11 \times 5) + 1$$

$$\Rightarrow a = 55 + 1$$

$$\Rightarrow a = 56$$

So, the required value of 'a' is 56.

**18.** Which statement is True and which is False?

- (a) The sum of two whole numbers is again a whole number.  
True
- (b) Zero is called the identity element for multiplication.  
False
- (c) If a, b, c are any three whole numbers, then  $(a + b) + c = a + (b + c)$ .  
True
- (d) One is the multiplicative identity.  
True
- (e)  $a \times b \neq b \times a$   
False
- (f)  $0 \div 5 = 0$   
False
- (g)  $a \div a = 1$   
True
- (h)  $a \times (b - c) \neq a \times b - a \times c$   
False
- (i) The product of a whole number and 1 is itself is a whole number.  
True

## Exercise 2.2

**1.** Simplify :

- (a)  $40 + [80 + \{(20 - 3) \times 7\}]$   
 $= 40 + [80 + \{70 \times 7\}]$   
 $= 40 + [80 + 119]$   
 $= 40 + 199$   
 $= 239$
- (b)  $25 \text{ of } [70 - \{9 \times 7 + (14 - 3 \text{ of } 4)\}]$   
 $= 25 \text{ of } [70 - \{9 \times 7 + (14 - 12)\}]$   
 $= 25 \text{ of } [70 - \{9 \times 7 + 2\}]$   
 $= 25 \text{ of } [70 - \{63 + 2\}]$

$$= 25 \text{ of } [70 - 65]$$

$$= 25 \text{ of } 5 = 25 \times 5 = 125$$

$$(c) (12 \times 3) \div 4 \times 5 - 7 + 3 \times (9 - 5)$$

$$= 36 \div 4 \times 5 - 7 + 3 \times 4$$

$$= 9 \times 5 - 7 + 3 \times 4$$

$$= 45 - 7 + 12 = 57 - 7 = 50$$

$$(d) \{(112 + 3) - (5 \times 10 - 17) + 6\} \div 4.$$

$$\{(112 + 3) - (50 - 17) + 6\} \div 4$$

$$\{115 - 33 + 6\} \div 4$$

$$= \{121 - 33\} \div 4$$

$$= 88 \div 4 = 22$$

## 2. Find the value :

$$(a) 30 \div (2 \text{ of } 4 + 11 - 4) + 7$$

$$= 30 \div (8 + 11 - 4) + 7$$

$$= 30 \div (19 - 4) + 7$$

$$= 30 \div 15 + 7$$

$$= 2 + 7 = 9$$

$$(b) 20 - \{6 + 4 - (4 \times 2 - 3 + 5)\}$$

$$= 20 - \{6 + 4 - (4 \times 2 - 8)\}$$

$$= 20 - \{6 + 4 - (8 - 8)\} = 20 - \{6 + 4 - 0\}$$

$$= 20 - \{10 - 0\} = 20 - 10 = 10$$

$$(c) 25 - [20 - \{10 - (7 - 5 + 3)\}]$$

$$= 25 - [20 - \{10 - (10 - 5)\}]$$

$$= 25 - [20 - \{10 - 5\}]$$

$$= 25 - [20 - 5] = 25 - 15 = 10$$

$$(d) 37 + 26 \div 2 + 2 \text{ of } 25 - 60 \div 2$$

$$= 37 + 26 \div 2 + 50 - 60 \div 2$$

$$(e) 6 + [12 - \{8 + 3 - (9 \text{ of } 6 - 13 \times 4 + 1)\}]$$

$$= 6 + [12 - \{8 + 3 - (54 - 13 \times 4 + 1)\}]$$

$$= 6 + [12 - \{8 + 3 - (54 + 52 + 1)\}]$$

$$= 6 + [12 - \{8 + 3 - (55 - 52)\}]$$

$$= 6 + [12 - \{8 + 3 - 3\}]$$

$$= 6 + [12 - \{11 - 3\}] = 6 + [12 - 8]$$

$$= 6 + 4 = 10$$

## Mental Ability

### A. Tick (✓) the correct option :

1. (b) 2. (c) 3. (b) 4. (c) 5. (c) 6. (b) 7. (a) 8. (d)

### B. B. Fill in the blanks :

1. 1 2. 1 3. 990 4. Commutative 5. 0 6. 0

### C. State True (T) or False (F) :

1. False 2. True 3. True 4. True

## Chapter

# 3

## Integers

### 1. Write the opposite of the following statements :

- (a) 30 km below sea level  
30 km above sea level.
- (b) Earning ₹ 5000  
Spending ₹ 5000.
- (c) A decrease of 10  
An increase of 10
- (d) Moving 7 km to the North.  
Moving 7 km to the South.

### 2. Fill in the blanks with an appropriate symbol '>' or '<' :

- (a)  $-7 < -5$                       (b)  $0 < 2$                       (c)  $-6 > -8$
- (d)  $-9 < 2$                       (e)  $-3 < 0$                       (f)  $+5 > 1$

### 3. Arrange the following in increasing order :

- (a) 6, -10, 4, -5, 1, -2, 0, 15  
The increasing order of given integers is  
 $-10 < -5 < -2 < 0 < 1 < 4 < 15$
- (b) -7, 6, 0, 2, -8, 7  
The increasing order of given integers is  
 $-8 < -7 < 0 < 2 < 6 < 7$
- (c) 4, -3, 5, -8, -5, 1, 10  
The increasing order of given integers is  
 $-8 < -5 < -3 < 1 < 4 < 5 < 10$

- (d)  $-19, 15, 10, -7, 8, 1, -2$

The increasing order of given integers is

$$-19 < -7 < -2 < 1 < 8 < 10 < 15$$

4. Arrange the following in decreasing order :

- (a)  $-2, 5, -1, 0, 8$

The decreasing order of given integers is

$$8 > 5 > 0 > -1 > -2$$

- (b)  $7, -3, -4, 0, 4, -10$

The decreasing order of given integers is

$$7 > 4 > 0 > -3 > -4 > -10$$

- (c)  $-10, 6, -1, 3, -5, 7$

The decreasing order of given integer is

$$7 > 6 > 3 > -1 > -5 > -10$$

- (d)  $-15, 10, 8, -7, 0, 2$

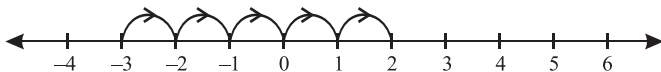
The decreasing order of given integers is

$$10 > 8 > 2 > 0 > -7 > -15$$

5. Using the number line, find the integer which is :

- (a) 5 more than  $-3$

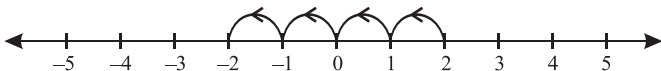
On the number line, we start from  $-3$  and move five steps to the right and we reach at 2.



$\therefore$  5 more than  $-3$  is 2.

- (b) 4 less than 2

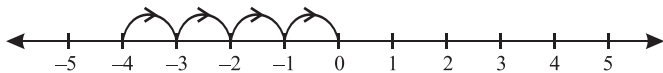
On the number line, we start from 2 and move 4 steps to the left and we reach at  $-2$ .



$\therefore$  4 less than 2 is  $-2$ .

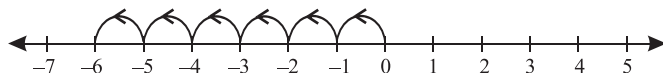
- (c) 4 more than  $-4$

On the number line, we start from  $-4$  and move 4 steps to the right and we reach at 0.



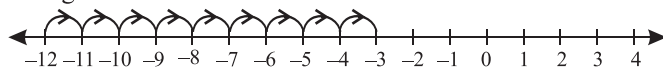
∴ 4 more than  $-4$

- (d) On the number line, we start from 0 and move 6 steps to the left and we reach at  $-6$ .



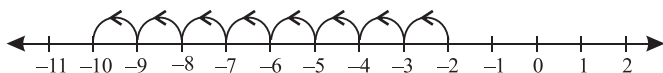
∴ 6 less than 0 is  $-6$ .

- (e) On the number line, we start from  $-12$  and move 9 steps to the right and we reach at



∴ 9 more than  $-12$  is  $-3$ .

- (f) On the number line, we start from  $-2$  and move 8 steps to the left and we reach at  $-10$ .



∴ 8 less than  $-2$  is  $-10$ .

6. Which number in each of the following pairs is greater?

(a)  $-39, -45$

$-39$  is greater.

(b)  $0, 5$

$5$  is greater.

(c)  $210, -405$

$210$  is greater.

(d)  $-150, -165$

$0$  is greater.

(e)  $0, -9$

$0$  is greater.

(f)  $140, 30$

$140$  is greater.

7. With the help of number line, give two possible integral values of  $x$  if :

(a)  $x > 4$

$5, 6$

(b)  $x < 1$

$-1, 0$

(c)  $x > -3$

$-2, -1$

(d)  $x < -5$

$-6, -7$

(e)  $1 < x < 4$

$2, 3$

(f)  $-6 < x < -3$

$-5, -4$

8. Find the value of the following :

- (a)  $|-7| + |-2| = 7 + 2 = 9$       (b)  $|0| - |3| = 0 - 3 = -3$   
(c)  $|-4| - |0| = 4 - 0 = 4$       (d)  $|-5| - |-5| = 5 - 5 = 0$   
(e)  $|13| - |-7| = 13 - 7 = 6$       (f)  $|-9| + |9| = 9 + 9 = 18$

9. Fill in the blanks :

- (a) Zero is greater than every **negative** integer.  
(b) The absolute value of zero is **zero**.  
(c) There are **four** integers between 3 and  $-2$ .  
(d) All natural numbers are **positive** integers.

10. Which of the following statements are true and which are false?

- (a) False                      (b) True                      (c) True  
(d) True                      (e) True                      (f) False

### Exercise 3.2

1. Fill in the blanks :

- (a)  $\boxed{-27} + 8 = -19$                       (b)  $-4 + \boxed{-8} = -12$   
(c)  $-8 + \boxed{3} = -5$                       (d)  $34 - \boxed{24} = 10$   
(e)  $\boxed{-2} + (-10) = -12$                       (f)  $-15 + \boxed{15} = 0$

2. Insert the appropriate symbol  $>$ ,  $<$  or  $=$  in the following :

- (a)  $-2 + (-4) \boxed{<} (-3) - (-2)$       (b)  $-6 - 5 \boxed{= } (-6) + (-5)$   
(c)  $50 - (-40) \boxed{>} -60 - 30$       (d)  $163 - (-117) > -163 - 117$   
(e)  $-631 + 853 > (-1000) + (-115)$   
(f)  $-78 + (-86) < (-97) - 10$

3. Subtract :

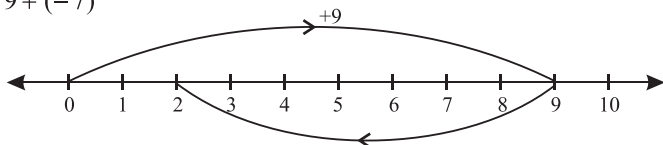
- (a)  $-16$  from  $-15$   
 $-15 - (-16) = -15 + 16 = 1$   
(b)  $-451$  from  $-286$   
 $-286 - (-451) = -286 + 451 = 165$   
(c)  $5123$  from  $-2154$   
 $-2154 - 5123 = -7277$   
(d)  $-1040$  from  $-562$   
 $-562 - (-1040) = -562 + 1040 = 478$   
(e)  $-52$  from  $52$   
 $52 - (-52) = 52 + 52 = 104$

(f)  $-725$  from  $0$

$$0 - (-725) = 0 + 725 = 725$$

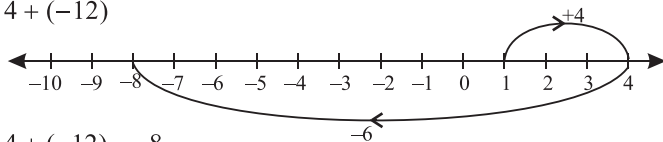
4. Use the number line to add the following integers :

(a)  $9 + (-7)$



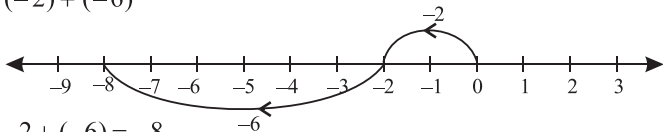
$$9 + (-7) = 2$$

(b)  $4 + (-12)$



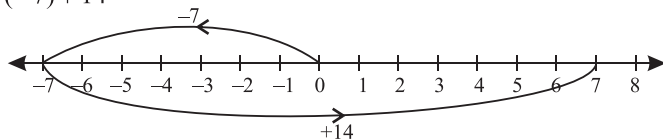
$$4 + (-12) = -8$$

(c)  $(-2) + (-6)$



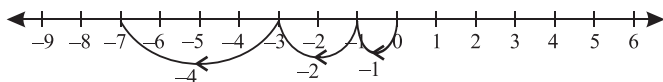
$$-2 + (-6) = -8$$

(d)  $(-7) + 14$



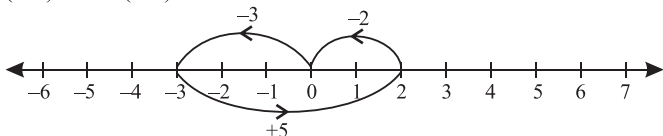
$$(-7) + 14 = 7$$

(e)  $(-1) + (-2) + (-4)$



$$-1 + (-2) + (-4) = -7$$

(f)  $(-3) + 5 + (-2)$



5. Write the successor and predecessor of the following :

(a)  $-1059$

$$\text{Successor of } (-1059) = -1059 + 1 = -1058$$

$$\text{Predecessor of } (-1059) = -1059 - 1 = -1060$$

(b)  $-99$

$$\text{Successor of } (-99) = -99 + 1 = -98$$

$$\text{Predecessor of } (-99) = -99 - 1 = -100$$

(c)  $-9090$

$$\text{Successor of } (-9090) = -9090 + 1 = 9089$$

$$\text{Predecessor of } (-9090) = -9090 - 1 = -9091$$

(d)  $0$

$$\text{Successor of } (0) = 0 + 1 = 1$$

$$\text{Predecessor of } (0) = 0 - 1 = -1$$

6. Find the value of :

(a)  $36 + (-3) + (-66) + 35$

$$= 36 - 3 - 66 + 35$$

$$= 71 - 69 = 2$$

(b)  $-25 + (-9) + 7 + 35$

$$= -25 - 9 + 7 + 35$$

$$= -34 + 42 = 8$$

(c)  $17 + (-43) + (-63) + 68$

$$= 17 + 68 - 43 - 63$$

$$= 85 - 106 = -21$$

7. Simplify :

(a)  $-10 - 5 - (-35)$

$$= -10 - 5 + 35$$

$$= 20$$

$$= -1$$

(b)  $-15 + 34 - 14 - 6$

$$= -15 - 14 - 6 + 34$$

$$= -35 + 34$$

(c)  $-8 + (-9) + (-80)$

$$= -8 - 9 - 80$$

$$= -17 - 80$$

$$= -97$$

$$\begin{aligned} \text{(d)} \quad & 100 - (-100) - (-100) \\ & = 100 + 100 + 100 \\ & = 300 \end{aligned}$$

$$\begin{aligned} \text{(e)} \quad & -26 + (-13) + (-52) \\ & = -26 - 13 - 52 \\ & = -39 - 52 \\ & = -91 \end{aligned}$$

$$\begin{aligned} \text{(f)} \quad & -13 + (-17) - (-22) - (-40) \\ & = -13 - 17 + 22 + 40 \\ & = -30 + 62 \\ & = 32 \end{aligned}$$

8. In Srinagar, the temperature was  $4^{\circ}\text{C}$  in the morning. It dropped by 7 degrees at night. Find the temperature of Srinagar at night.

The temperature in the morning =  $4^{\circ}\text{C}$

Dropped temperature at night =  $7^{\circ}\text{C}$

$\therefore$  The temperature of Srinagar at night =  $4^{\circ}\text{C} - 7^{\circ}\text{C} = -3^{\circ}\text{C}$

9. A submarine was situated 700 m below the sea level. If it ascends 250 m, what is its new position?

Its ascends is 250 m.

$\therefore$  The new position of submarine below the sea level

$$= 700 \text{ m} - 250 \text{ m}$$

$$= 450 \text{ m}$$

10. In a quiz, positive marks are given for correct answers and negative marks are given for incorrect answers. If Reeta's scores in four successive rounds were 35, -5, -10, 20, what was her total score at the end?

Reeta's positive marks and negative marks for a quiz are :

$$35, -5, -10, 20$$

$\therefore$  The total score at the end =  $35 + (-5) + (-10) + 20$

$$= 55 - 15 = 40 \text{ marks}$$

Hence, the required total score at the end of quiz is 40 marks.

11. In Shimla, the temperature was  $2^{\circ}\text{C}$  on afternoon. If the temperature dropped by  $5^{\circ}\text{C}$  at night, find the temperature of Shimla at night.

The temperature of Shimla in afternoon time is  $2^{\circ}\text{C}$ .

The temperature dropped by  $5^{\circ}\text{C}$  at night.

$$\begin{aligned}\text{So, the temperature of Shimla at night} &= 2^{\circ}\text{C} - 5^{\circ}\text{C} \\ &= -3^{\circ}\text{C}\end{aligned}$$

Hence, the required temperature of Shimla at night is  $(-3^{\circ}\text{C})$ .

12. (a) True (b) False (c) False (d) False (e) False.

## Mental Ability

### A. Multiple Choice Questions (MCQ) :

1. (a) 2. (a) 3. (b) 4. (c) 5. (c) 6. (c) 7. (d) 8. (b) 9. (b) 10. (a)

### B. Fill in the blanks :

- The successor of an integer ' $a$ ' is  $(a + 1)$ .
- The value of  $1 - 13 - 51 = -63$ .
- Zero is greater than every **Negative** integer.
- The sum of two negative integers is always a **Negative** integer.
- The largest negative integer  $-1$ .

### C. State True (T) or False (F) :

1. False 2. False 3. False 4. False 5. False

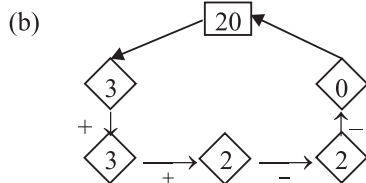
### D. Match the columns :

- |                       |           |
|-----------------------|-----------|
| 1. $-73 - (-37)$      | (b) $-36$ |
| 2. $ -17 $            | (d) 17    |
| 3. Negative of $-36$  | (a) 36    |
| 4. $-12 + 26 - (-16)$ | (c) 30    |

## Higher Order Thinking Skills (HOTS)

(a)  $\boxed{65} \xrightarrow{+} \boxed{2} \xrightarrow{-} \boxed{2} \xrightarrow{-} \boxed{0} \xrightarrow{+} \boxed{1}$

$$\Rightarrow 65 + 2 - 2 - 0 + 1 = 66$$



$$20 - 3 + 3 + 2 - 2 - 0 = 20$$

## Exercise 4.1

1. Find the prime factorisation of each of the following numbers :

(a) 4335

3	4335
5	1445
17	289
17	17
	1

$$\therefore 4335 = 3 \times 5 \times 17 \times 17$$

(c) 9282

2	9282
3	4641
7	1547
13	221
17	17
	1

$$\therefore 9282 = 2 \times 3 \times 7 \times 13 \times 17$$

(b) 2448

2	2448
2	1224
2	612
2	306
3	153
3	51
17	17
	1

$$\therefore 2448 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 17$$

(d) 2907

3	2907
3	969
17	323
19	19
	1

$$\therefore 2907 = 3 \times 3 \times 17 \times 19$$

2. Find the smallest number having four different prime factors.

**(Hint :** First four prime numbers are 2, 3, 5, 7.)

We know that,

First four prime numbers are :

2, 3, 5, 7

So, The required number  $= 2 \times 3 \times 5 \times 7 = 210$ .

Hence, The required number is 210.

3. Write the smallest 4-digit number and find its prime factors.

The smallest 4-digit number = 1000

Now,

2	1000
2	500
2	250
5	125
5	25
5	5
	1

$$\therefore 1000 = 2 \times 2 \times 2 \times 5 \times 5 \times 5$$

4. Write the greatest 6-digit number and find its prime factors.

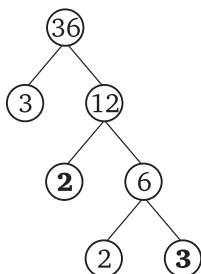
Now,

2	999999
2	333333
2	111111
5	37037
5	5291
5	481
	37
	1

$$\therefore 999999 = 3 \times 3 \times 3 \times 7 \times 11 \times 13 \times 37$$

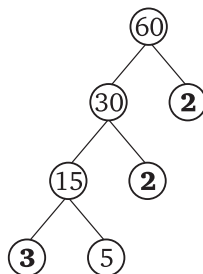
5. Write the missing numbers :

(a)



$\therefore$  Required numbers are 2, 3.

(b)



$\therefore$  Required numbers are :  
2, 2, 3

6. Find, whether the first number is a factor of the second number or not :
- (a) 6, 48  
Yes, 6 is a factor of 48.
- (b) 13, 40  
No, 13 is not a factor of 40.
- (c) 7, 42  
Yes, 7 is a factor of 42.
- (d) 14, 60  
No, 14 is not a factor of 60.
7. Express each as the sum of three odd prime numbers :
- (a)  $31 = 7 + 11 + 13$
- (b)  $35 = 7 + 11 + 17$
- (c)  $41 = 5 + 17 + 19$
8. Write the greatest prime number less than or equal to the following numbers :
- (a) 67  
The greatest prime number less than or equal to 67 is 67.
- (b) 78  
The greatest prime number less than or equal to 78 is 73.
- (c) 101  
The greatest prime number less than or equal to 101 is 101.
9. Write all multiples of :
- (a) 7 between 70 and 90  
All the multiples of 7 between 70 and 90 are : 77, 84.
- (b) 21 between 100 and 200  
All the multiples of 21 between 100 200 are :  
105, 126, 147, 168, 189.
10. Can the product of two prime numbers be prime? If yes, give an example.  
No, the product of two prime numbers is a composite number.
11. Write all the prime numbers between 30 and 50.  
All the prime numbers between 30 and 50 are :  
31, 37, 41, 43, 47
12. How many even prime numbers are there in the set of natural numbers? List them.  
Only one i.e., 2.
14. State whether the following statements are true or false :
- (a) True      (b) False      (c) False      (d) True  
(e) False      (f) False      (g) False      (h) True

## Exercise 4.2

1. Which of the following numbers are divisible by 2 ?
  - (a) 989400  
In, 989400, last digit is 0, so it is divisible by 2.
  - (b) 177316  
In 177316, last digit is 6, so it is divisible by 2.
  - (c) 237897  
In 237897, last digit is 7, which is not even, so it is not divisible by 2.
2. Which of the following numbers are divisible by 3 ?
  - (a) 50802  
Here, sum of digits =  $5 + 0 + 8 + 0 + 2 = 15$   
Which is multiple of 3. So 50802 is divisible by 3.
  - (b) 854784  
Here, sum of digits =  $8 + 5 + 4 + 7 + 8 + 4 = 36$   
 $\therefore$  36 is multiple of 3. So, 854784 is divisible by 3.
  - (c) 400083  
here, sum of digits =  $4 + 0 + 0 + 0 + 8 + 3 = 15$   
 $\therefore$  15 is multiple of 3. So, 400083 is divisible by 3.
3. Test the divisibility of the following numbers by 4 :
  - (a) 63720  
In 63720, the number formed by last two digit is 20, which is divisible by 4.  
So, 63720 is divisible by 4.
  - (b) 79832  
In 79832, the number formed by last two digit is 32, which is divisible by 4.  
So, 79832 is divisible by 4.
  - (c) 66666  
In 66666, the number formed by last two digit is 66, which is not divisible by 4.  
So, 66666 is not divisible by 4.
4. Which of the following numbers are divisible by 5 ?
  - (a) 680031  
In 680031, the last digit is 1.

So, 680031 is not divisible by 5.

(b) 1006550

In 1006550, the last digit is 0.

So, 1006550 is divisible by 5.

(c) 735070

In 735070, the last digit is 0.

So, 735070 is divisible by 5.

5. Test the divisibility of the following numbers by 6 :

(a) 33675

In 33675, the last digit is 5, which is not divisible by 2.

So, 33675 is not divisible by 6.

(b) 55770

In 55770, the last digit is 0.

$\therefore$  55770 is divisible by 2.

Sum of digits of 55770 =  $5 + 5 + 7 + 7 + 0 = 24$ ,  
which is divisible by 3.

Since, 55770 is divisible by both 2 and 3.

So, 55770 is divisible by 6.

(c) 42174

In 42174, the last digit is 4. So, 42174 is divisible by 2.

Sum of digits of 42174 =  $4 + 2 + 1 + 7 + 8 = 18$ ,  
which is divisible by 3.

Since, 42174 is divisible by both 2 and 3.

So, 42174 is divisible by 6.

6. Test the divisibility of the following numbers by 8 :

(a) 837092

In 837092, the number formed by last three digit is 092,  
which is not divisible by 8.

(b) 1000

In 1000, the number formed by last three digit is 000, which  
is divisible by 8.

(c) 989264

In 989264, the number formed by last three digits is 264,  
which is divisible by 8.

So, 989264 is divisible by 8.

7. Test the divisibility of the following numbers by 9 :

(a) 835686

In 835686, the sum of all digits =  $8 + 3 + 5 + 6 + 8 + 6 = 36$ , which is divisible by 9.

So, 835686 is divisible by 9.

(b) 96525

In 96525, the sum of all digits =  $9 + 6 + 5 + 2 + 5 = 27$ , which is divisible by 9.

So, 96525 is divisible by 9.

(c) 297351

In 297351, the sum of all digits =  $2 + 9 + 7 + 3 + 5 + 1 = 27$ , which is divisible by 9.

So, 297351 is divisible by 9.

8. Which of the following numbers are divisible by 10 ?

(a) 93640

In 93640, the last digit is 0.

So, 93640 is divisible by 10.

(b) 26570

In 26570, the last digit is 0.

So, 26570 is divisible by 10.

(c) 207000

In 207000, the last digit is 0.

So, 207000 is divisible by 10.

9. Test the divisibility of the following numbers by 11 :

(a) 97834

In 97834, sum of digits at odd places =  $4 + 8 + 9 = 21$

Sum of digits at even places =  $3 + 7 = 10$

Difference of these sums =  $21 - 10 = 11$ , which is multiple of 11.

So, 97834 is divisible by 11.

(b) 446321

In 446321, sum of digits at odd places =  $1 + 3 + 4 = 8$

Sum of digits at even places =  $2 + 6 + 4 = 12$

Difference of these sums =  $12 - 8 = 4$ , which is not multiple of 11.

So, 446321 is not divisible by 11.

(c) 201351

In 201351, sum of digits at odd places =  $1 + 3 + 0 = 4$ ,

Sum of digits at even places =  $5 + 1 + 2 = 8$ .

Difference of these sums =  $8 - 4 = 4$ ,

which is not multiple of 11.

So, 201351 is not divisible by 11.

(d) 38353

In 38353, sum of digits at odd places =  $3 + 3 + 3 = 9$ .

Sum of digits at even places =  $5 + 8 = 13$

Difference of these sums =  $13 - 9 = 4$ ,

which is not multiple of 11.

So, 38353 is not divisible by 11.

(e) 11111

In 11111, Sum of digits at odd place =  $1 + 1 + 1 = 3$ ,

Sum of digits at even places =  $1 + 1 = 2$

Difference of these sums =  $3 - 2 = 1$ ,

which is not multiple of 11.

So, 11111 is not divisible by 11.

(f) 999999

In 999999, sum of digits at odd places =  $9 + 9 + 9 = 27$ ,

Sum of digits at even places =  $9 + 9 + 9 = 27$

Difference of these sums =  $27 - 27 = 0$ ,

So, 999999 is divisible by 11.

10. Which of the following are prime numbers ?

(a) 167

Given number = 167

Test the divisibility of 167 by each of the prime numbers 2, 3, 5, 7, 11, 13, 17 and 19.

We find that 167 is not divisible by any of these prime numbers.

So, 167 is a prime number.

(b) 179

Test the divisibility of 179 by each of the prime numbers 2, 3, 5, 7, 11, 13, 17 and 19.

We find that 179 is not divisible by any of these prime numbers.

So, 179 is a prime number.

(c) 267

Given number = 267

Test the divisibility of 267 by each of the prime numbers 2, 3, 5, 7, 11, 13, 17 and 19.

We find that 267 is divisible by 3.

So, 267 is not a prime number.

(d) 353

Test the divisibility of 353 by each of the prime numbers 2, 3, 5, 7, 11, 13, 17 and 19.

We find that 353 is not divisible by any of these prime numbers.

So, 353 is a prime number.

**11.** In each of the following numbers, replace  $y$  by the smallest numbers to make it divisible by 3 :

(a) 54 y 106

Here,  $5 + 4 + y + 1 + 0 + 6 = y + 16$

Let  $y + 16 = 18 \Rightarrow y = 18 - 16 = 2$

$\therefore$  the required value of  $y$  is 2.

(b) 237 y 48

Here,  $2 + 3 + 7 + y + 4 + 8 = 24 + y$

Let  $y + 24 = 24 \Rightarrow y = 24 - 24 = 0$

$\therefore$  the required value of  $y$  is 0.

**12.** In each of the following numbers, replace  $y$  by the smallest number to make it divisible by 9 :

(a) 53 y 88

Here,  $5 + 3 + y + 8 + 8 = y + 24$

Let  $y + 24 = 27 \Rightarrow y = 27 - 24 = 3$

So, the required value of  $y$  is 3.

(b) 667 y 48

Here,  $6 + 6 + 7 + y + 4 + 8 = y + 31$

Let  $y + 31 = 36 \Rightarrow y = 36 - 31 = 5$

So, the required value of  $y$  is 5.

**13.** In each of the following numbers, replace  $y$  by the smallest number to make it divisible by 11 :

(a) 90208 y 14

In 90208 y 14, sum of digits at odd places  $= 4 + y + 0 + 0$   
 $= y + 4$

Sum of digits at even places  $= 1 + 8 + 2 + 9$   
 $= 20$

Difference of these sums  $= 20 - y - 4 = 16 - y$

Let,  $16 - y = 11$

$$\Rightarrow -y = 11 - 16 \quad \Rightarrow \quad -y = -5 \quad \Rightarrow \quad y = 5$$

So, the required value of  $y$  is 5.

(b) 8 y 3423

In 8y3423, sum of digits at odd places  $= 3 + 4 + y$   
 $= y + 8$

Sum of digits at even places  $= 2 + 3 + 8 = 13$

Difference of these sums  $= y + 7 - 13 = y - 6$

Let,  $y - 6 = 0 \quad \Rightarrow \quad y = 6$

So, the required value of  $y$  is 6.

### Exercise 4.3

1. Find the H.C.F. of the numbers in each of the following, using the prime factorisation method :

(a) 120, 162 and 270

The prime factors of the numbers.

2	120	2	162	2	270
2	60	3	81	3	135
2	30	3	27	3	45
3	15	3	9	3	15
5	5	3	3	5	5
	1		1		1

$$\therefore 120 = 2 \times 2 \times 2 \times 3 \times 5$$

$$162 = 2 \times 3 \times 3 \times 3 \times 3$$

$$270 = 2 \times 3 \times 3 \times 3 \times 5$$

The common factors are 2 and 3.

$$\therefore \text{HCF} = 2 \times 3 = 6$$

So, HCF of 120, 162 and 270 is 6.

(b) 81 and 117

The prime factors of the numbers.

3	81	2	117
3	27	3	39
3	9	3	13
3	3	3	1
	1		

$$\therefore 81 = 3 \times 3 \times 3 \times 3$$

$$117 = 3 \times 3 \times 13$$

Here, common factors are : 3, 3.

$$\therefore \text{HCF} = 3 \times 3 = 9$$

So, the HCF of 81 and 117 is 9.

(c) 234, 519 and 786

The prime factors of the numbers

2	234	3	519	2	786
3	117	173	173	3	393
3	39		1	3	131
13	13			3	1
	1				

$$\therefore 234 = 2 \times 3 \times 3 \times 13$$

$$519 = 3 \times 173$$

$$786 = 2 \times 3 \times 131$$

Here, the common factor is 2.

So, the HCF of 234, 519 and 786 is 3.

(d) 1794, 2346 and 4761.

The prime factors of the numbers :

2	1794	2	2346	3	4761
3	897	3	1173	3	1587
13	299	3	391	23	529
23	23	3	23	23	23
	1		1		1

$$\therefore 1794 = 2 \times 3 \times 13 \times 23$$

$$2346 = 2 \times 3 \times 17 \times 23$$

$$4761 = 3 \times 3 \times 23 \times 23$$

Here, the common factors are 3 and 23.

$$\therefore \text{HCF} = 3 \times 23 = 69$$

So, The HCF of 1794, 2346 and 4761 is 69.

2. Find the H.C.F. of the following numbers by division method :

(a) 289, 391 and 884

First we find HCF of 289 and 391

$$\begin{array}{r} 289 \overline{) 391} (1 \\ \underline{-289} \phantom{00} \\ 102 \overline{) 289} (2 \\ \underline{-204} \phantom{00} \\ 85 \overline{) 102} (1 \\ \underline{-85} \phantom{00} \\ 17 \overline{) 85} (5 \\ \underline{-85} \phantom{00} \\ 0 \end{array}$$

$\therefore$  HCF of 289 and 391 is 17.

Now, we find HCF of 17 and 884.

$$\begin{array}{r} 17 \overline{) 884} (52 \\ \underline{-85} \phantom{00} \\ 34 \\ \underline{-34} \phantom{00} \\ 0 \end{array}$$

So, the HCF of 289, 391 and 884 is 17.

(b) 1197, 5320, 4389

First we find HCF of 1197 and 5320.

$$\begin{array}{r} 1197 \overline{) 5320} (4 \\ \underline{-4788} \phantom{00} \\ 532 \overline{) 1197} (2 \\ \underline{-1064} \phantom{00} \\ 133 \overline{) 532} (4 \\ \underline{-532} \phantom{00} \\ 0 \end{array}$$

$\therefore$  HCF of 1197 and 5320 is 133.

Now, we find HCF of 133 and 4389.

$$\begin{array}{r}
 133 \overline{) 4389} \left( 33 \right. \\
 \underline{-399} \downarrow \\
 399 \\
 \underline{-399} \\
 0
 \end{array}$$

So, the HCF of 1197, 5320 and 4389 is 133.

(c) 513, 621 and 783

First we find the HCF of 513 and 621.

$$\begin{array}{r}
 513 \overline{) 621} \left( 1 \right. \\
 \underline{-513} \\
 108 \overline{) 513} \left( 4 \right. \\
 \underline{-432} \\
 81 \overline{) 108} \left( 1 \right. \\
 \underline{-81} \\
 27 \overline{) 81} \left( 3 \right. \\
 \underline{-81} \\
 0
 \end{array}$$

∴ HCF of 513 and 621 is 27.

Now, we find the HCF of 27 and 783.

$$\begin{array}{r}
 27 \overline{) 783} \left( 29 \right. \\
 \underline{-54} \downarrow \\
 243 \\
 \underline{-243} \\
 0
 \end{array}$$

So, the HCF of 513, 621 and 783 is 27.

(d) 1760, 4048, 3696 and 7568.

First we find HCF of 1760 and 4048.

$$\begin{array}{r}
 1760 \overline{) 4048} \left( 2 \right. \\
 \underline{-3520} \\
 528 \overline{) 1760} \left( 3 \right. \\
 \underline{-1584} \\
 176 \overline{) 528} \left( 3 \right. \\
 \underline{-528} \\
 0
 \end{array}$$

∴ HCF of 1760 and 4048 is 176.

Now, we find HCF of 3696 and 7568.

$$\begin{array}{r}
 3696 \overline{) 7568} \left( 2 \right. \\
 \underline{-7392} \phantom{00} \\
 176 \overline{) 3696} \left( 3 \right. \\
 \underline{-352} \phantom{00} \\
 176 \\
 \underline{-176} \\
 0
 \end{array}$$

In last we find HCF of 176 and 176.

$$\begin{array}{r}
 176 \overline{) 176} \left( 1 \right. \\
 \underline{-176} \\
 0
 \end{array}$$

3. Reduce each of the following fractions to the lowest terms :

(a)  $\frac{399}{437}$

First, we find HCF of 399 and 437.

$$\begin{array}{r}
 399 \overline{) 437} \left( 1 \right. \\
 \underline{-399} \phantom{00} \\
 38 \overline{) 399} \left( 1 \right. \\
 \underline{-38} \phantom{00} \\
 19 \overline{) 38} \left( 2 \right. \\
 \underline{-38} \\
 \times
 \end{array}$$

$$\therefore \frac{399 \div 19}{437 \div 19} = \frac{21}{23}$$

Hence, the lowest term is  $\frac{21}{23}$ .

(b)  $\frac{296}{480}$

First we find HCF of 296 and 480.

$$\begin{array}{r}
 296 \overline{)480} (1 \\
 \underline{-296} \\
 184 \overline{)184} (1 \\
 \underline{-112} \\
 72 \overline{)112} (1 \\
 \underline{-72} \\
 40 \overline{)72} (1 \\
 \underline{-40} \\
 32 \overline{)40} (1 \\
 \underline{-32} \\
 8 \overline{)32} (4 \\
 \underline{-32} \\
 \underline{0}
 \end{array}$$

$$\therefore \frac{296 \div 8}{480 \div 8} = \frac{37}{60}$$

Hence, the lowest term is  $\frac{37}{60}$ .

$$\begin{array}{r}
 1794 \overline{)2346} (1 \\
 \underline{-1794} \\
 552 \overline{)1794} (3 \\
 \underline{-1656} \\
 138 \overline{)552} (4 \\
 \underline{-552} \\
 \underline{0}
 \end{array}$$

(c)  $\frac{1794}{2346}$

First, we find HCF of 1794 and 2346.

$$\begin{array}{r}
 2211 \overline{)5025} (1 \\
 \underline{-4422} \\
 603 \overline{)2211} (3 \\
 \underline{-1809} \\
 402 \overline{)603} (1 \\
 \underline{-402} \\
 201 \overline{)402} (2 \\
 \underline{-402} \\
 \underline{0}
 \end{array}$$

(d)  $\frac{2211}{5025}$

First, we find HCF of 2211 and 5025.

$$\therefore \frac{2211 \div 201}{5025 \div 201} = \frac{11}{25}$$

Hence, the lowest term is  $\frac{11}{25}$ .

4. Find the greatest number which divides 1277 and 1368 leaving a remainder of 3 in each case.

Clearly, we must find the greatest number which divides  $(1277 - 3)$  and  $(1368 - 3)$  exactly.

$$\begin{array}{r} 1274 \overline{) 1365} \left( 1 \right. \\ \underline{-1274} \phantom{0} \\ 91 \overline{) 1274} \left( 14 \right. \\ \underline{-91 \downarrow} \phantom{0} \\ 364 \\ \underline{-364} \\ 0 \end{array}$$

So, the required number = HCF of 1274 and 1365 = 91

Hence, the required number is 91.

5. Find the greatest number which divides 404 and 442 leaving a remainder of 5 in each case.

Clearly, we must find the greatest number which divides  $(404 - 5)$  and  $(442 - 5)$ .

$$\begin{array}{r} 399 \overline{) 437} \left( 1 \right. \\ \underline{-399} \phantom{0} \\ 38 \overline{) 399} \left( 1 \right. \\ \underline{-38} \phantom{0} \\ 19 \overline{) 38} \left( 2 \right. \\ \underline{-38} \\ \times \end{array}$$

$\therefore$  The required number = HCF of 399 and 437 = 19

Hence, the required number is 19.

6. Show that the following pairs are co-primes :

(a) 343, 432

First, we find HCF of 343 and 432.

$$\begin{array}{r}
343 \overline{)432} (1 \\
\underline{-343} \phantom{0} \\
89 \overline{)343} (3 \\
\underline{-267} \phantom{0} \\
76 \overline{)89} (1 \\
\underline{-76} \phantom{0} \\
13 \overline{)76} (5 \\
\underline{-65} \phantom{0} \\
11 \overline{)13} (1 \\
\underline{-11} \phantom{0} \\
2 \overline{)11} (1 \\
\underline{-10} \phantom{0} \\
1 \overline{)2} (1 \\
\underline{-2} \phantom{0} \\
0
\end{array}$$

∴ the HCF of 343 and 432 is 1.

So, 343 and 432 are co-primes.

(b) 847, 1014.

First, we find HCF of 847 and 1014.

$$\begin{array}{r}
847 \overline{)1014} (1 \\
\underline{-847} \phantom{0} \\
167 \overline{)847} (5 \\
\underline{-835} \phantom{0} \\
12 \overline{)167} (2 \\
\underline{-12 \downarrow} \phantom{0} \\
47 \phantom{0} \\
\underline{-36} \phantom{0} \\
11 \overline{)12} (1 \\
\underline{-11} \phantom{0} \\
1 \overline{)11} (11 \\
\underline{-11} \phantom{0} \\
0
\end{array}$$

∴ HCF of 847 and 1014 is 1.

Hence, 847 and 1014 are co-primes.

7. Determine the longest tape which can be used to measure exactly the lengths 7 m, 3 m 85 cm and 12 m 95 cm.

Given three lengths one

$$7 \text{ m} = 700 \text{ cm}$$

$$3 \text{ m } 85 \text{ cm} = 385 \text{ cm}$$

and,  $12 \text{ m } 95 \text{ cm} = 1295 \text{ cm}.$

First, we find HCF of 700, 385 and 1295.

$$\begin{array}{r}
 385 \overline{)700} \begin{array}{l} 1 \\ -385 \\ \hline 315 \end{array} \begin{array}{l} 385 \begin{array}{l} 1 \\ -315 \\ \hline 70 \end{array} \begin{array}{l} 315 \begin{array}{l} 4 \\ -280 \\ \hline 35 \end{array} \begin{array}{l} 70 \begin{array}{l} 2 \\ -70 \\ \hline 0 \end{array} \end{array}
 \end{array}$$

Now, we find HCF of 35 and 1295

$$\begin{array}{r}
 35 \overline{)1295} \begin{array}{l} 37 \\ -105 \downarrow \\ \hline 245 \\ -245 \\ \hline 0 \end{array}
 \end{array}$$

Since, HCF of 700, 385 and 1295 is 35.

Hence, the required longest tape is 35 cm.

8. Three farmers have 490 kg, 588 kg and 882 kg of wheat respectively. Find the maximum capacity of a bag so that the wheat can be packed in exact number of bags.

First, we find HCF of 490, 588 and 882.

$$\begin{array}{r}
 490 \overline{)588} \begin{array}{l} 1 \\ -490 \\ \hline 98 \end{array} \begin{array}{l} 490 \begin{array}{l} 1 \\ -490 \\ \hline \times \end{array} \end{array}
 \end{array}$$

Hence, the HCF of 490, 588 and 882 is 98.

So, the required maximum capacity of a bag is 98 kg.

9. The length, breadth and height of a room is 8 m 25 cm, 6 m 75 cm and 4 m 50 cm respectively. Determine the longest tape which can be used to measure the three dimensions of the room exactly.

The length of the room = 8 m 25 cm

$$= 825 \text{ cm}$$

breadth of the room = 6 m 75 cm

$$= 675 \text{ cm}$$

and, height of the room = 4 m 50 cm

Now, we find HCF of 825, 675 and 450.

$$\begin{array}{r} 450 \overline{) 675} ( 1 \\ \underline{-450} \\ 225 \end{array} \quad \begin{array}{r} 450 \overline{) 225} ( 2 \\ \underline{-450} \\ 0 \end{array}$$

$\therefore$  HCF of 450 and 675 is 225.

Again, find HCF of 225 and 825

$$\begin{array}{r} 225 \overline{) 825} ( 3 \\ \underline{-675} \\ 150 \end{array} \quad \begin{array}{r} 225 \overline{) 150} ( 1 \\ \underline{-150} \\ 75 \end{array} \quad \begin{array}{r} 75 \overline{) 150} ( 2 \\ \underline{-150} \\ 0 \end{array}$$

Since, HCF of 825, 675 and 450 is 75.

So, the required longest tape is 75 cm.

10. Find the greatest number that will divide 328, 436 and 544 remainder 7, 8 and 9 respectively.

$$\begin{array}{r} 321 \overline{) 428} ( 1 \\ \underline{-321} \\ 107 \end{array} \quad \begin{array}{r} 321 \overline{) 107} ( 3 \\ \underline{-321} \\ 0 \end{array}$$

Now, find HCF of 107 and 535.

$$\begin{array}{r} 107 \overline{) 535} \left( 5 \right. \\ \underline{-535} \\ 0 \end{array}$$

$\therefore$  HCF of 321, 428 and 535 is 107.

So, the required greatest number is 107.

- 11.** Find the largest number that will divide 445, 572 and 699 leaving remainders 4, 5 and 6 respectively.

Clearly, we must find the greatest number which divides  $(445 - 4)$ ,  $(572 - 5)$  and  $(699 - 6)$ .

$$\begin{array}{r} 441 \overline{) 567} \left( 1 \right. \\ \underline{-441} \\ 126 \overline{) 441} \left( 3 \right. \\ \underline{-378} \\ 63 \overline{) 126} \left( 2 \right. \\ \underline{-126} \\ 0 \end{array}$$

Now, find HCF of 63 and 693

$$\begin{array}{r} 63 \overline{) 693} \left( 29 \right. \\ \underline{-63} \\ 63 \\ \underline{-63} \\ 0 \end{array}$$

So, the required largest number is 63.

- 12.** Three different containers contain 391 litres, 425 litres and 527 litres of milk respectively, find the maximum capacity of a container which can measure the milk of all the containers in exact number of times.

The capacity three containers as, 391 litres, 425 litres and 527 litre. First, we find HCF of 391, 425 and 527.

$$\begin{array}{r}
 391 \overline{) 425} (1 \\
 \underline{-391} \\
 34 \overline{) 391} (11 \\
 \underline{-34} \downarrow \\
 51 \\
 \underline{-34} \\
 17 \overline{) 34} (2 \\
 \underline{-34} \\
 0
 \end{array}$$

Now, we find HCF of 17 and 527

$$\begin{array}{r}
 17 \overline{) 527} (31 \\
 \underline{-51} \downarrow \\
 17 \\
 \underline{-17} \\
 0
 \end{array}$$

So, the required maximum capacity of or container is 17 litres.

### Exercise 4.4

1. Find the L.C.M. using the prime factorization method :

(a) 112, 168 and 266

$$\begin{array}{c|c}
 2 & 112 \\
 \hline
 2 & 56 \\
 \hline
 2 & 28 \\
 \hline
 2 & 14 \\
 \hline
 7 & 7 \\
 \hline
 & 1
 \end{array}$$

$$\begin{array}{c|c}
 2 & 168 \\
 \hline
 2 & 84 \\
 \hline
 2 & 42 \\
 \hline
 3 & 21 \\
 \hline
 7 & 7 \\
 \hline
 & 1
 \end{array}$$

$$\begin{array}{c|c}
 2 & 266 \\
 \hline
 7 & 133 \\
 \hline
 19 & 19 \\
 \hline
 & 1
 \end{array}$$

$$\therefore 112 = 2 \times 2 \times 2 \times 2 \times 7 = 2^4 \times 7^1$$

$$168 = 2 \times 2 \times 2 \times 3 \times 7 = 2^3 \times 3^1 \times 7^1$$

$$266 = 2 \times 7 \times 19 = 2^1 \times 7^1 \times 19^1$$

$$\text{So, LCM of 112, 168 and 266} = 2^4 \times 3^1 \times 7^1 \times 19^1$$

$$= 16 \times 3 \times 7 \times 19$$

$$= 48 \times 13$$

$$= 6384$$

(b) 162, 132, and 108

We have,

2	162
3	81
3	27
3	9
3	3
	1

2	132
2	66
3	33
11	11
	1

2	108
2	54
3	27
3	9
3	3
	1

$$\therefore 162 = 2 \times 3 \times 3 \times 3 \times 3 = 2^1 \times 3^4$$

$$132 = 2 \times 2 \times 3 \times 11 = 2^3 \times 3^1 \times 11^1$$

$$108 = 2 \times 2 \times 3 \times 3 \times 3 = 2^2 \times 3^3$$

So, LCM of 162, 132 and 108

$$= 2^2 \times 3^4 \times 11^1$$

$$= 4 \times 81 \times 11$$

$$= 4 \times 891$$

$$= 3564$$

(c) 64, 72, 96

We have

2	64
2	32
2	16
2	8
2	4
2	2
	1

2	72
2	36
2	18
3	9
3	3
	1

2	96
2	48
2	24
2	12
2	6
3	3
	1

$$\therefore 64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^6$$

$$72 = 2 \times 2 \times 2 \times 3 \times 3 = 2^3 \times 3^2$$

$$96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 = 2^5 \times 3^1$$

So, LCM of 64, 72 and 96 =  $2^6 \times 3^2 = 64 \times 9$

$$= 576$$

- (d) 108, 96, 72, 54 and 36

We have,

$\begin{array}{r l} 2 & 108 \\ \hline 2 & 54 \\ 3 & 27 \\ 3 & 9 \\ 3 & 3 \\ \hline & 1 \end{array}$	$\begin{array}{r l} 2 & 96 \\ \hline 2 & 48 \\ 2 & 24 \\ 2 & 12 \\ 2 & 6 \\ 3 & 3 \\ \hline & 1 \end{array}$	$\begin{array}{r l} 2 & 72 \\ \hline 2 & 36 \\ 2 & 18 \\ 3 & 9 \\ 3 & 3 \\ \hline & 1 \end{array}$	$\begin{array}{r l} 2 & 54 \\ \hline 3 & 27 \\ 3 & 9 \\ 3 & 3 \\ \hline & 1 \end{array}$	$\begin{array}{r l} 2 & 36 \\ \hline 2 & 18 \\ 3 & 9 \\ 3 & 3 \\ \hline & 1 \end{array}$
---	--	--	--	--

$$\therefore 108 = 2^2 \times 3^3$$

$$96 = 2^5 \times 3^1$$

$$72 = 2^3 \times 3^2$$

$$54 = 2^1 \times 3^3$$

$$36 = 2^2 \times 3^2$$

$$\text{So, LCM of 108, 96, 72, 54 and 36} = 2^5 \times 3^3$$

$$= 32 \times 27$$

$$= 864$$

2. Find the L.C.M. using the division method :

(a) 24, 19, 40, 60

(b) 117, 221

(c) 234, 572

(d) 5, 10, 12, 15, 18, 25 and 30.

3. Find the H.C.F. and L.C.M. of the following numbers :

(a) 450 and 1150

First find HCF of 450 and 1150.

$$\begin{array}{r}
 450 \overline{) 1150} \left( 2 \right. \\
 \underline{-900} \\
 250 \overline{) 450} \left( 2 \right. \\
 \underline{-250} \\
 200 \overline{) 250} \left( 1 \right. \\
 \underline{-200} \\
 50 \overline{) 200} \left( 4 \right. \\
 \underline{-200} \\
 0
 \end{array}$$

$\therefore$  HCF of 450 and 1150 is 50.

$$\therefore \text{LCM of (450 and 1150)} = \frac{450 \times 1150}{50}$$

$$(\because \text{HCF} \times \text{LCM} = \text{Product of numbers}) = 450 \times 23 = 10350$$

(b) 720 and 1296

First, we find HCF of 720 and 1296.

$$\begin{array}{r} 720 \overline{) 1296} \left( 1 \right. \\ \underline{-720} \phantom{00} \\ 576 \overline{) 720} \left( 1 \right. \\ \underline{-576} \phantom{00} \\ 144 \overline{) 576} \left( 4 \right. \\ \underline{-576} \phantom{00} \\ 0 \end{array}$$

$\therefore$  HCF of 720 and 1296 is 144

$$\text{and, LCM} = \frac{\text{1st number} \times \text{2nd number}}{\text{HCF}}$$

$$\begin{aligned} &= \frac{10^5 \cancel{720} \times 1296}{144 \cancel{1}} \\ &= 5 \times 1296 \\ &= 6480 \end{aligned}$$

Hence, HCF = 144

and, LCM = 6480

(c) 1152, 1664

First, we find HCF of 1152 and 1664.

$$\begin{array}{r} 1152 \overline{) 1664} \left( 1 \right. \\ \underline{-1152} \phantom{00} \\ 512 \overline{) 1152} \left( 2 \right. \\ \underline{-1024} \phantom{00} \\ 128 \overline{) 512} \left( 4 \right. \\ \underline{-512} \phantom{00} \\ 0 \end{array}$$

(d) 861 and 1353

First, we find HCF of 861 and 1353.

$$\begin{array}{r}
 861 \overline{) 1353} \left( 1 \right. \\
 \underline{-861} \\
 492 \overline{) 861} \left( 1 \right. \\
 \underline{-492} \\
 369 \overline{) 492} \left( 1 \right. \\
 \underline{-369} \\
 123 \overline{) 369} \left( 3 \right. \\
 \underline{-369} \\
 0
 \end{array}$$

$$\therefore \text{HCF} = 123$$

$$\text{and, LCM} = \frac{\text{Product of numbers}}{\text{HCF}}$$

$$\begin{array}{r}
 7 \overline{) 287} \\
 \underline{861} \times 1353 \\
 123 \\
 \underline{411}
 \end{array}$$

$$= 7 \times 1353 = 9471$$

Hence, HCF = 123 and, LCM = 9471

4. The H.C.F. of two numbers is 145 and their L.C.M. is 2175. If one of the numbers is 725, find the other number.

Given,

HCF = 145, LCM = 2175 and one number 725.

Let other number be 'x'.

$$\begin{array}{r}
 \therefore 'x' = \frac{\text{LCM} \times \text{HCF}}{\text{one number}} \\
 = \frac{2175 \times 145}{725}
 \end{array}$$

$$'x' = \frac{2175}{5} = 435$$

So, the other number is 435.

5. The L.C.M. of two numbers is 32 and their product is 128, determine their H.C.F.

Given,

LCM = 32, Product of two numbers = 128

HCF = ?

We have,

$$\begin{aligned} \text{HCF} &= \frac{\text{Product of two numbers}}{\text{LCM}} \\ &= \frac{\overset{32}{\cancel{128}}}{\underset{8}{\cancel{32}}} = \frac{32^4}{8_1} = 4 \end{aligned}$$

So, the required HCF is 4.

6. The H.C.F. of two numbers is 16 and their product is 3072. Find their L.C.M.

Given,

HCF = 16, Product of numbers = 3072, LCM = ?

We have,

$$\text{LCM} = \frac{\text{Product of numbers}}{\text{HCF}}$$

$$\text{LCM} = \frac{\overset{768}{\cancel{3072}}}{\underset{4}{\cancel{16}}} = \frac{768}{4} = 192$$

So, the required LCM is 192.

7. Determine the two numbers nearest to 10,000 which are exactly divisible by 2, 3, 4, 5, 6 and 7.

First, we find the LCM of 2, 3, 4, 5, 6 and 7.

2	2, 3, 4, 5, 6, 7
2	1, 3, 2, 5, 3, 7
3	1, 3, 1, 5, 3, 7
5	1, 1, 1, 5, 1, 7
7	1, 1, 1, 1, 1, 7
	1, 1, 1, 1, 1, 1

$$\begin{aligned} \therefore \text{LCM of given numbers} &= 2 \times 2 \times 3 \times 5 \times 7 \\ &= 60 \times 7 = 420 \end{aligned}$$

Now smallest 5-digit number = 10,000

We find that when is divided by 420.

$$\begin{array}{r} 420 \overline{) 10000} \left( 31 \right. \\ \underline{-840} \phantom{0} \\ 1600 \\ \underline{-1260} \\ 340 \end{array}$$

Here, remainder is 340.

So, required first number =  $10000 - 420 = 9660$

and, second number =  $9660 + 420$

$$= 10080$$

8. Find the greatest number of five digits exactly divisible by 5, 10, 15, 20 and 25.

First we find LCM of 5, 10, 15, 20 and 25.

$$\begin{array}{r|l} 2 & 5, 10, 15, 20, 25 \\ \hline 2 & 5, 5, 15, 10, 25 \\ \hline 3 & 5, 5, 15, 5, 25 \\ \hline 5 & 5, 5, 5, 5, 25 \\ \hline 5 & 1, 1, 1, 1, 5 \\ \hline & 1, 1, 1, 1, 1 \end{array}$$

$$\therefore \text{LCM of given numbers} = 2 \times 2 \times 3 \times 5 \times 5$$

$$= 60 \times 5$$

$$= 300$$

Now, 5-digit least number = 10000

$\therefore$  We find remainder, when is divided by 300.

$$\begin{array}{r} 300 \overline{) 10000} \left( 33 \right. \\ \underline{-900} \phantom{0} \\ 1000 \\ \underline{-900} \\ 100 \end{array}$$

$$\therefore \text{Remainder} = 100$$

So, the required 5-digit greatest number =  $10000 - 100 + 300$   
 $= 9900 + 300 = 10200$ .

Hence, the required number is 10200.

9. Three bells ring at intervals of 6, 8 and 20 minutes. They ring simultaneously at 8 am. At what time will they ring together?

First, we find LCM of 6, 8 and 20.

2	6, 8, 20
2	3, 4, 10
3	3, 2, 5
5	3, 1, 5
5	1, 1, 5
	1, 1, 1

$$\begin{aligned}\therefore \text{LCM of 6, 8, and 20} &= 2 \times 2 \times 2 \times 3 \times 5 \\ &= 24 \times 5 \\ &= 120\end{aligned}$$

$\therefore$  Required time = 120 minutes

Hence, the required time = 8 a.m. + 120 minutes  
 $= 8 \text{ a.m.} + 2 \text{ hours}$   
 $= 10 : 00 \text{ a.m.}$

10. Find the least number of five digits which on dividing by 4, 12, 20 and 24 leaves remainder 3 in each case.

First, we find LCM of 4, 12, 20 and 24.

2	4, 12, 20, 24
2	2, 6, 10, 12
3	1, 3, 5, 6
3	1, 1, 5, 1
5	1, 1, 5, 1
	1, 1, 1, 1

$$\begin{aligned}\therefore \text{LCM} &= 2 \times 2 \times 2 \times 3 \times 5 \\ &= 24 \times 5 = 120\end{aligned}$$

According to question, we divided 10000 by  $(120 + 3 = 123)$ , and find remainder.

$$\begin{array}{r}
 123 \overline{) 10000} \left( 81 \right. \\
 \underline{-984} \downarrow \\
 160 \\
 \underline{-123} \\
 37
 \end{array}$$

$$\therefore \text{remainder} = 37$$

$$\begin{aligned}
 \therefore \text{the required number} &= 10000 + 120 - 37 \\
 &= 10120 - 37 \\
 &= 10,083
 \end{aligned}$$

Hence, the required number is 10083.

- 11.** What is the smallest number which when divided by 16, 24, 40 leaves a remainder 8 in each case.

First, we find LCM of 16, 24 and 40.

2	16, 24, 40
2	8, 12, 20
3	4, 6, 10
3	2, 3, 5
5	1, 3, 5
5	1, 1, 5
	1, 1, 5

$$\begin{aligned}
 \therefore \text{LCM} &= 2 \times 2 \times 2 \times 2 \times 3 \times 5 \\
 &= 48 \times 5 = 240
 \end{aligned}$$

$$\text{So, the required number} = 240 + 8 = 248$$

Hence, the required number is 248.

- 12.** What is the smallest number that both 33 and 39 divides leaving remainders of 5 in each case.

First, we find LCM of 33 and 39.

3	33, 39
11	11, 13
13	1, 13
	1, 1

$$\therefore \text{LCM} = 3 \times 11 \times 13 = 33 \times 13 = 429$$

So, the required number =  $429 + 5 = 435$

Hence, the required number is 434.

13. A boy saves ₹ 4.65 daily. Find the least number of days in which he will be able to save an exact number of rupees.

We have,

$$\begin{aligned}\text{₹ } 4.65 &= (4.65 \times 100) \text{ p} = 465.00 \text{ p} \\ &= 465 \text{ paise}\end{aligned}$$

Then, we find LCM of 465 and 100.

2	465, 100
2	465, 50
3	465, 25
5	155, 25
5	31, 5
31	31, 1
	1, 1

$$\begin{aligned}\therefore \text{LCM} &= 2 \times 2 \times 3 \times 5 \times 5 \times 31 \\ &= 60 \times 155 \\ &= 9300\end{aligned}$$

So, the boy saves 9300 paise.

Hence, the least number of days required to save 9300 paise

$$= 9300 \div 465$$

$$= 20$$

So, the required number of days are 20.

14. The circumference of the wheels of a carrier are 3m 25cm and 5m. What is the least distance in which both wheels make an exact number of revolutions?

Here,

$$3\text{m } 25\text{ cm} = 325\text{ cm}$$

$$5\text{ m} = 500\text{ cm}$$

Now, we find LCM of 325 and 500.

2	325, 500
2	325, 250
5	325, 125
5	65, 25
5	13, 5
13	13, 1
	1, 1

$$\begin{aligned}\therefore \text{LCM} &= 2 \times 2 \times 5 \times 5 \times 5 \times 13 \\ &= 100 \times 65 \\ &= 6500\end{aligned}$$

So, the required least distance to make exact number of revolutions  
 $= 6500\text{ cm}$   
 $= 65\text{ m}$

## Mental Ability

### A. Multiple Choice Questions :

1. (a) 2. (c) 3. (a) 4. (a) 5. (d) 6. (b) 7. (a) 8. (d)

### B. Fill in the blanks :

- 1 is neither a **prime number** nor a composite number.
- The smallest prime number is **2**.
- The smallest even prime is **2**.
- The smallest composite number is **4**.
- The total number of prime numbers up to 100 is **25**.

**C. Match the items in column A with the items in column B :**

1. (ii) 2. (iv) 3. (i) 4. (iii)

**D. True/False :**

1. T 2. F 3. T 4. F 5. T 6. F

**E. Solve the quiz/puzzle :**

Across → FACTOR, EVEN, TEN, MULTIPLE

Down → FIVE, LCM, THREE, NINE

**Higher Order Thinking Skills (HOTS)**

**1. Given,**

Four digits are 2, 4, 5 and 6.

According to question.

Let required number = 6254.

Which is divisible by 4 when,

By interchanging first and last digit,

The new number = 4256

its omitted one's digit the number becomes 425.

which is divisible by 5.

Hence, the number is 6254.

**2. Let  $x = 2$ , then,**

$$x = 2$$

$$2x = 2 \times 2 = 4$$

$$3x = 3 \times 2 = 6$$

and,  $7x = 7 \times 2 = 14$

So, we find HCF of 2, 4, 6 and 14.

Now, by prime factorising

$$2 = 1 \times 2$$

$$4 = 1 \times 2 \times 2$$

$$6 = 1 \times 2 \times 3$$

$$14 = 1 \times 2 \times 7$$

$\therefore$  HCF of 2, 4, 6 and 14 =  $1 \times 2 = 2$ .

## Exercise 5.1

1. Find the ratio of the following in the lowest form :

- (a) 75 paise to 25 paise

75 paise, 25 paise

$$\therefore \text{ratio} = \frac{\cancel{75}^3}{\cancel{25}_1} = \frac{3}{1} = 3 : 1$$

- (b) 3 m 5 cm to 35 cm

First convert both numbers with same unit.

$$3 \text{ m } 5 \text{ cm} = 300 \text{ cm} + 5 \text{ cm} = 305 \text{ cm}$$

and, 35 cm = 35 cm

$$\text{Ratio} = \frac{\cancel{305}^{61}}{\cancel{35}_7} = \frac{61}{7} = 61 : 7$$

- (c) 3 dozen to 2 scores

First convert both numbers with same unit.

$$3 \text{ dozen} = 3 \times 12 = 36 \text{ units}$$

$$2 \text{ scores} = 2 \times 20 = 40 \text{ units}$$

$$\text{Ratio} = \frac{\cancel{36}^9}{\cancel{40}_{10}} = \frac{9}{10} = 9 : 10$$

- (d) 8 l to 560 ml

First convert both numbers with same unit

$$\left\{ \begin{array}{l} 8 \text{ l} = 8 \times 1000 \text{ ml} = 8000 \text{ ml} \\ 560 \text{ m} = 560 \text{ ml} \end{array} \right.$$

$$\text{Ratio} = \frac{\cancel{8000}^{\cancel{800}^{100}}}{\cancel{560}_{56}_7} = \frac{100}{7} = 100 : 7$$

- (e) 48 min to 2 hours 50 min

First convert both numbers with same unit.

$$48 \text{ min} = 48 \text{ min}$$

$$2 \text{ hours } 50 \text{ min} = (2 \times 60 + 50) \text{ min}$$

$$= (120 + 50) \text{ min}$$

$$= 170 \text{ min}$$

$$\text{Ratio} = \frac{48}{170} = \frac{24}{85} = 24 : 85$$

- (f) 3 hrs to 5 hrs 20 mins.

First convert both numbers with same unit.

$$3 \text{ hours} = 3 \times 60 \text{ min} = 180 \text{ min}$$

$$5 \text{ hours } 20 \text{ min} = (5 \times 60 + 20) \text{ min} \\ = (300 + 20) \text{ min} = 320 \text{ min}$$

$$\text{Ratio} = \frac{180}{320} = \frac{18}{32} = \frac{9}{16} = 9 : 16$$

2. Fill in the blanks :

$$(a) \frac{3}{5} = \frac{9}{15} = \frac{12}{20} = \frac{15}{25} = \frac{24}{40}$$

$$(b) \frac{2}{7} = \frac{4}{14} = \frac{6}{21} = \frac{20}{70} = \frac{28}{98}$$

3.  $PR$  is a line of length 4.5 cm.  $Q$  is a point on  $PR$ . If  $PQ : QR = 7 : 8$ , find the length of  $PQ$  and  $QR$ .

We have,

$$PR = 4.5 \text{ cm and } PQ : QR = 7 : 8$$

$$\text{Sum of ratios} = 7 + 8 = 15$$

$$\therefore \text{Length of } PQ = \frac{7}{15} \times 4.5^{0.3} \text{ cm}$$

$$= 7 \times 0.3 \text{ cm} = 2.1 \text{ cm}$$

$$\text{and, Length of } QR = \frac{8}{15} \times 4.5^{0.3} \text{ cm}$$

$$= 8 \times 0.3 \text{ cm} = 2.4 \text{ cm}$$

Hence, the required lengths are 2.1 cm and 2.4 cm.

4. Express the following in ratio form :

- (a) A mixture contains 30 litres of milk and 5 litres of water.

$$\text{Milk quantity} = 30 \text{ litres}$$

$$\text{Water quantity} = 5 \text{ litres}$$

$$\therefore \text{ratio of milk to water} = \frac{30}{5} = 6 : 1$$

- (b) The length of a room is triple to its breadth.

Let breadth of the room = 'x' m.

∴ Length of the room = '3x' m

So, the ratio of length of breadth =  $\frac{3x}{1x} = 3 : 1$

- (c) The income and expenditure of a man are respectively ₹ 9000 and ₹ 7500.

Income of a man = ₹ 900

Total expenditure = ₹ 7500

∴ ratio =  $\frac{\cancel{₹ 9000}^6}{\cancel{₹ 7500}_5} = \frac{6}{5} = 6 : 5$

5. Divide ₹ 900 in the ratio 12 : 15 between A and B.

Total money = ₹ 900

Ratio of A and B = 12 : 15 = 4 : 5

∴ Sum of ratios = 4 + 5 = 9

So, Amount of A =  $\frac{4}{9} \times \cancel{₹ 900}^{1000}$   
= ₹ 400

Amount of B =  $\frac{5}{9} \times \cancel{₹ 900}^{1000}$   
= ₹ 500

6. A man travels on a cycle 20 km in  $1\frac{1}{2}$  hours and a car travels 120 km

in 2 hours. Find the ratio of their speeds.

For cycle :

Distance = 20 km and Time =  $\frac{3}{2}$  hours

∴ Speed of cycle =  $\left(20 \div \frac{3}{2}\right)$  km/h  
=  $20 \times \frac{2}{3} = \frac{40}{3}$  km/h

**For car :**

Distance = 120 km and Time = 2 hours

$$\therefore \text{Speed of car} = \frac{120}{2} \text{ km/h} = 60 \text{ km/h}$$

$$\begin{aligned} \text{So, the required ratio} &= \frac{\frac{40}{3}}{\frac{60}{1}} = \frac{40 \times 1}{3 \times 60} \\ &= \frac{4^2}{189} = 2 : 9 \end{aligned}$$

Hence, the required ratio is 2 : 9.

7. Sooaib scored 560 out of 600 and Noshad scored 450 out of 500. Whose performance is better in language of ratio?

$$\text{Sooaib's score} = \frac{560}{600} = \frac{28}{30} = \frac{14}{15}$$

$$\text{and, Noshad's car} = \frac{450}{500} = \frac{45}{50} = \frac{9}{10}$$

Now for compare :

$$\frac{14}{15} \quad \swarrow \quad \searrow \quad \frac{9}{10}$$

$$14 \times 10 = 140$$

$$15 \times 9 = 135$$

$$\text{So, } \frac{14}{15} > \frac{9}{10}$$

Hence, the performance of Sooaib is better.

8. Divide ₹ 1560 among Reena, Raziya and Leeza in the ratio 3 : 4 : 5.

$$\text{Total amount} = ₹ 1560$$

$$\text{Given ratio} = 3 : 4 : 5$$

$$\text{Sum of ratios} = 3 + 4 + 5 = 12$$

$$\begin{aligned} \therefore \text{Amount of Reena} &= \frac{3}{12} \times ₹ 1560 \\ &= ₹ 390 \end{aligned}$$

$$\begin{aligned} \text{Amount of Raziya} &= \frac{4}{12} \times ₹ 1560 \\ &= ₹ 520 \end{aligned}$$

$$\begin{aligned}\text{Amount of Leeza} &= \frac{5}{12} \times \text{₹ } \frac{130}{1560} \\ &= \text{₹ } 650\end{aligned}$$

Hence, the required amounts are ₹ 390, ₹ 520 and ₹ 650.

9. Manoj Sain works in corporate office and earns ₹ 12,500 per month.

His saving per month is ₹ 2500 from his earnings. Find the ratio of :

- his savings to his expenses.
- his savings to his earnings.
- his earnings to his expenditure.

Total earning = ₹ 12500

Saving = ₹ 2500

$$\therefore \text{Expenses} = \text{₹ } 12500 - \text{₹ } 2500 = \text{₹ } 10000$$

$$\begin{aligned}\text{(a) Ratio of savings to expenses} &= \frac{2500}{10000} \\ &= \frac{25}{100} = \frac{1}{4} = 1 : 4\end{aligned}$$

$$\begin{aligned}\text{(b) Ratio of saving to earnings} &= \frac{2500}{12500} \\ &= \frac{25}{125} = 1 : 5\end{aligned}$$

$$\begin{aligned}\text{(c) Ratio of earnings to expenditure} &= \frac{12500}{10000} = \frac{125}{100} \\ &= \frac{5}{4} = 5 : 4\end{aligned}$$

10. To make an alloy, copper and tin are required by weight in the ratio 5 : 2. How much tin is to be added with 31.5 gm of copper to get the alloy?

In an alloy,

Ratio of copper and tin = 5 : 2

Let the required weight of tin = 'x' gm.

According to question,

$$\frac{31.5}{x} = \frac{5}{2}$$

$$\Rightarrow x = \frac{6.3 \times 2}{1} = 6.3 \times 2 = 12.6$$

Hence, the required weight of tin is 12.6 gm.

11. A fruit-seller sells oranges at the rate of ₹ 100 per score and apples at the rate of ₹ 100 per dozen. Find the ratio of the selling price of oranges to apples.

1 score = 20 units

1 dozen = 12 units

So, the required ratio for oranges to apples =  $\frac{20}{12} = \frac{5}{3} = 5 : 3$

Hence, the required ratio is 5 : 3.

12. Which ratio is greater :

- (a) 5 : 8 or 11 : 15 ?

$$5 : 8 = \frac{5}{8} \text{ and } 11 : 15 = \frac{11}{15}$$

Now,

$$\frac{5}{8} \quad \frac{11}{15}$$

$$5 \times 15 = 75$$

$$8 \times 11 = 88$$

$$\text{So, } \frac{5}{8} < \frac{11}{15}$$

Hence, the ratio 11 : 15 is greater.

- (b) 12 : 25 or 25 : 48 ?

$$12 : 25 = \frac{12}{25} \text{ and } 25 : 48 = \frac{25}{48}$$

Now,

$$\frac{12}{25} \quad \frac{25}{48}$$

$$12 \times 48 = 576$$

$$25 \times 25 = 625$$

$$\text{So, } \frac{12}{25} < \frac{25}{48}$$

Hence the ratio 25 : 48 is greater.

## Exercise 5.2

1. Fill the box so that the four numbers are in proportion :

(a) , 16, 5, 40

Let the required number be 'x'.

$$\therefore x : 16 = 5 : 40$$

We know that,

Product of extremes = Product of means

$$x \times 40 = 16 \times 5$$

$$\Rightarrow x = \frac{\cancel{16}^4 \times 5}{\cancel{40}_{10}} = \frac{4 \times \cancel{5}^1}{\cancel{10}_2} = \frac{4^2}{2_1} = 2$$

So, 2, 16, 5, 40 are in proportion.

(b) 5, 7, , 49

Let the required number be 'x'.

$$\therefore 5 : 7 = x : 49$$

We know that,

Product of means = Product of extremes

$$7 \times x = 5 \times 49$$

$$\Rightarrow x = \frac{5 \times \cancel{49}^7}{\cancel{7}_1} = 5 \times 7 = 35$$

Hence, 5, 7, 35, 49 are in proportion.

(c) 24, 6, 48,

Let the required number be 'x'.

$$\therefore 24 : 6 = 48 : x$$

We know that,

Product of extremes = Product of means

$$24 \times x = 6 \times 48$$

$$\Rightarrow x = \frac{6 \times \cancel{48}^2}{\cancel{24}_1} = 6 \times 2 = 12$$

Hence, 24, 6, 48, 12 are in proportion.

(c) 3, , 15, 75

Let the required number be 'x'.

$$\therefore 3 : x = 15 : 75$$

We know that,

Product of means = Product of extremes

$$x \times 15 = 3 \times 75$$

$$\Rightarrow x = \frac{3 \times 75}{15} = 3 \times 5 = 15$$

Hence, 3, 15, 15, 75 are in proportion.

2. Check whether the following numbers are proportion or not :

(a)  $3 : 5 = 15 : 25$

Here, Product of extremes =  $3 \times 25 = 75$

and, Product of means =  $5 \times 15 = 75$

So, product of means = Product of extremes

Hence, given numbers are in proportion.

(b)  $4 : 15 = 16 : 30$

Here,

Product of extremes =  $4 \times 30 = 120$

and, Product of means =  $15 \times 16 = 240$

So, Product of extremes  $\neq$  Product of means

Hence, given numbers are not in proportion.

(c)  $7 : 16 = 28 : 32$

Here,

Product of extremes =  $7 \times 32 = 224$

and, Product of means =  $16 \times 28 = 448$

So, Product of means  $\neq$  Product of extremes

Hence, given number are not in proportion.

(d)  $5 : 24 = 30 : 144$

Here,

Product of extremes =  $5 \times 144 = 720$

and, Product of means =  $24 \times 30 = 720$

So, Product of means = Product of extremes

Hence, given numbers are in proportion.

(e)  $15 : 45 = 75 : 125$

Here, Product of extremes =  $15 \times 125 = 1875$

and, Product of means =  $45 \times 75 = 3375$

So, product of means  $\neq$  Product of extremes

Hence, given numbers are not in proportion.

3. Check whether the given ratios form a proportion or not :

- (a) 600 g to 1 kg and 750 ml to 2l.

First, change the units,

$$1 \text{ kg} = 1000 \text{ g}$$

$$\text{and, } 2\text{l} = 2 \times 1000 \text{ ml} = 2000 \text{ ml}$$

$$\therefore 600 : 1000 = 750 : 2000$$

Now,

$$\text{Product of extremes} = 600 \times 2000 = 1200000$$

$$\text{and, product of means} = 1000 \times 750 = 750000$$

So, Product of extremes  $\neq$  Product of means

Hence, the given ratio are not in proportion.

- (b) 4 days to a week and 400 m to 1 km.

Change the units first,

We have,

$$\text{A week} = 7 \text{ and } 1 \text{ km} = 1000 \text{ m.}$$

$\therefore$  ratio becomes,

$$4 : 7 = 400 : 1000$$

Now,

$$\text{Product of extremes} = 4 \times 1000 = 4000$$

$$\text{and product of means} = 7 \times 400 = 2800$$

So, Product of means  $\neq$  Produce of extremes

Hence, the given ratios are not in proportion.

- (c) 7 mm to 1cm and 70 cm to 1m.

Change the units first.

We have

$$1 \text{ m} = 1000 \text{ mm and } 1 \text{ m} = 100 \text{ cm.}$$

$\therefore$  ration becomes,

$$7 : 10 = 70 : 100$$

$$\text{Now, Product of extremes} = 7 \times 100 = 700$$

$$\text{and, Product of mean} = 10 \times 70 = 700$$

So, Product of extremes = Product of means

Hence, the given ratios are in proportion.

- (d) 30 min to 2 hours and 250 ml to 1 litre.

Change the units first

$$2 \text{ hours} = 2 \times 60 \text{ min} = 120 \text{ min}$$

1 litre = 1000 ml

∴ ratios becomes  $30:120 = 250:1000$

Now, Product of extremes =  $30 \times 1000 = 30,000$

Product of means =  $120 \times 250 = 30000$

So, product of means = Product of extremes

Hence, the given ratios are in proportion.

(e) 2 km to 800 m and ₹ 75 to ₹ 30.

Change the units first

2 km =  $2 \times 1000$  m = 2000 m

∴ ratio becomes,

$2000 : 800 = 75 : 30$

Now, product of extremes =  $2000 \times 30 = 60,000$

and, product of means =  $800 \times 75 = 60,000$

So, Product of means = Product of extremes

Hence, the given ratios are in proportion.

4. Find the values of  $a$ ,  $b$ ,  $c$  and  $d$  so that the following are in proportion :

(a)  $a$ , 30, 40, 60

Given that,

$a$ , 30, 40 and 60 are in proportion.

So, Product of extremes = Product of means

$$a \times 60 = 30 \times 40$$

$$\Rightarrow a = \frac{\cancel{30} \times \cancel{40}^{20}}{\cancel{60}_2}$$

$$\Rightarrow a = 20$$

Hence, the required value of ' $a$ ' is 20.

(b)  $a$ , 24, 32, 48

Given that,

$a$ , 24, 32 and 48 are in proportion.

So product of extremes = Product of means

$$a \times 48 = 24 \times 32$$

$$\Rightarrow a = \frac{\cancel{24} \times \cancel{32}^2}{\cancel{48}_2} = \frac{32}{2} = 16$$

Hence, the required value of ' $a$ ' is 16.

- (c) 10,  $b$ , 24, 60

10,  $b$ , 24 and 60 are in proportion.

So, Product of means = Product of extremes

$$b \times 24 = 10 \times 60$$

$$\Rightarrow b = \frac{\cancel{10}^5 \times \cancel{60}^5}{\cancel{24}_1} = 5 \times 5 = 25$$

Hence, the required value of ' $b$ ' is 25.

- (d) 24,  $b$ , 72, 144

Given that,

24,  $b$ , 72 and 144 are in proportion.

So, Product of means = Product of extremes

$$b \times 72 = 24 \times 144$$

$$\Rightarrow b = \frac{\cancel{24}^1 \times 144}{\cancel{72}_3} = \frac{144}{3} = 48$$

Hence, the required value of ' $b$ ' is 48.

- (e) 12, 48,  $c$ , 36

12, 48,  $c$  and 36 are in proportion.

So, product of means = Product of extremes

$$48 \times c = 12 \times 36$$

$$\Rightarrow c = \frac{\cancel{12}^1 \times 36}{\cancel{48}_4} = \frac{36}{4} = 9$$

Hence, the required value of ' $c$ ' is 9.

- (f) 57, 95,  $d$ , 190

Given that,

57, 95,  $d$  and 190 are in proportion.

So, Product of means = Product of extremes

$$95 \times d = 57 \times 190$$

$$\Rightarrow d = \frac{\cancel{57}^3 \times 190}{\cancel{95}_5} = \frac{3 \times \cancel{190}^{38}}{\cancel{5}_1}$$

$$\Rightarrow d = 3 \times 38 = 114$$

Hence, the required value of ' $d$ ' is 114.

5. Are 4, 6, 9 in proportion?

4, 6 and 9 are said to be in proportion.

$$\text{If } 4 : 6 = 6 : 9$$

$$\Rightarrow 4 : 6 = \frac{\cancel{4}^2}{\cancel{6}_3} = \frac{2}{3}$$

$$\text{and, } 6 : 9 = \frac{\cancel{6}^2}{\cancel{9}_3} = \frac{2}{3}$$

$$\therefore 4 : 6 = 6 : 9$$

Hence, 4, 6 and 9 are in proportion.

6. Find the third term of a proportion whose first, second and fourth terms are respectively 15, 25 and 50.

Let the third term be 'x'.

$$\therefore 15 : 25 = x : 50$$

We have,

Product of means = Product of extremes

$$25 \times x = 15 \times 50$$

$$\Rightarrow x = \frac{15 \times \cancel{50}^2}{\cancel{25}_1} = 15 \times 2 = 30$$

Hence, the required third term is 30.

7. The first, second and third terms of a proportion are respectively 48, 96 and 144. Find its 4th term.

Let the fourth term be 'x'.

$$\therefore 48 : 96 = 144 : x$$

We have,

Product of extremes = Product of means

$$48 \times x = 96 \times 144$$

$$\Rightarrow x = \frac{\cancel{96}^2 \times 144}{\cancel{48}_1} = 2 \times 144 = 288.$$

Hence, the required fourth term is 288.

8. Check whether the following numbers are in continued proportion or not :

(a) 8, 14, 22

For continued proportion, we know that,  
(Square of middle term) = Product of extremes

$$(14)^2 = 196$$

$$8 \times 22 = 176$$

$$\therefore 196 \neq 176$$

Hence, the given numbers are not in continued proportion.

(b) 6, 18, 54

For continued proportion, we know that,

(Middle term)<sup>2</sup> = Product of extremes

$$\therefore (18)^2 = 324$$

$$6 \times 54 = 324$$

$$\Rightarrow 324 = 324$$

Hence, the given number are in continued proportion.

(c) 9, 12, 16

For continued proportion, we know that

(Middle term)<sup>2</sup> = Product of extremes

$$\therefore (12)^2 = 144$$

$$9 \times 16 = 144$$

$$\Rightarrow (12)^2 = 9 \times 16$$

Hence, the given numbers are in continued proportion.

(d) 3, 12, 48

For continued proportion, we know that,

(Middle term)<sup>2</sup> = Product of extremes

$$\therefore (12)^2 = 144$$

$$3 \times 48 = 144$$

$$\Rightarrow (12)^2 = 3 \times 48$$

Hence, the given number are in continued proportion.

(e) 7, 56, 200

For continued proportion, we know that

(Middle term)<sup>2</sup> = Product of extremes

$$\therefore (56)^2 = 3136$$

$$7 \times 200 = 1400$$

$$\Rightarrow (56)^2 \neq 7 \times 200$$

Hence, the given numbers are not in continued proportion.

(f) 5, 10, 20

For continued proportion, we know that,

(Middle term)<sup>2</sup> = Product of extremes

$$\therefore (10)^2 = 100$$

$$5 \times 20 = 100$$

$$\Rightarrow (10)^2 = 5 \times 20$$

Hence, the given numbers are in continued proportion.

9. The ratio of boys and girls students in a school is 5 : 2. If there are 725 boys in the school, how many girls are there?

Let the number of girls in school be 'x'.

Ratio of boys to girls = 5 : 2

Number of boys = 725

According to question,

$$5 : 2 = 725 : x$$

$$\therefore x \times 5 = 2 \times 725$$

$$\Rightarrow x = \frac{2 \times 725}{5} = \frac{1450}{5} = 290$$

Hence, the number of girls in the school are 290.

10. The time of travel and the distance travelled are in proportion. If a car travels 150 km in 3 hours, what is the distance it travels in 7 hours?

Let the required distance to travel in 7 hours be 'x'.

According to the question,

$$150 : 3 = x : 7$$

We have

Product of means = Product of extremes

$$3 \times x = 150 \times 7$$

$$x = \frac{50 \cancel{150} \times 7}{\cancel{3}1} = 50 \times 7$$

$$x = 50 \times 7 = 350$$

Hence, the distance travel in 7 hours is 350 km.

11. The (Ratio of) scale of drawing to floor plan of a house is 1 : 200 :

Ratio of scale of drawing to plan floor = 1 : 200

- (a) What is the actual length and breadth of a room which is shown on the plane 6 cm × 5 cm?

$$\begin{aligned} \therefore \text{the actual length of room} &= 200 \times 6 \text{ cm} = 1200 \text{ cm} \\ &= 12 \text{ m} \end{aligned}$$

$$\begin{aligned} \text{and, the actual breadth of the room} &= 200 \times 5 \text{ cm} \\ &= 1000 \text{ cm} \\ &= 10 \text{ m} \end{aligned}$$

- (b) What will be the length on the drawing whose actual length is 5 metres?

$$\begin{aligned} \text{The length on the drawing whose actual length 6 m} \\ &= 600 \text{ m} \div 200 \\ &= 3 \text{ m} \end{aligned}$$

12. The three numbers 6, 18 and  $y$  are in continued proportion. Find the value of  $y$ .

Given,

Three numbers 6, 18 and  $y$  are in continued proportion.

We know that,

$$(\text{middle term})^2 = \text{product of extremes}$$

$$\Rightarrow (18)^2 = 6 \times y$$

$$\Rightarrow 18 \times 18 = 6 \times y$$

$$\Rightarrow y = \frac{18 \times \cancel{18}^3}{\cancel{6}} = 54$$

Hence, the required value of  $y$  is 54.

13. The three numbers  $x$ , 8 and 64 are in continued proportion. Find the value of  $x$ .

Given,

Three numbers  $x$ , 8 and 64 are in continued proportion,

We know that,

$$(\text{Middle term})^2 = \text{Product of extremes}$$

$$(8)^2 = x \times 64$$

$$\Rightarrow x = \frac{8^1 \times 8}{64_1} = 1$$

Hence, the required value of  $x$  is 1.

14. A man earns ₹ 420 in a week. What is his earnings in a month of 30 days?

Let the earning of a man in a month (30 days) be ₹  $x$ .

According to question,

$$420 : 7 = x : 30$$

We have,

Product of means = Product of extremes

$$7 \times x = 420 \times 30$$

$$\Rightarrow x = \frac{420 \times 30}{7_1} = 60 \times 30 = 1800$$

Hence, the required earning of a man in a month is ₹ 1800.

### Exercise 5.3

1. The cost of 15 cards is ₹ 37.50. Find the cost of 55 cards.

$$\text{Cost of 15 cards} = ₹ 37.50$$

$$\therefore \text{Cost of 1 card} = ₹ 37.50 \div 15$$

$$\therefore \text{Cost of 55 cards} = ₹ \frac{37.50}{15_1} \times 55^{11}$$

$$= ₹ 12.50 \times 11$$

$$= ₹ 137.50$$

Hence, the cost of 55 card is ₹ 137.50.

2. Rakesh can walk 15 km in 3 hours. How far can he walk in 4 hours?

Walking distance covered by Rakesh in 3 hours = 15 km.

$$\therefore \text{Distance covered in 1 hour} = 15 \text{ km} \div 3 \\ = 5 \text{ km}$$

$$\therefore \text{Distance covered by Rakesh in 4 hours} = 5 \times 4 \text{ km} \\ = 20 \text{ km}$$

hence, the required distance is 20 km.

3. Seema earns ₹ 1050 in 7 days. How much will she earn in 30 days?

Seema's earning in 7 days = ₹ 1050

$$\therefore \text{Seema's earning in 1 day} = ₹ 1050 \div 7$$

$$\therefore \text{Seema's earning in 30 days} = ₹ \frac{1050 \times 30}{7} \\ = ₹ 150 \times 30 \\ = ₹ 4500$$

Hence, the required earning is ₹ 4500.

4. The cost of 2 dozen bananas is ₹ 48. What is the cost of 30 bananas?

$$2 \text{ dozen bananas} = 2 \times 12 \text{ bananas} \\ = 24 \text{ bananas}$$

$$\therefore \text{Cost of 24 bananas} = ₹ 48$$

$$\therefore \text{Cost of 1 banana} = ₹ 48 \div 24 \\ = ₹ 2$$

$$\therefore \text{Cost of 30 bananas} = ₹ 2 \times 30 \\ = ₹ 60$$

Hence, the cost of 30 bananas is ₹ 60.

5. 5 boats can accommodate 250 people. How many boats will be required for 700 people?

Boats required for 250 people = 5

$$\therefore \text{Boats required for 1 people} = 5 \div 250$$

$$\therefore \text{Boats required for 700 people} = \frac{5}{250} \times 700 \\ = 70 \div 5 \\ = 14$$

Hence, the required number of boats for 700 people are 14.

6. Light travels  $28 \times 10^3$  km in 1 sec. How long will it take to travel  $210 \times 10^6$  km?

Given,

Light travels  $28 \times 10^3$  km in 1 sec.

$$\begin{aligned}\therefore \text{ Required time for travel to } 210 \times 10^6 \text{ km} \\ &= 210 \times 10^6 \div 28 \times 10^3 \\ &= 7.5 \times 10^3 = 7.5 \times 1000 \\ &= 7500 \text{ sec}\end{aligned}$$

Hence, the required times is 7500 sec.

7. In an army camp there were provisions for 250 mens for 40 days. If another 150 mens join in the camp, how long will the provisions last?

Let the required number of days be 'x'.

According to question,

$$\begin{aligned}250 : 40 &= (250 + 150) : x \\ \Rightarrow 250 : 40 &= 400 : x\end{aligned}$$

Here, ratio os inverse

$$\begin{aligned}\text{So, } 250 \times 40 &= x \times 400 \\ \Rightarrow x &= \frac{250 \times 40}{400} \\ &= \frac{25 \times \cancel{4}}{\cancel{4}} = 25\end{aligned}$$

Hence, the required number of days are 25.

8. A water pipe can fill a 300 litre tank in 1 hour 40 minutes. In how much time will it fill  $\frac{3}{10}$  of the tank?

$$\begin{aligned}\text{Time taken by water pipe to fill for 300 litre} \\ &= 1 \text{ h } 40 \text{ min} \\ &= (60 + 40) \text{ min} \\ &= 100 \text{ min.}\end{aligned}$$

$$\therefore \text{ Time taken by water pipe for to fill for 1 litre } = \frac{100}{300} \text{ min.}$$

$$\begin{aligned}
 \therefore \text{Time take by water pipe to fill for } & \left( \frac{3}{10} \times 300 \right) \text{ litre} \\
 & = \left( \frac{100}{300} \times 3 \times 30 \right) \text{ min.} \\
 & = (10 \times 3) \text{ min.} \\
 & = 30 \text{ min.}
 \end{aligned}$$

Hence, the required time 30 min.

9. In a training camp there were provisions for 550 men for 72 days. But 150 trainees are not attending the camp. How long will the provisions last?

Let the required number of days for last the provisions be 'x'.

According to question,

$$\begin{aligned}
 550 : 72 &= (550 - 150) : x \\
 \Rightarrow 550 : 72 &= 400 : x
 \end{aligned}$$

Here, ratio is inverse

$$\begin{aligned}
 \therefore 550 \times 72 &= 400 \times x \\
 \Rightarrow x &= \frac{550 \times 72}{400} \\
 &= \frac{55^{11} \times 18^9}{10^2} \\
 &= 11 \times 9 = 99
 \end{aligned}$$

Hence, the required number of days are 99.

10. In 14 days a piece of land is cultivated by 15 men :

- (a) How long will it be finished by 35 men?

Let required number of days be 'x'.

Number of men	15	35
Number of days	14	x

Here, inverse variation,

$$\text{So, } 15 \times 14 = x \times 35$$

$$\Rightarrow x = \frac{14 \times 15}{35}$$

$$= \frac{2 \cancel{14} \times 3}{\cancel{7}_1}$$

$$= 6 \text{ days}$$

Hence, the required number of days are 6.

- (b) How many men are required to finish it in 10 days?

Let the required number of men be 'x'.

Number of men	15	x
Number of days	14	10

Here variation is inverse

$$15 \times 14 = x \times 10$$

$$\Rightarrow x = \frac{\cancel{15}^3 \times \cancel{14}^7}{\cancel{10}_1}$$

$$\Rightarrow x = 3 \times 7 = 21$$

Hence, the required number of men are 21.

11. At a speed of 35 km (per) hour, a car takes 5 hours for a journey. How long will it take at a speed of 50 km/hr to complete the journey?

Let the required time for complete journey be 'x' hour.

Speed (in km/h)	35	50
Time (in hours)	5	x

Here, variation is inverse.

$$\therefore 35 \times 5 = x \times 50$$

$$\Rightarrow x = \frac{35 \times \cancel{5}^1}{\cancel{50}_{10}} = \frac{35}{10} = 3.5 \text{ hours}$$

hence, the required time to complete journey is 3.5 hours or 3 hours 30 min.

12. The yield of wheat from 5 hectares of land is 350 quintals :

We have,

$$1 \text{ hectare} = 10,000 \text{ m}^2$$

$$\therefore 5 \text{ hectares} = 50,000 \text{ m}^2$$

- (a) Find the quantity of land in  $\text{m}^2$ , which is required to yield 175 quintals of wheat.

Let required quantity of land be ' $x$ '  $\text{m}^2$ .

Land (in $\text{m}^2$ )	50000	$x$
Wheat (in quintals)	350	175

Here, ratio is direct.

$$\therefore \frac{50000}{350} = \frac{x}{175}$$

$$\Rightarrow x = \frac{50000 \times 175}{350} = 5000 \times 5 = 25000 \text{ m}^2$$

Hence, the required land is  $25000 \text{ m}^2$ .

- (b) How much wheat can be yielded from  $500 \text{ m}^2$  of land ?

Let the required quantity of wheat be ' $x$ ' quintals.

Land (in $\text{m}^2$ )	50000	500
Wheat (in quintals)	350	$x$

Here, ratio is direct,

$$\therefore \frac{50000}{350} = \frac{500}{x}$$

$$\Rightarrow x = \frac{500 \times 350}{50000} = \frac{35}{10} = 3.5 \text{ quintals}$$

Hence, the required quantity of wheat is 3.5 quintals.

## Mental Ability

### A. Multiple Choice Questions (MCQ) :

1. (d) 2. (c) 3. (b) 4. (d) 5. (c) 6. (a) 7. (a) 8. (c)

## B. Fill in the blanks :

1. Product of extremes = product of **Means**.
2.  $5:10::48$ .
3. The First term of ratio is called **Antecedent** and the second term is called **Consequent**.
4. A ratio has **no** unit.
5. The ratio equivalent to  $18:12$  is **3:2**.
6. In a proportion, If the second and third terms are equal, then the proportion is called **Compound proportion**.

## Higher Order Thinking Skills (HOTS)

Here, total number of white beads =  $2 + 2 + 2 = 6$

and, total number of black beads =  $3 + 3 = 6$

(a) The ratio of white beads to black beads =  $6:6 = 1:1$

(b) Let the required number of white beads be 'x'.

$$\therefore \frac{x}{24} = \frac{1}{1} \Rightarrow x = 24$$

Hence, the required number of white beads is 24.

(c) Here, number of black beads in 75 beads

$$= \frac{3}{(2+3)} \times 75 = \frac{3}{5} \times 75 = 45$$

Hence, the required number of black beads are 45.

## Chapter

# 6

## Fractions

### Exercise 6.1

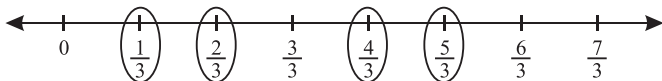
1. Do it yourself.
2. What part of the figure is shaded?  
(a)  $\frac{3}{8}$                       (b)  $\frac{5}{15}$                       (c)  $\frac{2}{6}$                       (d)  $\frac{6}{12}$
3. For each of the following, write a fraction :  
(a)  $\frac{3}{8}$                       (b)  $\frac{6}{10}$                       (c)  $\frac{5}{12}$                       (d)  $\frac{8}{9}$

4. Write the fractional number for each of the following :

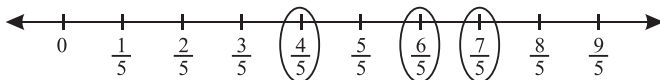
- (a) Two-sevenths (b) Seven-eighths  
(c) Four-ninths (d) Nine-sixteenths

5. Draw number line and represent the following fractions :

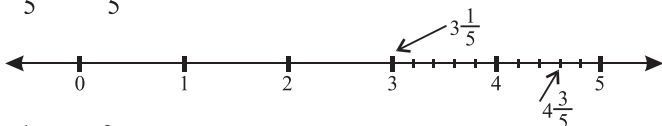
(a)  $\frac{1}{3}, \frac{2}{3}, \frac{4}{3}, \frac{5}{3}$



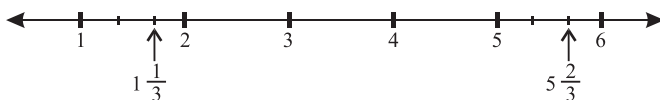
(b)  $\frac{4}{5}, \frac{6}{5}, \frac{7}{5}$



(c)  $3\frac{1}{5}$  and  $4\frac{3}{5}$



(d)  $1\frac{1}{3}$  and  $5\frac{2}{3}$



6. Write  $\frac{3}{5}$  of a collection of :

(a)  $\frac{3}{5} \times \cancel{20}^4$  balloons = 12 balloons

(b)  $\frac{3}{5} \times \cancel{25}^5$  pens = 15 pens

(c)  $\frac{3}{5} \times \cancel{42}^9$  toffees = 27 toffees

(d)  $\frac{3}{5} \times \cancel{15}^3$  books = 9 books

7. Change the following group of fractions into like fractions :

(a)  $\frac{2}{7}, \frac{7}{8}, \frac{5}{14}, \frac{9}{16}$

First find LCM of 7, 8, 14 and 16.

$\therefore \text{LCM} = 2 \times 2 \times 2 \times 2 \times 7 = 112$

Now,

$$\frac{2}{7} = \frac{2 \times 16}{7 \times 16} = \frac{32}{112}$$

$$\frac{7}{8} = \frac{7 \times 14}{8 \times 14} = \frac{98}{112}$$

$$\frac{5}{14} = \frac{5 \times 8}{14 \times 8} = \frac{40}{112}$$

$$\frac{9}{16} = \frac{9 \times 7}{16 \times 7} = \frac{63}{112}$$

So, required like fractions are :

$$\frac{32}{112}, \frac{98}{112}, \frac{40}{112}, \frac{63}{112}$$

(b)  $\frac{4}{5}, \frac{7}{6}, \frac{6}{7}, \frac{9}{10}$

First find LCM of 5, 6, 7 and 10.

$\therefore \text{LCM} = 2 \times 3 \times 5 \times 7 = 210$

Now,

$$\frac{4}{5} = \frac{4 \times 42}{5 \times 42} = \frac{168}{210}$$

$$\frac{7}{6} = \frac{7 \times 35}{6 \times 35} = \frac{245}{210}$$

$$\frac{6}{7} = \frac{6 \times 30}{7 \times 30} = \frac{180}{210}$$

$$\frac{9}{10} = \frac{9 \times 21}{10 \times 21} = \frac{189}{210}$$

So, required like fractions are :

$$\frac{168}{210}, \frac{245}{210}, \frac{180}{210}, \frac{189}{210}$$

2	7, 8, 14, 16
2	7, 4, 7, 8
2	7, 2, 7, 4
2	7, 1, 7, 2
7	7, 1, 7, 1
	1, 1, 1, 1

2	5, 6, 7, 10
3	5, 3, 7, 5
5	5, 1, 7, 5
7	1, 1, 7, 1
	1, 1, 1, 1

(c)  $\frac{1}{5}, \frac{7}{10}, \frac{3}{4}, \frac{5}{7}$

First find LCM of 5, 10, 4 and 7

$\therefore \text{LCM} = 2 \times 2 \times 5 \times 7 = 140$

Now,

$$\frac{1}{5} = \frac{1 \times 28}{5 \times 28} = \frac{28}{140}$$

$$\frac{7}{10} = \frac{7 \times 14}{10 \times 14} = \frac{98}{140}$$

$$\frac{3}{4} = \frac{3 \times 35}{4 \times 35} = \frac{105}{140}$$

$$\frac{5}{7} = \frac{5 \times 20}{7 \times 20} = \frac{100}{140}$$

So, required like fractions are :

$$\frac{28}{140}, \frac{98}{140}, \frac{105}{140}, \frac{100}{140}$$

(d)  $\frac{5}{6}, \frac{7}{8}, \frac{11}{12}, \frac{3}{10}$

First find LCM of 6, 8, 12 and 10.

$\therefore \text{LCM} = 2 \times 2 \times 2 \times 3 \times 5 = 120$

Now,

$$\frac{5}{6} = \frac{5 \times 20}{6 \times 20} = \frac{100}{120}$$

$$\frac{7}{8} = \frac{7 \times 15}{8 \times 15} = \frac{105}{120}$$

$$\frac{11}{12} = \frac{11 \times 10}{12 \times 10} = \frac{110}{120}$$

$$\frac{3}{10} = \frac{3 \times 12}{10 \times 12} = \frac{36}{120}$$

So, required like fractions are :

$$\frac{100}{120}, \frac{105}{120}, \frac{110}{120}, \frac{36}{120}$$

2	5, 10, 4, 7
2	5, 5, 2, 7
5	5, 5, 1, 7
7	1, 1, 1, 7
	1, 1, 1, 1

2	6, 8, 12, 10
2	3, 4, 6, 5
2	3, 2, 3, 5
3	3, 1, 3, 5
5	1, 1, 1, 5
	1, 1, 1, 1

(e)  $\frac{1}{3}, \frac{2}{5}, \frac{3}{4}, \frac{1}{6}$ .

First, find LCM of 3, 5, 4 and 6.

$\therefore \text{LCM} = 2 \times 2 \times 3 \times 5 = 60$

Now,  $\frac{1}{3} = \frac{1 \times 20}{3 \times 20} = \frac{20}{60}$

$$\frac{2}{5} = \frac{2 \times 12}{5 \times 12} = \frac{24}{60}$$

$$\frac{3}{4} = \frac{3 \times 15}{4 \times 15} = \frac{45}{60}$$

$$\frac{1}{6} = \frac{1 \times 10}{6 \times 10} = \frac{10}{60}$$

So, required like fractions are :

$$\frac{20}{60}, \frac{24}{60}, \frac{45}{60}, \frac{10}{60}$$

8. Reduce the given fractions to their lowest terms :

(a)  $\frac{56}{70}$

First find HCF of 56 and 70.

$$\begin{array}{r} 56 \overline{) 70} (1 \\ \underline{-56} \\ 14 \overline{) 56} (4 \\ \underline{-56} \\ 0 \end{array}$$

$\therefore \text{HCF} = 14$

Now,  $\frac{56}{70} = \frac{56 \div 14}{70 \div 14} = \frac{4}{5}$

Hence, the required lowest form is  $\frac{4}{5}$ .

(b)  $\frac{198}{462}$

First find HCF of 198 and 462.

$$\begin{array}{r|l} 2 & 3, 5, 4, 6 \\ \hline 2 & 3, 5, 2, 3 \\ \hline 3 & 3, 5, 1, 3 \\ \hline 5 & 1, 5, 1, 1 \\ \hline & 1, 1, 1, 1 \end{array}$$

$$\begin{array}{r}
 198 \overline{)462} \left( 2 \right. \\
 \underline{-396} \\
 66 \overline{)198} \left( 3 \right. \\
 \underline{-198} \\
 0
 \end{array}$$

$$\therefore \text{HCF} = 66$$

Now,

$$\frac{198}{462} = \frac{198 \div 66}{462 \div 66} = \frac{3}{7}$$

Hence, the required lowest form is  $\frac{3}{7}$ .

(c)  $\frac{550}{825}$

Find the HCF of 550 and 825.

$$\begin{array}{r}
 550 \overline{)825} \left( 1 \right. \\
 \underline{-550} \\
 275 \overline{)550} \left( 2 \right. \\
 \underline{-550} \\
 0
 \end{array}$$

$$\therefore \text{HCF} = 275$$

$$\text{Now, } \frac{550}{825} = \frac{550 \div 275}{825 \div 275} = \frac{2}{3}$$

Hence, the required lowest form is  $\frac{2}{3}$ .

(d)  $\frac{1000}{3000}$

Here,

$$\frac{1000}{3000} = \frac{1000 \div 1000}{3000 \div 1000} = \frac{1}{3},$$

So,  $\frac{1}{3}$  is required lowest form.

(e)  $\frac{975}{4875}$

First find HCF of 975 and 4875.

$$\begin{array}{r} 975 \overline{)4875} \left( 5 \right. \\ \underline{-4875} \\ 0 \end{array}$$

$$\therefore \text{HCF} = 975$$

Now,

$$\frac{975}{4875} = \frac{975 \div 975}{4875 \div 975} = \frac{1}{5}$$

Hence, the required lowest form is  $\frac{1}{5}$ .

$$(f) \frac{11025}{7350}$$

First find HCF 11025 and 7350.

$$\begin{array}{r} 7350 \overline{)11025} \left( 1 \right. \\ \underline{-7350} \\ 3675 \end{array} \begin{array}{r} 7350 \left( 2 \right. \\ \underline{-350} \\ 0 \end{array}$$

$$\therefore \text{HCF} = 3675$$

Now,

$$\frac{11025}{7350} = \frac{11025 \div 3675}{7350 \div 3675} = \frac{3}{2}$$

Hence, the required lowest form is  $\frac{3}{2}$ .

9. Which of the following are proper fractions?

(a), (c) and (d) are proper fraction because numerator is less than denominator is all of these.

10. Which of the following are improper fractions?

(c) and (d) are improper because numerator is greater than denominator is both.

11. Express the following as improper fraction :

$$(a) 6\frac{1}{7} = \frac{(7 \times 6 + 1)}{7} = \frac{42 + 1}{7} = \frac{43}{7}$$

$$(b) 10\frac{5}{19} = \frac{(19 \times 10 + 5)}{19} = \frac{190 + 5}{19} = \frac{195}{19}$$

$$(c) 19\frac{4}{5} = \frac{(5 \times 19 + 4)}{5} = \frac{95 + 4}{5} = \frac{99}{5}$$

$$(d) 16\frac{2}{3} = \frac{(3 \times 16 + 2)}{3} = \frac{48 + 2}{3} = \frac{50}{3}$$

12. Express the following as mixed fraction :

$$(a) \frac{15}{4} = 3\frac{3}{4} \quad 4 \overline{)15} \begin{array}{r} 3 \\ -12 \\ \hline 3 \end{array} \quad (b) \frac{17}{6} \quad 6 \overline{)17} \begin{array}{r} 2 \\ -12 \\ \hline 5 \end{array}$$

So,  $\frac{17}{6} = 2\frac{5}{6}$

$$(c) \frac{29}{11} \quad 11 \overline{)29} \begin{array}{r} 2 \\ -22 \\ \hline 7 \end{array} \quad (d) \frac{600}{35} \quad 35 \overline{)600} \begin{array}{r} 17 \\ -35 \downarrow \\ 250 \\ -245 \\ \hline 5 \end{array}$$

So,  $\frac{29}{11} = 2\frac{7}{11}$       So,  $\frac{600}{35} = 17\frac{5}{35}$

Or,  $17\frac{1}{7}$

### Exercise 6.2

1. Write four fractions equivalent to each of the following :

$$(a) \frac{3}{4} = \frac{3 \times 2}{5 \times 2} = \frac{3 \times 3}{5 \times 3} = \frac{3 \times 4}{5 \times 4} = \frac{3 \times 5}{5 \times 5}$$

$$\therefore \frac{3}{5} = \frac{6}{10} = \frac{9}{15} = \frac{12}{20} = \frac{15}{25}$$

So, the four fractions equivalent to  $\frac{3}{5}$  are  $\frac{6}{10}$ ,  $\frac{9}{15}$ ,  $\frac{12}{20}$  and  $\frac{15}{25}$ .

$$(b) \frac{4}{7} = \frac{4 \times 2}{7 \times 2} = \frac{4 \times 3}{7 \times 3} = \frac{4 \times 4}{7 \times 4} = \frac{4 \times 5}{7 \times 5}$$

$$\therefore \frac{4}{7} = \frac{8}{14} = \frac{12}{21} = \frac{16}{28} = \frac{20}{35}$$

So, the four fractions equivalent to  $\frac{4}{7}$  are  $\frac{8}{14}$ ,  $\frac{12}{21}$ ,  $\frac{16}{28}$  and  $\frac{20}{35}$ .

$$(c) \frac{6}{11} = \frac{6 \times 2}{11 \times 2} = \frac{6 \times 3}{11 \times 3} = \frac{6 \times 4}{11 \times 4} = \frac{6 \times 5}{11 \times 5}$$

$$\therefore \frac{6}{11} = \frac{12}{22} = \frac{18}{33} = \frac{24}{44} = \frac{30}{55}$$

So, the four fractions equivalent to  $\frac{6}{11}$  are  $\frac{12}{22}$ ,  $\frac{18}{33}$ ,  $\frac{24}{44}$  and  $\frac{30}{55}$ .

$$(d) \frac{8}{13} = \frac{8 \times 2}{13 \times 2} = \frac{8 \times 3}{13 \times 3} = \frac{8 \times 4}{13 \times 4} = \frac{8 \times 5}{13 \times 5}$$

$$\therefore \frac{8}{13} = \frac{16}{26} = \frac{24}{39} = \frac{32}{52} = \frac{40}{65}$$

So, the four equivalent fractions to  $\frac{8}{13}$  are :

$$\frac{16}{26}, \frac{24}{39}, \frac{32}{52} \text{ and } \frac{40}{65}.$$

$$(e) \frac{7}{9} = \frac{7 \times 2}{9 \times 2} = \frac{7 \times 3}{9 \times 3} = \frac{7 \times 4}{9 \times 4} = \frac{7 \times 5}{9 \times 5}$$

So, the four fractions equivalent to  $\frac{7}{9}$  are  $\frac{14}{18}$ ,  $\frac{21}{27}$ ,  $\frac{28}{36}$  and  $\frac{35}{45}$ .

$$(f) \frac{5}{12} = \frac{5 \times 2}{12 \times 2} = \frac{5 \times 3}{12 \times 3} = \frac{5 \times 4}{12 \times 4} = \frac{5 \times 5}{12 \times 5}$$

$$\therefore \frac{5}{12} = \frac{10}{24} = \frac{15}{36} = \frac{20}{48} = \frac{25}{60}$$

So, the four fractions equivalent to  $\frac{5}{12}$  are,  $\frac{10}{24}$ ,  $\frac{15}{36}$ ,  $\frac{20}{48}$  and  $\frac{25}{60}$ .

2. Which of the following are the pairs of equivalent fractions?

$$(a) \frac{2}{3} \text{ and } \frac{33}{22}$$

By cross-multiplying the terms of the fractions.

$$\frac{2}{3} \quad \begin{array}{c} \swarrow \searrow \\ \nearrow \nwarrow \end{array} \quad \frac{33}{22}$$

$$2 \times 22 = 44 \quad \Rightarrow \quad 44 \neq 99$$

$$3 \times 33 = 99$$

$$\therefore \frac{2}{3} \text{ is not equivalent to } \frac{33}{22}.$$

(b)  $\frac{1}{3}$  and  $\frac{9}{24}$

By cross-multiplying the terms of the fractions.

$$\frac{1}{3} \quad \begin{array}{c} \diagup \quad \diagdown \\ \blacktriangleleft \quad \blacktriangleright \end{array} \quad \frac{9}{24}$$

$$1 \times 24 = 24$$

$$3 \times 9 = 27 \quad \Rightarrow \quad 24 \neq 27$$

$\therefore \frac{1}{3}$  is not equivalent to  $\frac{9}{24}$ .

(c)  $\frac{2}{9}$  and  $\frac{14}{63}$

By cross-multiplying the terms of the fractions,

$$\frac{2}{9} \quad \begin{array}{c} \diagup \quad \diagdown \\ \blacktriangleleft \quad \blacktriangleright \end{array} \quad \frac{14}{63}$$

$$2 \times 63 = 126 \quad \Rightarrow \quad 126 = 126$$

$$9 \times 14 = 126$$

$\therefore \frac{2}{9}$  is equivalent to  $\frac{14}{63}$ .

(d)  $\frac{4}{7}$  and  $\frac{16}{21}$

By cross-multiplying the terms of the fractions.

$$\frac{4}{7} \quad \begin{array}{c} \diagup \quad \diagdown \\ \blacktriangleleft \quad \blacktriangleright \end{array} \quad \frac{16}{21}$$

$$4 \times 21 = 84 \quad \Rightarrow \quad 84 \neq 112$$

$$7 \times 16 = 112$$

$\therefore \frac{4}{7}$  is not equivalent to  $\frac{16}{21}$ .

(e)  $\frac{3}{8}$  and  $\frac{15}{40}$

By cross-multiplying the terms of the fractions.

$$\frac{3}{8} \quad \begin{array}{c} \diagup \quad \diagdown \\ \blacktriangleleft \quad \blacktriangleright \end{array} \quad \frac{15}{40}$$

$$3 \times 40 = 120 \quad \Rightarrow \quad 120 = 120$$

$$8 \times 15 = 120$$

$$\therefore \frac{3}{8} \text{ is equivalent to } \frac{15}{40}.$$

$$(f) \frac{5}{6} \text{ and } \frac{20}{24}$$

By cross-multiplying the terms of the fractions,

$$\frac{5}{6} \quad \begin{array}{c} \swarrow \searrow \\ \nearrow \nwarrow \end{array} \quad \frac{20}{24}$$

$$5 \times 24 = 120$$

$$6 \times 20 = 120 \quad \Rightarrow \quad 120 = 120$$

$$\therefore \frac{5}{6} \text{ is equivalent to } \frac{20}{24}.$$

3. Which fraction is greater?

$$(a) \frac{3}{5} \text{ or } \frac{2}{3}$$

$$\frac{3}{5} = \frac{3 \times 3}{5 \times 3} = \frac{9}{15}$$

$$\text{and, } \frac{2}{3} = \frac{2 \times 5}{3 \times 5} = \frac{10}{15}$$

$$\therefore \frac{2}{3} \text{ is greater fraction.}$$

$$(c) \frac{5}{9} \text{ or } \frac{3}{4}$$

$$\frac{5}{9} = \frac{5 \times 4}{9 \times 4} = \frac{20}{36}$$

$$\frac{3}{4} = \frac{3 \times 9}{4 \times 9} = \frac{27}{36}$$

$$\therefore \frac{3}{4} \text{ is greater fraction.}$$

4. Which fraction is smaller?

$$(a) \frac{3}{8} \text{ or } \frac{4}{5}$$

$$\frac{3}{8} = \frac{3 \times 5}{8 \times 5} = \frac{15}{40}$$

$$(b) \frac{11}{12} \text{ or } \frac{5}{6}$$

$$\frac{11}{12} = \frac{11 \times 6}{12 \times 6} = \frac{66}{72}$$

$$= \frac{5}{6} = \frac{5 \times 12}{6 \times 12} = \frac{60}{72}$$

$$\therefore \frac{11}{12} \text{ is greater fraction.}$$

$$\frac{4}{5} = \frac{4 \times 8}{5 \times 8} = \frac{32}{40}$$

$\therefore \frac{3}{8}$  is smaller fraction.

(b)  $\frac{5}{7}$  or  $\frac{3}{7}$

Here, Denominators are same of both fractions.

$\therefore \frac{3}{7}$  is smaller fraction.

(c)  $\frac{5}{9}$  or  $\frac{3}{5}$

$$\frac{5}{9} = \frac{5 \times 5}{9 \times 5} = \frac{25}{45}$$

$$\frac{3}{5} = \frac{3 \times 9}{5 \times 9} = \frac{27}{45}$$

$\therefore \frac{5}{9}$  is smaller fraction.

5. Arrange the following fractions in ascending order of their values :

(a)  $\frac{3}{4}, \frac{5}{6}, \frac{23}{24}$

First, we make some denominators of all fractions.

$$\frac{3}{4} = \frac{3 \times 6}{4 \times 6} = \frac{18}{24}$$

$$\frac{5}{6} = \frac{5 \times 4}{6 \times 4} = \frac{20}{24}$$

$$\frac{23}{24} = \frac{23 \times 1}{24 \times 1} = \frac{23}{24}$$

(b)  $\frac{2}{3}, \frac{5}{9}, \frac{5}{6}, \frac{3}{8}$

First find LCM of 3, 9, 6 and 8.

$\therefore \text{LCM} = 2 \times 2 \times 2 \times 3 \times 3 = 72$

Now,

$$\frac{2}{3} = \frac{2 \times 24}{3 \times 24} = \frac{48}{72}$$

2	3, 9, 6, 8
2	3, 9, 3, 4
2	3, 9, 3, 2
3	3, 9, 3, 13
3	1, 3, 1, 1
	1, 1, 1, 1

$$\frac{5}{9} = \frac{5 \times 8}{9 \times 8} = \frac{40}{72}$$

$$\frac{5}{6} = \frac{5 \times 12}{6 \times 12} = \frac{60}{72}$$

$$\frac{3}{8} = \frac{3 \times 9}{8 \times 9} = \frac{27}{72}$$

So, ascending order is :

$$\frac{3}{8} < \frac{5}{9} < \frac{2}{3} < \frac{5}{9}$$

(c)  $\frac{5}{6}, \frac{2}{7}, \frac{8}{9}, \frac{1}{3}$

First find LCM of 6, 7, 9 and 3.

$\therefore \text{LCM} = 2 \times 3 \times 3 \times 7 = 126$

Now,

$$\frac{5}{6} = \frac{5 \times 21}{6 \times 21} = \frac{105}{126}$$

$$\frac{2}{7} = \frac{2 \times 18}{7 \times 18} = \frac{36}{126}$$

$$\frac{8}{9} = \frac{8 \times 14}{9 \times 14} = \frac{112}{126}$$

$$\frac{1}{3} = \frac{1 \times 42}{3 \times 42} = \frac{42}{126}$$

So, ascending order is,

$$\frac{2}{7} < \frac{1}{3} < \frac{5}{9} < \frac{8}{9}$$

(d)  $\frac{11}{13}, \frac{8}{13}, \frac{5}{13}, \frac{2}{13}$

Here, Denominators of all fractions are same.

$\therefore \frac{2}{13} < \frac{5}{13} < \frac{8}{13} < \frac{11}{13}$

(e)  $\frac{10}{21}, \frac{15}{21}, \frac{25}{21}, \frac{3}{21}$

Here, Denominators of all fractions are same.

2	6, 7, 6, 3
3	5, 7, 9, 3
3	1, 7, 3, 1
7	1, 7, 1, 1
	1, 1, 1, 1

∴ ascending order is,

$$\frac{3}{21} < \frac{10}{21} < \frac{15}{21} < \frac{25}{21}$$

6. Arrange the following fractions in descending order of their values :

(a)  $\frac{5}{7}, \frac{3}{8}, \frac{9}{11}$

First find LCM of 7, 8 and 11.

$$\begin{aligned}\therefore \text{LCM} &= 2 \times 2 \times 2 \times 7 \times 11 \\ &= 56 \times 11 = 616\end{aligned}$$

Now,

$$\frac{5}{7} = \frac{5 \times 88}{7 \times 88} = \frac{440}{616}$$

$$\frac{3}{8} = \frac{3 \times 77}{8 \times 77} = \frac{231}{616}$$

$$\frac{9}{11} = \frac{9 \times 56}{11 \times 56} = \frac{504}{616}$$

So, descending order.

$$\frac{9}{11} > \frac{5}{7} > \frac{3}{8}$$

(b)  $\frac{4}{5}, \frac{7}{15}, \frac{11}{20}, \frac{3}{4}$

First find LCM of 5, 15, 20 and 4.

$$\therefore \text{LCM} = 2 \times 2 \times 3 \times 5 = 60$$

Now,

$$\frac{4}{5} = \frac{4 \times 12}{5 \times 12} = \frac{48}{60}$$

$$\frac{7}{15} = \frac{7 \times 4}{15 \times 4} = \frac{28}{60}$$

$$\frac{11}{20} = \frac{11 \times 3}{20 \times 3} = \frac{33}{60}$$

$$\frac{3}{4} = \frac{3 \times 15}{4 \times 15} = \frac{45}{60}$$

$$\text{So, descending order is } \frac{4}{5} > \frac{3}{4} > \frac{11}{20} > \frac{7}{15}.$$

2	7, 8, 11
2	7, 4, 11
2	7, 2, 11
7	1, 1, 11
11	1, 1, 11
	1, 1, 1

2	5, 15, 20, 4
2	5, 15, 10, 2
3	5, 15, 5, 1
5	5, 5, 5, 1
	1, 1, 1, 1

(c)  $\frac{5}{16}, \frac{13}{24}, \frac{7}{8}$

First find LCM of 16, 24 and 8.

$\therefore \text{LCM} = 2 \times 2 \times 2 \times 2 \times 3 = 48$

Now,

$$\frac{5}{16} = \frac{5 \times 3}{16 \times 3} = \frac{15}{48}$$

$$\frac{13}{24} = \frac{13 \times 2}{24 \times 2} = \frac{26}{48}$$

$$\frac{7}{8} = \frac{7 \times 6}{8 \times 6} = \frac{42}{48}$$

$\therefore$  descending order is  $\frac{7}{8} > \frac{13}{24} > \frac{5}{16}$

(d)  $\frac{19}{17}, \frac{11}{17}, \frac{5}{17}, \frac{21}{17}$

Here, Denominators of all fractions are same same.

$\therefore$  descending order is

$$\frac{21}{17} > \frac{19}{17} > \frac{11}{17} > \frac{5}{17}$$

(e)  $\frac{13}{31}, \frac{22}{31}, \frac{7}{31}, \frac{10}{31}$

Here, Denominators of all fractions are same,

$\therefore$  descending order is,

$$\frac{22}{31} > \frac{13}{31} > \frac{10}{31} > \frac{7}{31}$$

7. Let  $\frac{3}{5} = \frac{15}{?}$

Now, we have to find missing number by multiply numerator and denominator by 5.

$$\frac{3}{5} = \frac{3 \times 5}{5 \times 5} = \frac{15}{25}$$

So,  $\frac{3}{5}$  and  $\frac{15}{25}$  are equivalent fractions.

2	16, 24, 8
2	8, 12, 4
2	4, 6, 2
2	2, 3, 1
3	1, 3, 1
	1, 1, 1

8. Let  $\frac{5}{8} = \frac{?}{72}$

Now, we have to find missing number, by multiplying numerator and denominator by 9.

$$\therefore \frac{5}{8} = \frac{5 \times 9}{8 \times 9} = \frac{45}{72}$$

So,  $\frac{5}{8}$  and  $\frac{45}{72}$  are equivalent fractions.

9. Let  $\frac{24}{30} = \frac{4}{?}$

Now, we have to find missing number on dividing, numerator and denominator by 6.

$$\therefore \frac{24}{30} = \frac{24 \div 6}{30 \div 6} = \frac{4}{5}$$

So,  $\frac{24}{30}$  and  $\frac{4}{5}$  are equivalent fractions.

10. Let  $\frac{50}{60} = \frac{?}{6}$

Now, we find missing number on dividing numerator and denominator by 10.

$$\therefore \frac{50}{60} = \frac{50 \div 10}{60 \div 10} = \frac{5}{6}$$

So,  $\frac{50}{60}$  and  $\frac{5}{6}$  are equivalent fractions.

### Exercise 6.3

1. Find the sum :

$$\begin{aligned} \text{(a)} \quad & \frac{11}{14} + \frac{3}{28} + 1 \\ &= \frac{11}{14} + \frac{3}{28} + \frac{1}{1} \\ &= \frac{11 \times 2 + 3 \times 1 + 1 \times 28}{28} \end{aligned}$$

$$= \frac{22 + 3 + 28}{28} = \frac{53}{28} = 1\frac{25}{28}$$

LCM of 14 and 28 = 28

$$\begin{aligned} \text{(b)} \quad & \frac{2}{3} + 1\frac{1}{6} + 2\frac{5}{9} + 1 \\ &= \frac{2}{3} + \frac{7}{6} + \frac{23}{9} + \frac{1}{1} \end{aligned}$$

LCM of 3, 6, 9 = 18

$$\begin{aligned} &= \frac{6 \times 2 + 3 \times 7 + 23 \times 2 + 1 \times 18}{18} \\ &= \frac{12 + 21 + 46 + 18}{18} \\ &= \frac{97}{18} = 5\frac{7}{18} \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad & 3\frac{1}{2} + 4\frac{2}{3} + 7\frac{5}{6} \\ &= \frac{7}{2} + \frac{14}{3} + \frac{47}{6} \quad \text{LCM of 2, 3, and 6 = 6} \\ &= \frac{7 \times 3 + 14 \times 2 + 47 \times 1}{6} \\ &= \frac{21 + 28 + 47}{6} = \frac{96}{6} = 16 \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad & 3\frac{1}{5} + 4\frac{1}{10} + 5\frac{1}{15} \\ &= \frac{16}{5} + \frac{41}{10} + \frac{76}{15} \quad \text{LCM of 5, 10 and 15 = 30} \\ &= \frac{16 \times 6 + 41 \times 3 + 76 \times 2}{30} \\ &= \frac{96 + 123 + 152}{30} = \frac{371}{30} \\ &= 12\frac{11}{30} \end{aligned}$$

$$\begin{array}{r} 30 \overline{) 371} \left( 12 \right. \\ \underline{-30 \downarrow} \\ 71 \\ \underline{-60} \\ 11 \end{array}$$

2. Subtract the following fractions :

$$\begin{aligned}
 \text{(a)} \quad \frac{11}{12} - \frac{13}{16} &= \frac{11 \times 4 - 13 \times 3}{48} = \frac{44 - 39}{48} \quad \text{LCM of 12 and 16} = 48 \\
 &= \frac{5}{48}
 \end{aligned}$$

$$\begin{aligned}
 \text{(b)} \quad 2\frac{3}{4} - 1\frac{5}{6} &= \frac{11}{4} - \frac{11}{6} \\
 &= \frac{11 \times 3 - 11 \times 2}{12} \quad \text{LCM of 4 and 6 is 12} \\
 &= \frac{33 - 22}{12} = \frac{11}{12}
 \end{aligned}$$

$$\begin{aligned}
 \text{(c)} \quad 6\frac{2}{3} - 3\frac{3}{4} &= \frac{20}{3} - \frac{15}{4} \quad \text{LCM of 3 and 4 is 12.} \\
 &= \frac{20 \times 4 - 15 \times 3}{12} \\
 &= \frac{80 - 45}{12} = \frac{35}{12} = 2\frac{11}{12}
 \end{aligned}$$

$$\begin{aligned}
 \text{(d)} \quad 3\frac{5}{8} - 2\frac{5}{12} &= \frac{29}{8} - \frac{29}{12} \quad \text{LCM of 8 and 12} = 24 \\
 &= \frac{29 \times 3 - 29 \times 2}{24} \\
 &= \frac{29(3 - 2)}{24} = \frac{29 \times 1}{24} = \frac{29}{24} = 1\frac{5}{24}
 \end{aligned}$$

3. Simplify :

$$\text{(a)} \quad 4 + \frac{3}{10} - 1\frac{8}{15}$$

$$\begin{aligned}
&= \frac{4}{1} + \frac{3}{10} - \frac{23}{15} \quad \text{LCM of 1, 10 and 15} = 30 \\
&= \frac{4 \times 30 + 3 \times 3 - 23 \times 2}{30} \\
&= \frac{120 + 9 - 46}{30} = \frac{129 - 46}{30} = \frac{83}{30} = 2 \frac{23}{30}
\end{aligned}$$

$$\begin{aligned}
\text{(b)} \quad &1 \frac{3}{4} + 2 \frac{5}{7} - 1 \frac{3}{14} \\
&= \frac{7}{4} + \frac{19}{7} - \frac{17}{14} \quad \text{LCM of 4, 7 and 14} = 28 \\
&= \frac{7 \times 7 + 19 \times 4 - 17 \times 2}{28} \\
&= \frac{49 + 76 - 34}{28} = \frac{125 - 34}{28} = \frac{91}{28} \\
&= 3 \frac{7^1}{28_4} = 3 \frac{1}{4}
\end{aligned}$$

$$\begin{aligned}
\text{(c)} \quad &7 \frac{5}{8} - 3 \frac{1}{6} - 2 \frac{3}{4} \\
&= \frac{61}{8} - \frac{19}{6} - \frac{11}{4} \quad \text{LCM of 8, 6 and 4, is 24.} \\
&= \frac{61 \times 3 - 19 \times 4 - 11 \times 6}{24} \\
&= \frac{183 - 76 - 66}{24} = \frac{183 - 142}{24} \\
&= \frac{41}{24} = 1 \frac{17}{24}
\end{aligned}$$

$$\begin{aligned}
\text{(d)} \quad &2 \frac{5}{12} + 1 \frac{19}{60} + 2 \frac{11}{40} \\
&= \frac{29}{12} + \frac{79}{60} + \frac{91}{40} \quad \text{LCM of 12, 60 and 40 is 120.} \\
&= \frac{29 \times 10 + 79 \times 2 + 91 \times 3}{120} \\
&= \frac{290 + 158 + 273}{120}
\end{aligned}$$

$$= \frac{721}{120} = 6\frac{1}{120}$$

4. Let the required fraction be 'x'.

$$\therefore x + \frac{1}{3} = \frac{3}{7}$$

$$\Rightarrow x = \frac{3}{7} - \frac{1}{3} = \frac{3 \times 3 - 1 \times 7}{21} = \frac{9 - 7}{21}$$

$$\Rightarrow x = \frac{2}{21}$$

Hence, the required fraction is  $\frac{2}{21}$ .

5. The weight of three bags of rice  $15\frac{1}{2}$  kg,  $16\frac{3}{4}$  kg and  $17\frac{1}{5}$  kg.

$$\begin{aligned} \therefore \text{The total weight of rice} &= \left( 15\frac{1}{2} + 16\frac{3}{4} + 17\frac{1}{5} \right) \text{ kg} \\ &= \left( \frac{31}{2} + \frac{67}{4} + \frac{86}{5} \right) \text{ kg} \quad \text{LCM of 2, 4, 5} = 20 \\ &= \left( \frac{31 \times 10 + 67 \times 5 + 86 \times 4}{20} \right) \text{ kg} \\ &= \left( \frac{310 + 335 + 344}{20} \right) \text{ kg} \\ &= \left( \frac{989}{20} \right) \text{ kg} = 49\frac{9}{20} \text{ kg} \end{aligned}$$

Hence, the total weight of rice is  $49\frac{9}{20}$  kg.

6. Let the required fraction be 'x'.

$$\therefore x + 5\frac{7}{15} = 7\frac{1}{5}$$

$$\Rightarrow x = 7\frac{1}{5} - 5\frac{7}{15} = \frac{36}{5} - \frac{82}{15}$$

$$\Rightarrow x = \frac{36 \times 3 - 82 \times 1}{15}$$

$$\Rightarrow x = \frac{108 - 82}{15}$$

$$= \frac{26}{15} = 1\frac{11}{15}$$

Hence, the required fraction is  $1\frac{11}{15}$ .

7. We have,

$$\text{Fraction of Gopal's profit} = \frac{1}{4}$$

$$\text{and, Fraction of Vijay's profit} = \frac{2}{5}$$

$$\text{So, Fraction of Neha's profit} = 1 - \left( \frac{1}{4} + \frac{2}{5} \right)$$

$$= \frac{1}{1} - \left( \frac{5+8}{20} \right)$$

$$= \frac{1}{1} - \frac{13}{20}$$

$$= \frac{20-13}{20} = \frac{7}{20}$$

Hence, the neha's share is  $\frac{7}{20}$  part.

8. Total length of the rope =  $10\frac{1}{2}$  m

$$\text{Length of cut off part} = 4\frac{5}{8} \text{ m.}$$

$$\therefore \text{The length of remaining rope} = 10\frac{1}{2} - 4\frac{5}{8}$$

$$= \frac{21}{2} - \frac{37}{8}$$

$$= \frac{21 \times 4 - 37 \times 1}{8}$$

$$= \frac{84 - 37}{8}$$

$$= \frac{47}{8} = 5\frac{7}{8} \text{ m.}$$

Hence, the remaining length of rope is  $5\frac{7}{8}$  m.

9. Total worth of wheat, rice and vegetables

$$\begin{aligned}
 &= ₹ \left( 12\frac{1}{2} + 25\frac{3}{4} + 10\frac{1}{4} \right) \\
 &= ₹ \left( \frac{25}{2} + \frac{103}{4} + \frac{41}{4} \right) \\
 &= ₹ \left( \frac{25 \times 2 + 103 + 41}{4} \right) \\
 &= ₹ \left( \frac{50 + 103 + 41}{4} \right) = ₹ \frac{194}{4}
 \end{aligned}$$

∴ Jasmin gave a hundred rupee note to the shopkeeper.

∴ Money return by shopkeeper to Jasmin

$$\begin{aligned}
 &= ₹ 100 - ₹ \frac{194}{4} \\
 &= ₹ \left( \frac{100}{1} - \frac{194}{4} \right) = ₹ \left( \frac{400 - 194}{4} \right) \\
 &= ₹ \frac{206}{4} = ₹ 51\frac{2}{4} = ₹ 51\frac{1}{2}
 \end{aligned}$$

Hence, the required money is ₹  $51\frac{1}{2}$ .

10. Product of 60 and  $\frac{3}{4} = 60^{15} \times \frac{3}{4_1}$

$$= 45$$

$$\text{and Half of } 88 = \frac{1}{2} \times 88^{44}$$

$$= 44$$

$$\therefore \text{Difference} = 45 - 44 = 1$$

Hence, the required difference is 1.

## Mental Ability

### A. Multiple Choice Questions :

1. (d) 2. (d) 3. (b) 4. (c) 5. (a) 6. (b) 7. (d) 8. (d) 9. (b) 10. (a)

**B. Fill in the Blanks :**

1. Put any one sign ( <, > or =) in the box :

$$\frac{2}{9} < \frac{2}{5}$$

2. All **Unit** fractions are in lowest terms.
3. A fraction is said to be in the lowest terms when the HCF of the numerator and the denominator is **1**.
4. When the numerator of a fraction is greater than the denominator, then the fraction is said to be an **Improper Fraction**.
5. A proper fraction is always Less than 1.
6. A **Fractions** is a number representing a part of a whole.
7.  $\frac{5}{11} = \frac{85}{187}$ .

- C. State True (T) or False (F) :

1. False 2. True 3. True 4. False 5. False

**Higher Order Thinking Skills (HOTS)**

- A. Total time which have Peter

$$= \frac{2}{5} \text{ of } \frac{1}{2} \text{ of } \frac{2}{3} \text{ of a minute}$$

$$= \frac{2}{5} \times \frac{1}{2} \times \frac{3}{5} \times 60^{20} \text{ seconds}$$

$$= \frac{40}{5} \text{ seconds} = 8 \text{ seconds}$$

Hence, Peter have 8 seconds.

**B. Crossword Puzzle :****Across :**

- |               |                |
|---------------|----------------|
| 4. Improper   | 6. multiplying |
| 8. equivalent | 10. reciprocal |

**Down :**

- |                  |             |
|------------------|-------------|
| 1. factorisation | 2. fraction |
| 11. Prime        |             |

## Exercise 7.1

1. Identify the decimal and whole number parts in the following decimals :

**Note :**  $W \rightarrow$  Whole number part,  $D \rightarrow$  Decimal part

(a) 0.57

$W \rightarrow 0, D \rightarrow .57$

(b) 1.21

$W \rightarrow, D \rightarrow .21$

(c) 0.651

$W \rightarrow 0, D \rightarrow .651$

(d) 21.635

$W \rightarrow 21, D = .635$

(e) 63.793

$W \rightarrow 63, D \rightarrow .793$

(f) 21.935

$W \rightarrow 21, D \rightarrow .935$

(g) 16.108

$W \rightarrow 16, D \rightarrow .108$

(h) 25.169

$W \rightarrow 25, D \rightarrow .169$

(i) 1.738

$W \rightarrow 1, D \rightarrow .738$

2. Change the following into decimals :

(a)  $\frac{7}{10} = 0.7$

(b)  $\frac{11}{10} = 1.1$

(c)  $\frac{13}{10} = 1.3$

(d)  $\frac{11}{100} = 0.11$

(e)  $\frac{135}{100} = 1.35$

(f)  $\frac{1765}{1000} = 1.765$

(g)  $\frac{175}{100} = 1.75$

(h)  $\frac{17689}{1000} = 17.689$

(i)  $\frac{51728}{1000} = 51.728$

3. Write the following as decimals :

(a) Ninety-nine hundredths.

0.99

(b) Sixty-six thousandths.

0.066

(c) Seventy-five thousand and fifty-five hundredths.

75000.55

(d) Five hundred nineteen and three hundred fifty-five thousandths.

519.355

4. Write the following decimals in words :

(a) 7.34

Seven decimal three four.

(b) 127.45

One hundred twenty seven decimals four ifve.

(c) 5.005

Five decimal zero zero five

(d) 27.35

Twenty seven decimal three five

(e) 1.756

One decimal seven five six.

(f) 282.161

Two hundred eighty-two decimal one six one.

(g) 3512.77

Three thousand five hundred twelve decimal seven seven.

5. Count and write the number of decimal places in the following decimals :

(a) 3

(b) 2

(c) 1

(d) 3

(e) 3

(f) 4

6. Change the following into fractions. Also, express your answer in simplest form :

$$(a) 116.75 = \frac{11675}{100} = \frac{467}{4}$$

$$(b) 5.7832 = \frac{\overset{14458}{\cancel{57832}}}{\underset{2500}{\cancel{10000}}} = \frac{\overset{7229}{\cancel{14458}}}{\underset{1250}{\cancel{2500}}} = \frac{7229}{1250}$$

$$(c) 2.789 = \frac{2789}{1000}$$

$$(d) 6.785 = \frac{\overset{1357}{\cancel{6785}}}{\underset{200}{\cancel{1000}}} = \frac{1357}{200}$$

(e) 0.38512

$$0.38512 = \frac{\overset{9628}{\cancel{38512}}}{\underset{25000}{\cancel{1000000}}} = \frac{\overset{2407}{\cancel{9628}}}{\underset{6250}{\cancel{25000}}}$$

(f)  $1.6783 = \frac{16783}{10000}$

(g)  $3.77551 = \frac{377551}{100000}$

(h)  $15.2835 = \frac{\overset{30567}{\cancel{152835}}}{\underset{2000}{\cancel{10000}}} = \frac{30567}{2000}$

(i)  $7.7189 = \frac{77189}{10000}$

## Exercise 7.2

1. Write the decimals in the place value chart :

Places →	Thousands	Hundreds	Ten	Ones	Decimal	Tenths	Hundredths	Thousandths	Ten thousandths
Value of the Places no.	1000	100	10	1	(.)	$\left(\frac{1}{10}\right)$	$\left(\frac{1}{100}\right)$	$\left(\frac{1}{1000}\right)$	$\left(\frac{10000}{100000}\right)$
67.28			6	7	.	2	8		
78.005			7	8	.	0	0	5	
2865.6359	2	8	6	5	.	6	3	5	9
915.331		9	1	5	.	3	3	1	
258.23		2	5	8	.	23			

2. Write the following in expanded form :

(a)  $6.53 = 6 + 0.5 + 0.03$

- (b)  $7.175 = 7 + 0.1 + 0.07 + 0.005$   
 (c)  $235.238 = 200 + 30 + 5 + 0.2 + 0.03 + 0.008$   
 (d)  $96708.086 = 90000 + 6000 + 700 + 0 + 8 + 0.0 + 0.08 + 0.006$   
 (e)  $7659.22 = 7000 + 600 + 50 + 9 + 0.2 + 0.02$   
 (f)  $71.7005 = 70 + 1 + 0.7 + 0.00 + 0.000 + 0.0005$

3. Fill in the blank boxes with appropriate digit :

(a)  $0.751 = \frac{7}{\boxed{10}} + \frac{5}{\boxed{100}} + \frac{\boxed{1}}{1000}$

(b)  $5.061 = 5 + \frac{\boxed{0}}{10} + \frac{6}{\boxed{100}} + \frac{1}{\boxed{1000}}$

(c)  $16.699 = 10 + 6 + \frac{\boxed{6}}{10} + \frac{9}{\boxed{100}} + \frac{\boxed{9}}{1000}$

(d)  $0.609 = \frac{\boxed{6}}{10} + \frac{0}{\boxed{100}} + \frac{\boxed{9}}{1000}$

4. Find the place value of the underlined digit :

(a)  $7. \underline{1} 5$

The place value of 1 in  $7.15 = \frac{1}{10} = 0.1$

(b)  $17.23 \underline{5}$

The place value of 5 in  $17.235 = \frac{5}{1000} = 0.005$

(c)  $1 \underline{5} . 331$

The place value of 5 in  $15.331 = 5 \times 1 = 5$

(d)  $5.5 \underline{5} \underline{6}$

Place value of 5 =  $\frac{5}{100} = 0.05$

Place value of 6 =  $\frac{6}{1000} = 0.006$

(e)  $23. \underline{4} 1 \underline{5}$

The place value of 4 =  $\frac{4}{10} = 0.4$

The place value of 5 =  $\frac{5}{1000} = 0.005$

(f)  $\underline{6} . \underline{1} \underline{9} \underline{8}$

The place value of 1 =  $\frac{1}{10} = 0.1$

The place value of 6 =  $6 \times 1 = 6$

The place value of 8 =  $\frac{8}{1000} = 0.008$

5. Write the decimals for the following expanded forms :

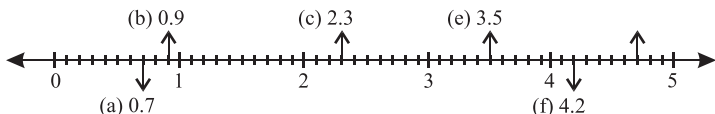
(a)  $40 + 5 + 0.500 + 0.090 + 0.009$   
 $= 45.599$

(b)  $400 + 70 + 0.200 + 0.07 + 0.003$   
 $= 470.273$

(c)  $3 + 0.70 + 0.03 = 3.73$

(d)  $10 + 5 + 0.400 + 0.050 + 0.006$   
 $= 15.456$

6. Represent the following on number line :



7. Write the decimals that are represented by the points P, Q, R, S, T and U on given number line.

$P \rightarrow 0.5, Q \rightarrow 1.2, R \rightarrow 2.7, S \rightarrow 3.1, T \rightarrow 4.3, U \rightarrow 4.9$

### Exercise 7.3

1. Convert each of the following into groups of like decimals :

(a) 7.8, 3.99, 1.682

We have, (we can add required zeros in decimal part)

$7.8 = 7.800, 3.99 = 3.990, 1.682 = 1.682$

So, the required like decimals are 7.800, 3.990 and 1.682.

(b) 16.7, 18.36, 2.007

We can add required number of zeros in right end of decimal part.

$\therefore 16.7, 16.700, 18.360, 2.007 = 2.007$

So, the required like decimals 16.700, 18.360 and 2.007

(c) 561.5, 389.6001, 175.0002

We can add required number of zeros in right end of decimal part.

$\therefore 561.5 = 561.5000, 389.6001 = 389.6001, 175.0002 = 175.002$   
So, the required like decimals are, 561.5000, 389.6001 and 175.0002.

(d) 0.78, 9.1, 0.0075

We can add required number of zeros in right end of decimal part.

$\therefore 0.78 = 0.7800, 9.1 = 9.1000, 0.0075 = 0.0075$

So, the required like decimal are 0.7800, 9.1000 and 0.0075.

(e) 13.668, 1.2, 6.7389

We can add required number of zeros in right end of decimal part.

$\therefore 13.668 = 13.6680, 1.2 = 1.2000$

$6.7389 = 6.7389$

so, the required like decimals are 13.6680, 1.2000 and 6.7389.

(f) 1.95, 6.005, 3.2966

We can add required number of zeros in right end of decimal part.

$\therefore 1.95 = 1.9500, 6.005 = 6.0050, 3.2966 = 3.2966$

So, the required decimals are 1.9500, 6.0050 and 3.2966.

2. We can add required number of zeros in right end of decimal part.

(a) 2.5

Now,  $2.5 = 2.50 = 2.500 = 2.5000 = 2.50000$

Hence, four equivalent decimals are : 2.50, 2.500, 2.5000 and 2.50000.

(b) 0.4

Now,  $0.4 = 0.40 = 0.400 = 0.4000 = 0.40000$

Hence, four equivalent decimals are 0.40, 0.400, 0.4000 and 0.40000.

(c) 71.5

Now,  $71.5 = 71.50 = 71.500 = 71.5000 = 71.50000$ .

Hence, four equivalent decimals are 71.50, 71.500, 71.500 and 71.50000.

(d) 3.89

Now,  $3.89 = 3.890 = 3.8900 = 3.89000 = 3.890000$

Hence, four equivalent decimals are 3.890, 3.8900, 3.89000 and 3.89000.

(e) 12.7

Now,  $12.7 = 12.70 = 12.700 = 12.7000 = 12.70000$

Hence, four equivalent decimals are 12.70, 12.700, 12.7000 and 12.70000

(f) 79.85

Now,  $79.85 = 79.850 = 79.8500 = 79.85000 = 79.850000$

hence, four equivalent decimals are 79.850, 79.8500, 79.85000 and 79.850000.

(g) 36.1

Now,  $36.1 = 36.10 = 36.100 = 36.1000 = 36.10000$

Hence, four equivalent decimals are 36.10, 36.100, 36.1000 and 36.10000.

(h) 25.45

Now,  $25.45 = 25.450 = 25.4500 = 25.45000 = 25.450000$

Hence, four equivalent decimals are 25.450, 25.4500, 25.45000 and 25.450000.

3. Compare the following decimals :

(a) 1.678 and 1.687

In decimal parts of given numbers  $7 < 8$  (Hundredths digit)

So,  $1.678 < 1.687$

(b) 2.40 and 2.4

We can write 2.4 as 2.40.

So,  $2.40 = 2.4$

(c) 5.1 and 5.001

In decimal parts of given numbers

$1 > 0$  (tenths digit)

So,  $5.1 > 5.001$

(d) 71.005 and 71.05

In decimal parts of given numbers

$0 < 5$  (Hundredths digit)

so,  $71.005 < 71.05$

(e) 21.6785 and 21.768

In decimal parts of given numbers

$6 < 7$  (tenths digit)

So,  $21.6785 < 21.768$

- (f) 75.128 and 75.218

In decimal parts of given numbers

$$1 < 2 \text{ (tenths digit)}$$

$$\text{So, } 75.128 < 75.218$$

- (g) 176.16 and 176.166

In decimal parts of given numbers.

$$0 < 6 \text{ (Thousandths digit)}$$

$$\text{So, } 176.16 < 176.166$$

- (h) 221.768 and 221.678

In decimal parts of given numbers

$$7 > 6 \text{ (tenths digit)}$$

$$\text{So, } 221.768 > 221.678$$

- (i) 73.915 and 73.951

In decimal parts of given numbers

$$1 < 5 \text{ (Hundredths digit)}$$

$$\text{So, } 73.915 < 73.951$$

4. Arrange the following decimals in descending order :

- (a) 2, 1.75, 0.7, 1.8

In decimal numbers 1.75 and 1.8

$$7 < 8 \text{ (tenths digit)}$$

$$\therefore 1.75 < 1.8$$

So, the required descending order is :

$$2 > 1.8 > 1.75 > 0.7$$

- (b) 3.685, 2.18, 5.66, 3.61

First change into like decimals 3.685, 2.180, 5.660, 3.610

In decimal numbers 3.685 and 3.610

$$8 > 1 \text{ (Hundredths digit)}$$

$$\therefore 3.685 > 3.610$$

Hence, the required descending order is

$$5.660 > 3.685 > 3.610 > 2.180$$

- (c) 6.1, 1.6, 1.62, 2.16

First change into like decimals

$$6.10, 1.60, 1.62, 2.16$$

In decimal number 1.60 and 1.62

$$0 < 2 \text{ (Hundredths digit)}$$

$$\therefore 1.60 < 1.62$$

Hence, the required descending order is :

$$6.10 > 2.16 > 1.62 > 1.60$$

5. Arrange the following decimals in ascending order :

- (a) 71.6, 70.86, 28.778, 29.03

In given decimal numbers, whole number parts as :

71, 70, 28, 29

So, required ascending order is

$$28.778 < 29.03 < 70.86 < 71.6$$

- (b) 189.3, 169.33, 819.28, 918.82

In given decimal numbers, whole number parts as,

189, 169, 819 and 918

So, the required ascending order is :

$$169.33 < 189.3 < 819.28 < 918.82$$

- (c) 718.5, 817.6, 187.67, 781.76

In given decimal numbers, whole number part as,

718, 817, 187, 781

So, the required ascending order is

$$187.67 < 718.5 < 781.76 < 817.6$$

### Exercise 7.4

1. Find the sum in each of the following :

- (a)  $3.6 + 16.2 + 18.75$

First change into like decimals and then add.

$$\begin{array}{r} 3.60 \\ 16.20 \\ + 18.75 \\ \hline 38.55 \end{array}$$

- (b)  $5.28 + 1.23 + 6.1$

First change into like decimals and then add :

$$\begin{array}{r} 5.28 \\ 1.23 \\ + 6.10 \\ \hline 12.61 \end{array}$$

(c)  $2.25 + 1.7 + 3.23$

First change into like decimals and, then add,

$$\begin{array}{r} 2.25 \\ 1.70 \\ + 3.23 \\ \hline 7.18 \end{array}$$

(d)  $3.10 + 7.28 + 1.66$

Here, all decimals are like decimals.

So, addition is,

$$\begin{array}{r} 3.10 \\ 7.28 \\ + 1.66 \\ \hline 12.04 \end{array}$$

Similarly, we can find the sum of next parts.

(e)  $16.2 + 1.62 + 0.162$

$$\begin{array}{r} 16.200 \\ 1.620 \\ + 0.162 \\ \hline 17.982 \end{array}$$

(f)  $8 + 2.6 + 3.2 + 0.32$

$$\begin{array}{r} 8.00 \\ 2.60 \\ 3.20 \\ + 0.32 \\ \hline 14.12 \end{array}$$

(g)  $172.5 + 2.85 + 112.6$

$$\begin{array}{r} 172.50 \\ 2.85 \\ + 112.60 \\ \hline 287.95 \end{array}$$

(h)  $77.5 + 3.66 + 1.85$

$$\begin{array}{r} 77.50 \\ 3.66 \\ + 1.85 \\ \hline 83.01 \end{array}$$

(i)  $667.12 + 18.68 + 32.6$

$$\begin{array}{r} 667.12 \\ 18.68 \\ + 32.60 \\ \hline 718.40 \end{array}$$

## 2. Subtract :

(a) 38.16 from 50.68

$$\begin{array}{r} 50.68 \\ - 38.16 \\ \hline 12.52 \end{array}$$

(b) 10.72 from 83.72

$$\begin{array}{r} 83.72 \\ - 10.72 \\ \hline 73.00 \end{array}$$

(c) 32.77 from 100.81

$$\begin{array}{r} 100.81 \\ - 32.77 \\ \hline 68.04 \end{array}$$

(e) 67.38 from 263.76

$$\begin{array}{r} 263.76 \\ - 67.38 \\ \hline 196.38 \end{array}$$

(d) 175.08 from 200.75

$$\begin{array}{r} 200.75 \\ - 175.08 \\ \hline 25.67 \end{array}$$

(f) 116.75 from 190

$$\begin{array}{r} \text{Here, } 190 = 190.00 \\ 190.00 \\ - 116.75 \\ \hline 73.25 \end{array}$$

3. Find the difference :

(a)  $100 - 78.65$

Here,  $100 = 100.00$

(Change into like decimal)

$$\begin{array}{r} \therefore 100.00 \\ - 78.65 \\ \hline 21.35 \end{array}$$

(c)  $33.75 - 12.8$

$$\begin{array}{r} \therefore 33.75 \\ - 12.80 \\ \hline 20.95 \end{array}$$

Here,  $12.8 = 12.80$

Change into like decimal.

(e)  $144.65 - 98.8$

$$\begin{array}{r} \therefore 144.65 \\ - 98.80 \\ \hline 45.85 \end{array}$$

Here,  $98.8 = 98.80$

Change into like decimal.

(b)  $136.75 - 28.805$

First change into like decimals.

$$\begin{array}{r} 136.750 \\ - 28.805 \\ \hline 107.945 \end{array}$$

(d)  $125.75 - 68.9$

$$\begin{array}{r} \therefore 125.75 \\ - 68.90 \\ \hline 56.85 \end{array}$$

Here,  $68.9 = 68.90$

Change into like decimal.

(f)  $375 - 198.96$

$$\begin{array}{r} \therefore 375.00 \\ - 198.96 \\ \hline 176.04 \end{array}$$

Here,  $375 = 375.00$

Change into like decimal.

4. Evaluate :

(a)  $28.4 - 2.66 + 2.35$

$$= 28.40 - 2.66 + 2.35 \quad (\text{Change into like decimals})$$

$$= (28.40 + 2.35) - 2.66$$

$$= 30.75 - 2.66$$

$$= 28.09$$

- (b)  $2.83 - 1.98 + 99.8 - 6.5$   
 $= 2.83 - 1.98 + 99.80 - 6.50$  (Change into like decimals)  
 $= 2.83 + 99.80 - 1.98 - 6.50$   
 $= 102.63 - 8.48$   
 $= 94.15$
- (c)  $75.2 - 8.68 + 1.25 - 2.5$   
 $= 75.20 - 8.68 + 1.25 - 2.50$  (Change into like decimal.)  
 $= 75.20 + 1.25 - 8.68 - 2.50$   
 $= 76.45 - 11.18 = 65.27$
- (d)  $77.6 - 35.28 + 78.75$   
 $= 77.60 - 35.28 + 78.75$  (Change into like decimals)  
 $= 77.60 + 78.75 - 35.28$   
 $= 156.35 - 35.28$   
 $= 121.07$
- (e)  $29.6 + 15.2 - 6.9$   
 $= 44.8 - 6.9$   
 $= 37.9$

5. Jenny's pocket money = ₹ 75.15

and her Orother's pocket money = ₹ 67.50

∴ Difference in pocket money = ₹ 75.15 - ₹ 67.50 = ₹ 7.65

6. Total money = ₹ 500.00

Cost of a purse = ₹ 75.50

and Cost of medicines = ₹ 121.35

∴ Amount of money was left with Dhani

$$= ₹ (500.00 - 75.50 - 121.35)$$

$$= ₹ (500.00 - 196.85)$$

$$= 303.15$$

Hence, the left money with Dhani is ₹ 303.15.

7. Given,

Temperature on tuesday =  $33.5^{\circ}\text{C}$ ,

Wenesday =  $40.2^{\circ}\text{C}$

and, Thursday =  $38.3^{\circ}\text{C}$

(a) The difference between temperature on Thursday and Tuesday

$$= 38.3^{\circ}\text{C} - 33.5^{\circ}\text{C}$$

$$= 4.8^{\circ}\text{C}$$

(b) The sum of temperature for the three days  
 $= 33.5^{\circ}\text{C} + 40.2^{\circ}\text{C} + 35.3^{\circ}\text{C} = 112^{\circ}\text{C}$

8. Amount of petrol filled in a car = 23 l 400 ml

Amount of petrol filled in two-wheeler = 6 l 250 ml

Amount of petrol filled in auto-rickshaw = 9 l 375 ml

$$\begin{aligned}\therefore \text{Total amount of petrol was sold at a petrol station} \\ &= 23 \text{ l } 400 \text{ ml} + 6 \text{ l } 250 \text{ ml} + 9 \text{ l } 375 \text{ ml} \\ &= 39 \text{ l } 025 \text{ ml} \\ &= 39 \text{ l } 25 \text{ ml} \\ &= (39.000 + 0.025) \text{ l} \\ &= 39.025 \text{ l}\end{aligned}$$

Hence, the required amount of petrol is 39.025 l.

9. Amount of money with Pawan = ₹ 701.50

According to question,

Amount of money with Saleem = ₹ 701.50 + ₹ 35.25 = ₹ 736.75

Hence, the required money for Saleem is ₹ 736.75.

10. Total length of fabric = 6.75 m.

Use of fabric = 3.45 m.

$$\begin{aligned}\therefore \text{The length of fabric left with Wahida} &= 6.75 \text{ m} - 3.45 \text{ m} \\ &= 3.3 \text{ m}\end{aligned}$$

Hence, the required left length of fabric with Wahida is 3.3 m.

## Exercise 7.5

1. Multiply :

(a)  $3.6 \times 8 = 28.8$

$$\begin{array}{r} \text{(b) } 6.65 \times 1.6 \\ = 10.640 \\ = 10.64 \end{array} \quad \begin{array}{r} 665 \\ \times 16 \\ \hline 3990 \\ + 665 \\ \hline 10640 \end{array}$$

$$\begin{array}{r} \text{(c) } 3.82 \times 2.6 \\ = 9.932 \end{array} \quad \begin{array}{r} 382 \\ \times 26 \\ \hline 2292 \\ + 7640 \\ \hline 9932 \end{array}$$

(d) $165.2 \times 1.2$ $= 198.24$	$  \begin{array}{r}  1652 \\  \times 12 \\  \hline  3304 \\  + 16520 \\  \hline  19824  \end{array}  $
(e) $2.88 \times 3.2$ $= 9.216$	$  \begin{array}{r}  288 \\  \times 32 \\  \hline  576 \\  + 8640 \\  \hline  9216  \end{array}  $
(f) $2.65 \times 3.12$ $= 8.2680$ $= 8.268$	$  \begin{array}{r}  265 \\  \times 312 \\  \hline  530 \\  2650 \\  79500 \\  \hline  82680  \end{array}  $
(g) $7.65 \times 7.1$ $= 54.315$	$  \begin{array}{r}  765 \\  \times 71 \\  \hline  765 \\  53550 \\  \hline  54315  \end{array}  $
(h) $2.862 \times 0.1$ $= 0.2862$	$  \begin{array}{r}  2862 \\  \times 1 \\  \hline  2862  \end{array}  $
(i) $31.76 \times 2.8$ $= 88.928$	$  \begin{array}{r}  3176 \\  \times 28 \\  \hline  25408 \\  + 63520 \\  \hline  88928  \end{array}  $

2. Find the products :

- (a)  $7.12 \times 10 = 71.20 = 71.2$       (b)  $7.68 \times 100 = 768.00 = 768$   
(c)  $0.0052 \times 1000 = 005.2000 = 5.2$   
(d)  $7.1285 \times 1000 = 7128.5000 = 7128.5$   
(e)  $2.8362 \times 100 = 283.6200 = 283.62$   
(f)  $0.7812 \times 100 = 78.1200 = 78.12$

3. Perform the following divisions :

$$(a) \quad 2.24 \div 1.6 = \frac{2.24}{1.6} = \frac{22.4}{16}$$

$$\text{Thus, } 2.24 \div 1.6 = 1.4$$

$$\begin{array}{r} 16 \overline{) 22.4} \left( 1.4 \right. \\ \underline{-16} \downarrow \\ 64 \\ \underline{-64} \\ 0 \end{array}$$

$$(b) \quad 0.408 \div 0.17$$

$$0.408 \div 0.17 = 40.8 \div 17$$

$$\text{Thus, } 0.408 \div 0.17 = 2.4$$

$$\begin{array}{r} 17 \overline{) 40.8} \left( 2.4 \right. \\ \underline{-34} \downarrow \\ 68 \\ \underline{-68} \\ 0 \end{array}$$

$$(c) \quad 6.25 \div 2.5 = 62.5 \div 25$$

$$\text{Thus, } 6.25 \div 2.5$$

$$\begin{array}{r} 25 \overline{) 62.5} \left( 2.5 \right. \\ \underline{-50} \downarrow \\ 125 \\ \underline{-125} \\ 0 \end{array}$$

$$(d) \quad 1.331 \div 0.11 = 133.1 \div 11$$

$$\text{Thus, } 1.331 \div 0.11 = 12.1$$

$$\begin{array}{r} 11 \overline{) 133.1} \left( 12.1 \right. \\ \underline{-11} \downarrow \\ 23 \\ \underline{-22} \downarrow \\ 11 \\ \underline{-11} \\ 0 \end{array}$$

$$(e) \quad 0.213 \div 0.3 = 2.13 \div 3$$

$$\text{Thus, } 0.213 \div 0.3 = 0.71$$

$$\begin{array}{r} 3 \overline{) 2.13} \left( 0.71 \right. \\ \underline{-0} \downarrow \\ 21 \\ \underline{-21} \downarrow \\ 3 \\ \underline{-3} \\ 0 \end{array}$$

$$(f) \quad 77.33 \div 1.1 = 773.3 \div 11$$

$$\text{Thus, } 77.33 \div 1.1 = 70.3$$

$$\begin{array}{r} 11 \overline{) 773.3} \left( 70.3 \right. \\ \underline{-77} \downarrow \\ 3 \\ \underline{-0} \downarrow \\ 33 \end{array}$$

$$(g) \quad \underbrace{0.196}_{\curvearrowright} \div \underbrace{2.8}_{\curvearrowright} = 1.93 \div 28$$

$$\text{Thus, } 0.196 \div 2.8 = 0.07$$

$$\begin{array}{r} 28 \overline{) 1.96} (0.07 \\ \underline{-0} \downarrow \\ 19 \downarrow \\ \underline{-0} \downarrow \\ 196 \\ \underline{-196} \\ 0 \end{array}$$

$$(h) \quad \underbrace{8.005}_{\curvearrowright} \div \underbrace{0.05}_{\curvearrowright} = 800.5 \div 5$$

$$\text{Thus, } 8.005 \div 0.05 = 160.1$$

$$\begin{array}{r} 5 \overline{) 800.5} (160.1 \\ \underline{-5} \downarrow \\ 30 \downarrow \\ \underline{-30} \downarrow \\ 0 \downarrow \\ \underline{-0} \downarrow \\ 5 \\ \underline{-5} \\ 0 \end{array}$$

$$(i) \quad \underbrace{76.363}_{\curvearrowright} \div \underbrace{0.7}_{\curvearrowright} = 763.63 \div 7$$

$$\text{Thus, } 76.363 \div 0.7 = 109.09$$

$$\begin{array}{r} 7 \overline{) 763.63} (109.09 \\ \underline{-7} \downarrow \\ 06 \downarrow \\ \underline{-0} \downarrow \\ 63 \downarrow \\ \underline{-63} \downarrow \\ 06 \downarrow \\ \underline{-0} \downarrow \\ 63 \\ \underline{-63} \\ 0 \end{array}$$

$$(j) \quad \underbrace{1.296}_{\curvearrowright} \div \underbrace{0.108}_{\curvearrowright} = 1296 \div 108$$

$$\text{Thus, } 1.296 \div 0.108 = 12$$

$$\begin{array}{r} 108 \overline{) 1296} (12 \\ \underline{-108} \downarrow \\ 216 \\ \underline{-216} \\ 0 \end{array}$$

$$(k) \quad 81.33 \div 0.03 = 8133 \div 3$$

$$\text{Thus, } 81.33 \div 0.03 = 2711$$

$$\begin{array}{r} 3 \overline{) 8133} (2711 \\ \underline{-6} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ 21 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \underline{-21} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ 3 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \underline{-3} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ 0 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \underline{-0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ 0 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \end{array}$$

$$(l) \quad 4.41 \div 0.04 = 441 \div 4$$

$$\begin{array}{r} 4 \overline{) 441.00} (110.25 \\ \underline{-4} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ 04 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \underline{-4} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ 01 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \underline{-0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ 10 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \underline{-8} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ 20 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \underline{-20} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ 0 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \end{array}$$

$$\text{Thus, } 4.41 \div 0.04 = 110.25$$

4. Find out the quotients :

$$(a) \quad 7.165 \div 10 = 0.7165$$

(Decimal point is shifted by one place to the left)

$$(b) \quad 785.16 \div 100 = 7.8516$$

(Decimal point is shifted by two places to the left)

$$(c) \quad 3368 \div 1000 = 3368.0 \div 1000 = 3.368$$

(Decimal point is shifted by three places to the left)

$$(d) \quad 17852 \div 100 = 17852.0 \div 100 = 178.52$$

(Decimal point is shifted by two places to the left.)

$$(e) \quad 28.96 \div 100 = 0.2896$$

(Decimal point is shifted by two places to the left).

$$(f) \quad 7186 \div 1000 = 7186 \div 1000 = 7.186$$

(Decimal point is shifted by three places to the left)

5. Given,

Cost of 75 books = ₹ 2043.75  
 $\therefore$  Cost of a single book = ₹ 2043.75  $\div$  75

Hence, the cost of a single book is ₹ 27.25.

$$\begin{array}{r} 75 \overline{) 2043.75} (27.25 \\ \underline{-150} \phantom{0} \downarrow \\ 543 \phantom{0} \downarrow \\ \underline{-525} \phantom{0} \downarrow \\ 187 \phantom{0} \downarrow \\ \underline{-150} \phantom{0} \downarrow \\ 375 \phantom{0} \downarrow \\ \underline{-375} \\ 0 \end{array}$$

6. Daily wages amount paid by a worker = ₹ 87.75

$\therefore$  The total amount paid for 23 workdays  
 $= ₹ 87.75 \times 23$   
 $= ₹ 2018.25$

Hence, the required amount is ₹ 2018.25.

$$\begin{array}{r} 8775 \\ \times 23 \\ \hline 26325 \\ + 175500 \\ \hline 201825 \end{array}$$

7. Given,

Total length of cloth = 17.5 m.

Cloth required for a shirt = 2.5 m.

$\therefore$  Number of shirts can be made from this cloth  
 $= 17.5 \text{ m} \div 2.5 \text{ m}$   
 $= 175 \div 25$   
 $= 7$

Hence, the required number of shirts are 7.

8. Total amount of water = 74.1 litres

A container can hold amount of water = 5.7 litres

$\therefore$  Number of containers required  
 $= 74.1 \div 5.7$   
 $= 741 \div 57$   
 $= 13$

$$\begin{array}{r} 57 \overline{) 741} (13 \\ \underline{-57} \\ 171 \\ \underline{-171} \\ 0 \end{array}$$

Thus, the required number of containers are 13.

9. Given,

The cost of one metre cloth = ₹ 46

and, Total amount for cloth bought by Yogesh = ₹ 425.50

∴ the required length of cloth (in m.)

$$= ₹ 425.50 \div 46$$

$$= 9.25$$

Hence, the required length of the cloth is 9.25 m.

**10.** Given,

Total length of string = 72.75 m

and, length of one piece of string = 14.55 m

∴ the number of pieces cut out from the rope (string)

$$= 72.75 \text{ m} \div 14.55 \text{ m}$$

$$= 7275 \div 1455$$

$$= 5$$

Hence, the required number of pieces are 5.

### **Mental Ability**

**A. Multiple Choice Questions (MCQ) :**

1. (d) 2. (d) 3. (c) 4. (d) 5. (d) 6. (a) 7. (d) 8. (c) 9. (a) 10. (b) 11. (a)  
12. (b)

**B. Fill in the blanks :**

1. The sum of 0.7, 0.77 and 0.777 is **2.247**.
2. The difference of the place values of 7 and 3 in 93.178 is **2.93**.
3.  $5000 + 70 + 6 + \frac{1}{10} + \frac{2}{100}$  can be expressed as **5076.12**.
4. The value of  $\frac{89}{100}$  is **0.89**.
5. 3 ones, 4 tenths, 0 hundredths and 1 thousandths in decimal form is **3.41**.

**C. State True (T) or False (F) :**

1. F 2. T 3. F 4. T 5. F

**D. Match the following :**

- (1) → iv, (2) → i, (3) → ii, (4) → iii

## Exercise 8.1

- Write the following algebraic expressions Using signs and symbols :
  - $5x + 8$
  - $\frac{p}{3} + 5$
  - $6a + 3b$
  - $10 - 5x$
  - $x - 9$
  - $3x - ab$
- Write down the terms of the following algebraic expressions :
  - $x, y$
  - $2a, 3b, -c$
  - $2abc^2, -2ab, > a^2c$
  - $2ab, 4ac^2, -6z$
- Identify monomials, binomials and trinomials from the following :
  - Monomial
  - Binomial
  - Binomial
  - trinomial
  - trinomial
- Which of the following groups have like or unlike terms?
  - (a), (e) and (f) are like terms.
  - (b), (c) and (d) are unlike terms.
- Write the following in exponential form :
  - $a \times a \times b \times b = a^2 b^2$
  - $d \times d \times d \times d \times d = d^5$
  - $z \times z \times z \times z = z^4$
  - $pq \times pq \times pq = (pq)^3$
  - $Z \times Z \times Z \times K \times K \times K = Z^3 K^3$
- Write the following in expanded form :
  - $a^4 = a \times a \times a \times a$
  - $p^5 = p \times p \times p \times p \times p$
  - $(pq)^3 (pq)^3 = pq \times pq \times pq$
- Fill in the blanks :
  - The coefficient of b in  $\left(\frac{-1}{2} + b\right)$  is **1**.
  - $18xy$  is a monomial.
  - $(-23x)$  and  $(-23y)$  are **Unlike** terms.
  - The literal factor in  $(-3xy)$  is **-3**.
  - Three times p increased by 7 is  $3p + 7$ .

## Exercise 8.2

1. (a) and (b) are not equations.
2. Write an equation for each of the following statements :
  - (a) The sum of three times  $x$  and 8 is 17.  
$$3x + 8 = 17$$
  - (b) The difference between one-fifth of  $x$  and one-tenth of  $x$  is 3.  
$$\frac{x}{5} - \frac{x}{10} = 3$$
3. Write an equation for each of the following statements :
  - (a) If 7 is added to a number, their sum will be equal to 21.  
 $\therefore$  Let the number be ' $x$ '.  
Sum of  $x$  and 7 =  $(x + 7)$   
According to questions,  
$$x + 7 = 21$$
  
Which is required equation.
  - (b) When three times a number is added to 1, their sum will be equal to 10.  
Let the number be ' $x$ '.  
$$3x + 1 = 10$$
  
Which is required equation.
  - (c) Take away 10 from  $7x$  to get a difference of 32.  
Take away 10 from  $7x = (7x - 10)$   
According to question,  
$$(7x - 10) = 32$$
  
$$\Rightarrow 7x - 10 = 32$$
  
Which is required equation.
4. Distance covered by Ruchi on foot =  $4x$  km.  
Distance covered by Ruchi by cycle =  $2y$  km.  
and distance covered by Ruchi by bus = 9 km.  
According to question,  
The total distance covered by Ruchi =  $(4x + 2y + 9)$  km.  
hence, the distance covered by Ruchi is  $(4x + 2y + 9)$  km.

5. Given,

The breadth of rectangular hall be ' $b$ ' m.

According to question,

The length of the rectangular hall =  $(3b - 4)$  m.

Hence, the required length of hall is  $(3b - 4)$  m.

6. Given that,

$$m = 6, n = 4 \text{ and } p = 2$$

(a) The value of  $(3m - 4n + 2p)$

$$= 3 \times 6 - 4 \times (4) + 2 \times 2$$

$$= 18 - 16 + 4$$

$$= 22 - 16 = 6$$

(b) The value of  $(6n + 8p - 7m)$

$$= 6 \times 4 + 8 \times 2 - 7 \times 6$$

$$= 24 + 16 - 42$$

$$= 40 - 42 = -2$$

(c) The value of  $(11p + 12n - 6m)$

$$= 11 \times 2 + 12 \times 4 - 6 \times 6$$

$$= 22 + 48 - 36$$

$$= 70 - 36 = 34$$

(d) The value of  $(5m - 6n - 2p)$

$$= 5 \times 6 - 6 \times 4 - 2 \times 2$$

$$= 30 - 24 - 4$$

$$= 30 - 28 = 2$$

7. Given that,

$$S = \frac{1}{2}, t = 4 \text{ and } u = \frac{1}{3}$$

Now,

(a) The value of  $(5t + s + u)$

$$= 5 \times 4 + \frac{1}{2} + \frac{1}{3}$$

$$= \frac{20}{1} + \frac{1}{2} + \frac{1}{3}$$

$$\begin{aligned}
 &= \frac{20 \times 6 + 1 \times 3 + 1 \times 2}{6} \\
 &= \frac{120 + 3 + 2}{6} = \frac{125}{6}
 \end{aligned}$$

(b) The value of  $(7t - s - u)$

$$\begin{aligned}
 &= 7 \times 4 - \frac{1}{2} - \frac{1}{3} \\
 &= \frac{28}{1} - \frac{1}{2} - \frac{1}{3} \\
 &= \frac{28 \times 6 - 1 \times 3 - 1 \times 2}{6} \\
 &= \frac{168 - 3 - 2}{6} = \frac{168 - 5}{6} = \frac{163}{6}
 \end{aligned}$$

(c) The value of  $(s + 4t - u)$

$$\begin{aligned}
 &= \frac{1}{2} + 4 \times 4 - \frac{1}{3} \\
 &= \frac{1}{2} + \frac{16}{1} - \frac{1}{3} \\
 &= \frac{1 \times 3 + 16 \times 6 - 1 \times 2}{6} \\
 &= \frac{3 + 96 - 2}{6} = \frac{97}{6}
 \end{aligned}$$

(d) The value of  $(u - s + 3t)$

$$\begin{aligned}
 &= \frac{1}{3} - \frac{1}{2} + 3 \times 4 \\
 &= \frac{1}{3} - \frac{1}{3} + \frac{12}{1} \\
 &= \frac{1 \times 2 - 1 \times 3 + 12 \times 6}{6} = \frac{2 - 3 + 72}{6} = \frac{71}{6}
 \end{aligned}$$

### Exercise 8.3

1. Solve the following equations by the trial and error method :

(a)  $3x + 1 = 10$

We try different values of  $x$  to find L.H.S. = R.H.S.

S. No.	Values of $x$	LHS = $(3x + 1)$	R.H.S. = (10)	LHS = RHS
1.	1	$3 \times 1 = 4$	10	No
2.	2	$3 \times 2 + 1 = 7$	10	No
3.	3	$3 \times 3 + 1 = 10$	10	Yes

From the above table, we find that

LHS = RHS, when  $x = 3$

$\therefore$  Solution is  $x = 3$

(b)  $4y = 20$

We try different values of  $y$  to find LHS = RHS

S.No.	Values of $y$	LHS = $4y$	RHS = (20)	LHS = RHS
1.	1	$4 \times 1 = 4$	20	No
2.	2	$4 \times 2 = 8$	20	No
3.	3	$4 \times 3 = 12$	20	No
4.	4	$4 \times 4 = 16$	20	No
5.	5	$4 \times 5 = 20$	20	Yes

From the above table, we find that

LHS = RHS, when  $y = 5$

$\therefore$  Solution is,  $y = 5$ .

(c)  $\frac{x}{4} - 10 = 1$

We try different values of  $x$  to find LHS = RHS.

S. No.	Values of $x$	LHS = $\frac{x}{4} - 10$	RHS = (1)	LHS = RHS
1.	1	$\frac{1}{4} - 10 = \frac{-39}{4}$	1	No
2	2	$\frac{2}{4} - 10 = \frac{-38}{4}$	1	No
:	:	:	:	:

:	:	:	:	:
39	36	$\frac{39}{4}-10=\frac{-1}{4}$	1	No
40	40	$\frac{40}{4}-10=0$	1	No
41	41	$\frac{41}{4}-10=\frac{1}{4}$	1	No
42	42	$\frac{42}{4}-10=\frac{2}{4}$	1	No
43	43	$\frac{43}{4}-10=\frac{3}{4}$	1	No
44	44	$\frac{44}{4}-10=\frac{4}{4}=1$	1	Yes

From the above table, we find that

LHS = RHS, when  $x = 44$

∴ Solution is  $x = 44$

2. Use the following equations by trial and error method :

(a)  $3z + 12 = 15$

We try different values of  $Z$  to find LHS = RHS

S. No.	Values of $Z$	LHS $= 3Z + 12$	RHS = (12)	LHS = RHS
1.	1	$3 \times 1 + 12 = 15$	15	Yes

From the above table, we find that

LHS = RHS, when  $Z = 1$

∴ Solution is  $Z = 1$

(b)  $5 - \frac{b}{3} = 2$

We try different values of  $b$  to find

LHS = RHS

S. No.	Values of $b$	LHS = $5 - \frac{b}{3}$	RHS = 2	LHS = RHS
1.	3	$5 - \frac{3}{3} = 5 - 1 = 4$	2	No
2.	6	$5 - \frac{6}{3} = 5 - 2 = 3$	2	No
3.	9	$5 - \frac{9}{3} = 5 - 3 = 2$	2	Yes

From the above table, we find that, LHS = RHS, when  $b = 9$ .

∴ Solution is  $b = 9$ .

(c)  $28 = 4 + 3(x + 5)$

We try different values of  $x$  to find LHS = RHS

S. No.	Values of $x$	RHS = $4 + 3(x + 5)$	L.H.S. = 28	L.H.S. = R.H.S.
1.	1	$4 + 3(1 + 5) = 22$	28	No
2.	2	$4 + 3(2 + 5) = 25$	28	No
3.	3	$4 + 3(3 + 5) = 28$	28	Yes

From the above table, we find that

LHS = RHS, when  $x = 3$

∴ Solution is  $x = 3$ .

(d)  $0 = 16 + (m - 6)4$

We try different values of  $m$  to find LHS = RHS

S. No.	Values of $m$	RHS = $16 + (m - 6)4$	LHS = 0	LHS = RHS
1.	0	$16 + (0 - 6)4 = -8$	0	No
2.	1	$16 + (1 - 6)4 = -4$	0	No
3.	2	$16 + (2 - 6)4 = 0$	0	Yes

From the above table, we find that

LHS = RHS, when  $m = 2$ ,

∴ Solution is  $m = 2$ .

(e)  $3x - 14 = x - 8$

We try different values of  $x$  to find LHS = RHS

S. No.	Value of $x$	LHS = $3x - 4$	RHS = $x - 8$	LHS = RHS
1.	1	$3 \times 1 - 14 = -11$	$1 - 8 = -7$	No
2.	2	$3 \times 2 - 14 = -8$	$2 - 8 = -6$	No
3.	3	$3 \times 3 - 14 = -5$	$3 - 8 = -5$	Yes

From the above table, we find that LHS = RHS, when  $x = 3$ .

∴ Solution is  $x = 3$ .

(f)  $-4(2 - x) = 12$

We try different values of  $x$  to find LHS = RHS

S. No.	Values of $x$	LHS = $-4(2 - x)$	RHS = 12	LHS = RHS
1.	1	$-4(2 - 1) = -4$	12	No
2.	2	$-4(2 - 2) = 0$	12	No
3.	3	$-4(2 - 3) = 4$	12	No
4.	4	$-4(2 - 4) = 8$	12	No
5.	5	$-4(2 - 5) = 12$	12	Yes

From the above table, we find that

LHS = RHS, when  $x = 5$ .

∴ Solution is  $x = 5$ .

3. Let the required number be ' $x$ '.

According to question,

$$92 - x = 32$$

$$\Rightarrow 92 - 32 = x$$

$$\Rightarrow 60 = x$$

$$\Rightarrow x = 60$$

Hence, the required number is 60.

4. Let the required number be 'x'.

$$\text{One-fourth of the number} = \frac{1}{4}x$$

According to question,

$$\frac{1}{4}x - 4 = 8$$

$$\Rightarrow \frac{1}{4}x = 8 + 4$$

$$\Rightarrow \frac{1}{4}x = 12$$

$$\Rightarrow x = 12 \times 4 = 48.$$

Hence, the required number is 48.

5. Let the required number be 'x'.

Now, Twice the number =  $2x$

and, 3 times the number =  $3x$

According to question,

$$2x + 3x = 90$$

$$\Rightarrow 5x = 90$$

$$\Rightarrow x = 90 \div 5 = 18$$

Hence, the required number is 18.

6. Let the required number be 'x'.

6-times the number =  $6x$

According to question,

$$6x - 10 = 32$$

$$\Rightarrow 6x = 32 + 10$$

$$\Rightarrow 6x = 42$$

$$\Rightarrow x = 42 \div 6 = 7$$

Hence, the required number is 7.

7. Let the unknown number be 'x'.

Now, one-third of the number =  $\frac{1}{3}x$

According to question,

$$\frac{1}{3}x + 9 = 19$$

$$\Rightarrow \frac{1}{3}x = 19 - 9 = 10$$

$$\Rightarrow x = 10 \times 3 = 30$$

Hence, the unknown number is 30.

8. Let the age of Krishna be  $x$ -years.

So, Age of Reshma =  $(3x)$  years

According to question,

$$x + 3x = 56$$

$$\Rightarrow 4x = 56$$

$$\Rightarrow x = 56 \div 4 = 14$$

Hence, The age of Reshma =  $3 \times 14 = 42$  years

and the age of Krishna = 14 years

9. Let three consecutive integers are

$x$ ,  $(x + 1)$  and  $(x + 2)$

According to question,

$$x + (x + 1) + (x + 2) = 45$$

$$\Rightarrow 3x + 3 = 45$$

$$\Rightarrow 3x = 45 - 3 = 42$$

$$\Rightarrow x = 42 \div 3 = 14$$

Hence, the required integers are 14, 15, 16.

10. Let the breadth of rectangle = ' $x$ ' cm

$\therefore$  Length of rectangle =  $(x + 2)$  cm

We have,

Perimeter of rectangle = 28 cm

$$\Rightarrow 2[(x + 2) + x] = 28 \text{ cm}$$

$$\Rightarrow 2 \times (2x + 2) = 28$$

$$\Rightarrow 2x + 2 = 14 \text{ cm}$$

$$\Rightarrow 2x = (14 - 2) \text{ cm}$$

$$\Rightarrow 2x = 12 \text{ cm}$$

$$\Rightarrow x = 6 \text{ cm}$$

Hence, Length of the rectangle =  $(6 + 2)$  cm = 8 cm  
and breadth of the rectangle = 6 cm

### Mental Ability

#### A. Multiple Choice Questions (MCQ) :

1. (c) 2. (a) 3. (a) 4. (c) 5. (a)

#### B. Fill in the blanks :

- $3x^3 + 5xy^2$  is the **binomial** expression.
- In  $x^5$ ,  $x$  is called **base**.
- $a \times a \times b \times b \times b \times c$  is written as  **$a^2 b^3 c$** .
- An algebraic expression containing three terms is called a **trinomials**.
- The numerical coefficient of  $pqr$  is 1.

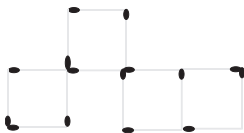
#### C. Match the following :

1. (ii) 2. (v) 3. (i) 4. (iii) 5. (iv)

### Higher Order Thinking Skill (HOTS)

**Sol.** Yes, I can remove 7 matchsticks to make 4 identical squares.

Figure is shown as follows :



### Chapter

9

## 3-D Shapes

### Exercise 9

#### 1. Fill in the blanks :

- A **triangle pyramid** has triangle base and three triangular lateral faces.
- A **solid** is an object that occupies space.
- The **opposite** faces of a cuboid are identical.
- An object that occupies space is called a **solid**.

- (e) A sphere has a **curved** surface.
  - (f) A triangular pyramid is also called a **tetrahedron**.
  - (g) A tennis ball is an example of **sphere**.
  - (h) A triangular prism has **6** vertices and **9** edges.
2. Give examples of four objects which are in the shape of :
- (a) Cone → Ice-cream cone, Joker's cap, Birthday Cap and Conical vessel.
  - (b) Cylinder → Circular pipe, New pencil, test tube and Gas cylinder.
  - (c) Cube → Ice-cube, Sugar cube, wooden cube and dice.
  - (d) Sphere → Football, Tennis ball, marbles and cricket ball.
3. Name a solid :
- (a) Sphere                      (b) Cylinder                      (c) Square pyramid
4. Match the following :
- (a) → iv; (b) → v; (c) → i; (d) → ii; (e) → iii.
5. Match the shape to its net :
- (a) → ii; (b) → iv; (c) → iii; (d) → v; (e) → (i)

## Mental Ability

### A. Multiple Choice Questions (MCQ) :

1. (c) 2. (d) 3. (a) 4. (a) 5. (c) 6. (b) 7. (a) 8. (b)

### B. Fill in the blanks :

- 1. A polygon has at least **three** sides.
- 2. A square pyramid has **four** triangular faces and a **square** base.
- 3. A heptagon has **seven** Sides.
- 4. The point where three edge meet is called a **vertex**.
- 5. **Sphere** has no vertex and no edge.

### C. State True (T) or False (F) :

1. (T) 2. (F) 3. (F) 4. (T) 5. (F)

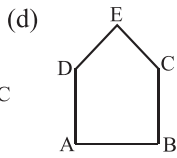
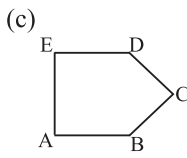
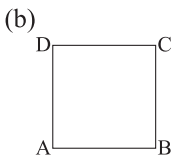
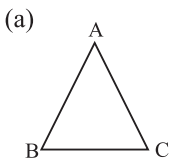
### D. Match the following :

1. (d) 2. (c) 3. (b) 4. (a) 5. (e)

## Exercise 10.1

- State whether the following statements are True or False :
 

(a) False	(b) True	(c) True	(d) False
(e) False	(f) False	(g) True	(h) False
(i) True	(j) False	(k) True	(l) True
- Look at the adjacent figure and answer the following questions :
  - $A, B, C, D, E, F, G, H$
  - 12,  $AB, BC, CD, DA, EF, FG, GH, HE, AE, DH, BF, CG$
  - $BF, EF, GF$
  - $AB, CB, FB$
  - Two groups are  $(AE, BF, CG, DH)$  and  $(AB, DC, EF, HG)$
- Name the points shown in the figures given below and join them by all possible line segments :



- A line has no beginning and no end point while a line segment has fix beginning and end points.
- A ray has only one end point while a line has no end point.
- $\overrightarrow{AB}, \overrightarrow{AQ}, \overrightarrow{AC}, \overrightarrow{AD}$
- $15, \overline{PA}, \overline{PB}, \overline{PQ}, \overline{AB}, \overline{AQ}, \overline{AD}, \overline{AC}, \overline{BQ}, \overline{RD}, \overline{RC}, \overline{RS}, \overline{DC}, \overline{CS}, \overline{BC}$
- $\overline{PQ} \parallel \overline{RS}$
- $(\overline{AD}, \overline{BC}); (\overline{AD}, \overline{AC}); (\overline{AC}, \overline{BC})$
- $\overline{AD}$  and  $\overline{AC}$  intersect at  $A$ ,  $\overline{AC}$  and  $\overline{BC}$  intersect at  $C$ ,  $\overline{PQ}$  and  $\overline{AD}$  intersect at  $A$ ,  $\overline{PQ}$  and  $\overline{BC}$  intersect at  $B$  and so on.

(f)  $\leftrightarrow \leftrightarrow \leftrightarrow$   
 $RS, AC, BC$

(g)  $\leftrightarrow \leftrightarrow$   
 $PQ, BC$

(h)  $\leftrightarrow \leftrightarrow \leftrightarrow$   
 $PQ, AC, AD$

7. (a) Infinite (b) only one

8. (a) Yes,  $B$  is the mid point of  $AC$ .

(b) Yes,  $C$  is the mid point of  $BD$ .

9.  $PX = XQ = \frac{15}{2} = 7.5$  cm and  $PY = PR = \frac{20}{2} = 10$  cm.

10. Infinite

11.  $\begin{matrix} \text{A} & \text{B} & \text{D} \\ & \text{C} & \text{E} \end{matrix}$

12. (a) Tip of the point, tip of a pen, tip of the ice-cream cone.

(b) Boundaries of a block boards, the edges of a table, greeting card etc.

(c) Sun rays, light emitted by the torch, a projector.

(d) adjacent walls of a room, 1 sing of  $X$ , both arms of a scissor.

(e) Railway track, opposite sides of a rectangle, opposite sides of a ruler.

### Exercise 10.2

1. Classify the curves as simple or not simple :

(a), (b) and (d) are not simple curve.

2. Classify curves as open or closed :

(a) and (c) are closed curve.

3. Identify the polygons from the following :

(a), (b) and (d) are polygons.

4. Draw the following :

(a)

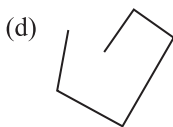


(b)

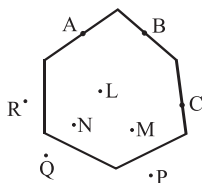


(c)

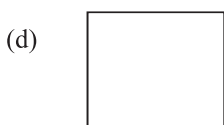
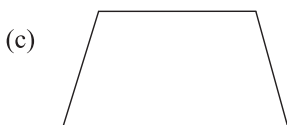




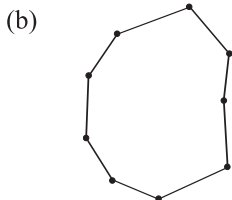
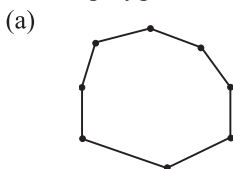
5.



6. If possible, draw the following :

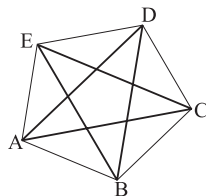


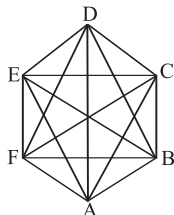
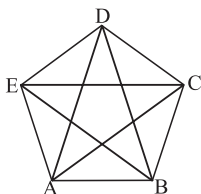
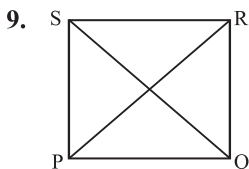
7. Draw a polygon having :



8. Draw a pentagon. Name its :

- (a)  $A, B, C, D$  and  $E$
- (b)  $(AB, BC); (BC, CD); (CD, DE); (DE, EA); (EA, AB)$
- (c)  $(A, B); (B, C); (C, D); (D, E); (E, A)$
- (d)  $AC, BD, CE, DA, EB$





10. Fill in the blanks :

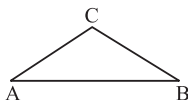
- A polygon is a simple closed curve formed by more than **two** line segments.
- A curve that ends at the starting point is called a **closed curve**.
- A polygon having three line segments is called a **triangle**.
- A polygon having four line segments is called a **quadrilateral**.

### Exercise 10.3

1.  $\angle SOR, \angle ROQ, \angle QOP, \angle ROP, \angle SOP$

Adjacent angles :  $\angle SOR$  &  $\angle ROQ$ ;  $\angle ROQ$  &  $\angle QOP$ ;  $\angle SOR$  &  $\angle ROP$ ;  $\angle QOP$  &  $\angle SOQ$ .

2. Straight line, Triangle.



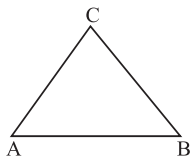
3. In the given figure, find the

- $\triangle ABC, \triangle AFE, \triangle FDB, \triangle EDC, \triangle DEF$
- $\triangle AFE, \triangle FED, \triangle EDC$
- $\overline{EF}, \overline{EC}, \overline{FB}$ .

4.  $\overline{AB}, \overline{BC}, \overline{BD}$

5. Vertices— $A, B, C$ ; Sides— $AB, BC, AC$ ;

Angles— $\angle A, \angle B, \angle C$



6. Let two angles of a triangle are  $x^\circ$ ,  $(2x)^\circ$  third angle =  $60^\circ$ .

By angle sum property of triangle

$$x + 2x + 60^\circ = 180^\circ$$

$$\Rightarrow 3x = 180^\circ - 60^\circ$$

$$\Rightarrow 3x = 120^\circ$$

$$\Rightarrow x = 120^\circ \div 3 = 40^\circ$$

Hence, the required angles are  $40^\circ$  and  $80^\circ$ .

### Exercise 10.4

- Write all the points, which lie :  
 (a)  $P, U, V$                       (b)  $R, S$                       (c)  $A, B, C, D, T$
- A quadrilateral in which the measure of each angle is less than  $180^\circ$  is called a convex quadrilateral. In concave quadrilateral one of the angles is more than  $180^\circ$  but less than  $360^\circ$ .
- Classify the following quadrilaterals as convex or concave :  
 (a) Convex      (b) Concave      (c) Convex      (d) Concave
- We have,

Sum of all angles of a quadrilateral =  $360^\circ$

$$\Rightarrow 100^\circ + 70^\circ + 120^\circ + x^\circ = 360^\circ$$

$$\Rightarrow 290^\circ + x^\circ = 360^\circ$$

$$\Rightarrow x^\circ = 360^\circ - 290^\circ = 70^\circ$$

- Given that,

All angles of a quadrilateral are :  $40^\circ, 30^\circ, 105^\circ$  and  $85^\circ$ .

Here, one angle is more than  $180^\circ$ .

$\therefore$  given quadrilateral is concave.

- Let all angles of quadrilateral are  $(1x)^\circ, (2x)^\circ, (3x)^\circ$  and  $(4x)^\circ$ .

Sum of all angles of quadrilateral =  $360^\circ$

$$1x^\circ + 2x^\circ + 3x^\circ + 4x^\circ = 360^\circ$$

$$\Rightarrow 10x^\circ = 360^\circ$$

$$\Rightarrow x^\circ = 360^\circ \div 10 = 36^\circ$$

Hence, the required angles of quad. are :

$$1x^\circ = 1 \times 36^\circ = 36^\circ$$

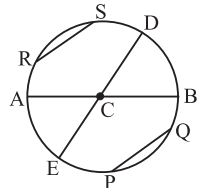
$$2x^\circ = 2 \times 36^\circ = 72^\circ$$

$$3x^\circ = 3 \times 36^\circ = 108^\circ$$

$$\text{and, } 4x^\circ = 4 \times 36^\circ = 144^\circ.$$

### Exercise 10.5

- Draw a circle and mark the following :  
 (a)  $C$                       (b)  $CD$                       (c)  $AB$   
 (d)  $PQ$  and  $RS$       (e)  $AB$  and  $DE$

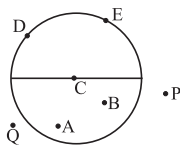


2. Draw a circle and mark the following :

(a)  $A, B$

(b)  $D, E$

(c)  $P, Q$



3. Find the diameter  $d$  of a circle when its radius  $r$  is :

(a)  $r = 4$  cm

(b)  $r = 5$  cm

$$\therefore d = 2r$$

$$\therefore d = 2r$$

$$= 2 \times 4 \text{ cm}$$

$$= 2 \times 5 \text{ cm}$$

$$= 8 \text{ cm}$$

$$= 10 \text{ cm}$$

(c)  $r = 7.5$  cm

(d)  $r = 14.5$  cm

$$\therefore d = 2r$$

$$\therefore d = 2r$$

$$= 2 \times 7.5 \text{ cm}$$

$$= 2 \times 14.5 \text{ cm}$$

$$= 15 \text{ cm}$$

$$= 29 \text{ cm}$$

4. Find the radius of a circle when its diameter is :

(a)  $d = 6$  cm

(b)  $d = 8$  cm

$$\therefore r = \frac{d}{2}$$

$$\therefore r = \frac{d}{2}$$

$$= \frac{6 \text{ cm}}{2}$$

$$= \frac{8 \text{ cm}}{2}$$

$$= 3 \text{ cm}$$

$$= 4 \text{ cm}$$

(b)  $d = 18$  cm

(d)  $d = 8.5$  cm

$$\therefore r = \frac{d}{2}$$

$$\therefore r = \frac{d}{2}$$

$$= \frac{18}{2} \text{ cm}$$

$$= \frac{8.5}{2} \text{ cm}$$

$$= 9 \text{ cm}$$

$$= 4.25 \text{ cm}$$

5. In the adjoining figure, identify :

(a)  $C$

(b)  $CA, CB, CD, CE$

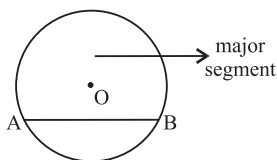
(c)  $Ae$

(d)  $EF$

(e)  $R, Q, P$

(f)  $CDB$

(g)  $AB, BD, ED$



6.

## Mental Ability

### A. Multiple Choice Questions (MCQ) :

1. (a) 2. (a) 3. (b) 4. (a) 5. (c) 6. (a) 7. (a) 8. (d)

### B. Fill in the blanks :

1. A line has **no** end points.
2. The length of a diameter is **Twice** that of a radius.
3. A pentagon has **5** sides.
4. The angle between North and East is a  **$90^\circ$** .
5. A dot gives an idea of a **point**.
6. The sum of the four angles of a quadrilateral is  **$360^\circ$** .

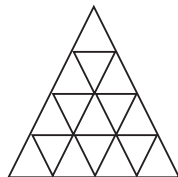
### C. State True (T) or False (F) :

1. True 2. True 3. True 4. False 5. False

## Higher Order Thinking Skills

**Sol.** Total number of triangles in the figure are 27.

Size	Up	Down
4 $\rightarrow$	1	0
3 $\rightarrow$	3	0
2 $\rightarrow$	6	1
1 $\rightarrow$	10	6
	<u>20</u>	<u>7</u>



$\therefore$  Total no. of triangles =  $20 + 7 = 27$

## Chapter

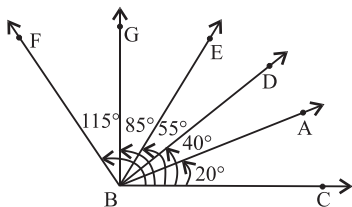
# 11

## Constructions

### Exercise 11.1

1. **Step 1.** Draw a ray  $BC$  with  $B$  as the end points.

**Step 2.** Place centre of the protractor on  $B$  and adjust it such that its base line coincides with the ray  $BC$ .



**Step 3.** Starting from  $0^\circ$ , read the inner scale and clockwise direction and mark the points  $A$  as  $20^\circ$ ,  $D$  as  $40^\circ$ ,  $E$  as  $55^\circ$ ,  $G$  as  $85^\circ$  and  $F$  as  $115^\circ$ .

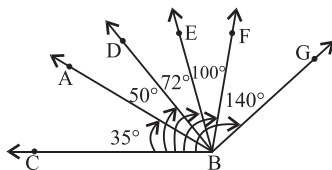
**Step 4.** Now, join the rays  $BA$ ,  $BD$ ,  $BE$ ,  $BG$  and  $BF$ .

**Step 5.** The required angle are constructed as

$\angle ABC = 20^\circ$ ,  $\angle DBC = 40^\circ$ ,  $\angle EBC = 50^\circ$ ,  $\angle GBC = 85^\circ$  and  $\angle FBC = 115^\circ$ .

2. **Step 1.** Draw a ray  $BC$  with  $B$  as the end point.

**Step 2.** Place centre of the protractor on  $B$  and adjust it such that its base line coincides with ray  $BC$ .



**Step 3.** Starting from  $0^\circ$  and read the outer scale clockwise direction and mark the point  $A$  as  $35^\circ$ ,  $D$  as  $50^\circ$ ,  $E$  as  $72^\circ$ ,  $F$  as  $100^\circ$  and  $G$  as  $140^\circ$ .

**Step 4.** Now join the rays  $BA$ ,  $BD$ ,  $BE$ ,  $BF$  and  $BG$ .

**Step 5.** The required angles are constructed as,

$\angle ABC = 35^\circ$ ,  $\angle DBC = 50^\circ$ ,  $\angle EBC = 72^\circ$ ,  $\angle FBC = 100^\circ$  and  $\angle GBC = 140^\circ$ .

3. **Step 1.** Draw the segment  $AB$  of 4 cm.

**Step 2.** Place centre of the protractor on  $A$  and adjust it such that its base line coincide with segment  $AB$ .

**Step 3.** Starting from  $0^\circ$  and read the inner scale and mark the point  $C$  as  $27^\circ$ , join the ray  $AC$ .

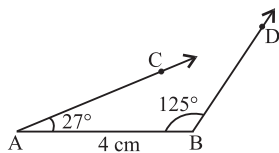
**Step 4.** Place centre of the protractor on  $B$  and adjust it such that its base line coincide with segment  $AB$ .

**Step 5.** Starting from  $0^\circ$  and read the outer scale and mark the point  $D$  as  $125^\circ$ , join the ray  $BD$ .

**Step 6.** The required angles constructed as,

$\angle BAC = 27^\circ$  and  $\angle ABD = 125^\circ$

4. **Step 1.** Draw a ray  $OB$ .

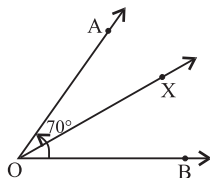


**Step 2.** Construct on  $\angle AOB$  of  $70^\circ$  with the help of protractor at  $O$  point.

**Step 3.** Construct angle bisector ray  $OX$  with the help of protractor.

**Step 4.** Measure angles,  
 $\angle AOX = 35^\circ$  and  $\angle BOX = 35^\circ$ .

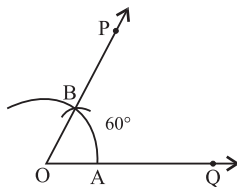
Yes, these two angles are equal.



5. Let  $\angle POQ = 60^\circ$  (which is given).

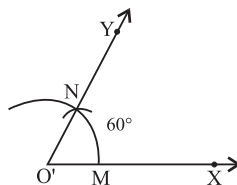
**Step 1.** Draw a ray  $O'X$ .

**Step 2.** With  $O$  as centre and any radius, draw an arc intersecting the arms of  $\angle POQ$  at  $A$  and  $B$ .



**Step 3.** With  $O'$  as center and the same radius as in step 2, draw an arc intersecting ray  $O'X$  at  $M$ .

**Step 4.** With  $n$  as centre and radius equal to  $AB$ , draw an arc intersecting to  $AB$ , draw an arc intersecting the arc in step 3 at  $N$ .



**Step 5.** Join  $O'N$  and produce it to  $Y$ .

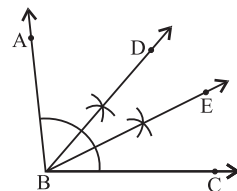
So, required angle is  $\angle YO'X$ .

6. Here,  $\angle ABC = 105^\circ$ ,  $\angle OBC = 52\frac{1}{2}^\circ$  and  $\angle EBC = 26\frac{1}{4}^\circ$ .

**Step 1.** Draw a ray  $BC$  with  $B$  as end point.

**Step 2.** Place centre of the protractor on  $B$  and adjust it such that its base line coincide with the ray  $BC$ .

**Step 3.** Starting from  $0^\circ$ , read the inner scale and mark the point  $A$  as  $105^\circ$ . Join ray  $BA$ .



**Step 4.** Draw the angle bisector of  $\angle ABC$  with the ray  $BD$ .

**Step 5.** Draw again angle bisector of  $\angle DBC \left( 52\frac{1}{2}^\circ \right)$  with ray  $BE$ .

Join ray  $BE$ .

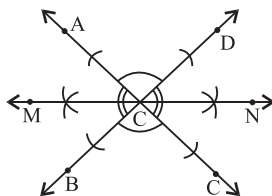
Hence, the required angle is  $= \frac{1}{2}$  of  $52\frac{1}{2}^\circ$   
 $= 26\frac{1}{4}^\circ$  or  $(26.25)^\circ$ .

7. **Step 1.** Draw a pair of vertically opposite angles as shown in above figure.

**Step 2.** Construct angle bisector on of  $\angle AOB$ , join  $OM$  ray.

**Step 3.** Construct angle bisector of  $\angle COD$  as ray  $ON$ .

**Step 4.** Here, we measure that, the angle bisectors on and  $ON$  in the same line, or  $MON$  is a straight line.



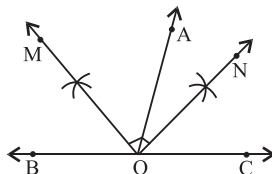
8. **Step 1.** Draw a linear pair of angles. ( $\angle BOA$  and  $\angle AOC$ ).

**Step 2.** Construct angle bisector on of  $\angle BOA$ , as ray on.

**Step 3.** Construct angle bisector  $ON$  of  $\angle AOC$ , as ray  $ON$ .

**Step 4.** Measure  $\angle MON$ , which is  $90^\circ$ .

Hence, the two bisecting rays are perpendicular to each other.



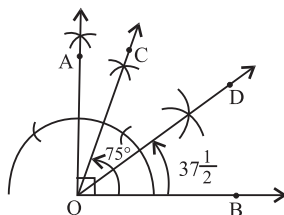
9. **Step 1.** Draw a ray  $OB$  with end point as  $O$ .

**Step 2.** Construct an angle of  $90^\circ$  as  $\angle AOB$ .

**Step 3.** Construct  $\angle COB = 75^\circ$ , at  $O$ , as centre.

**Step 4.** Construct angle bisector  $OD$  of  $\angle COB$  at  $O$  as centre.

**Step 5.** Measure of  $\angle DOB$  is  $37\frac{1}{2}^\circ$ .

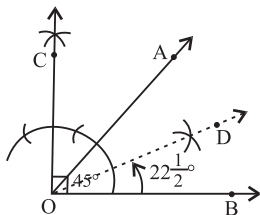


**10. Step 1.** Draw a ray  $OB$  with  $O$  as end point.

**Step 2.** Draw an  $\angle AOB$  of  $45^\circ$  with  $O$  as centre, with the help of protractor.

**Step 3.** Construct angle bisector  $OD$  of  $\angle AOB$ .

**Step 4.** Construct  $\angle COB$  of  $90^\circ$  at the centre  $O$ .



## Exercise 11.2

**1. Step 1.** Draw a line  $XY$ .

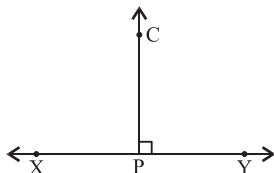
**Step 2.** Mark a point  $P$  on it.

**Step 3.** Place a protractor on the line  $XY$  such that protractor base line coincides with line  $XY$  and  $O$  is at the centre.

**Step 4.** Mark a point at  $90^\circ$  in protractor scale and say it  $C$ .

**Step 5.** Join  $P$  to  $C$ .

So,  $\angle CPY = 90^\circ$  and  $PC$  is required perpendicular to  $XY$ .



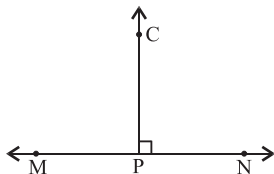
**2. Step 1.** Draw a line  $MN$ .

**Step 2.** Place the scale on line  $MN$  and fixed it.

**Step 3.** Place a set-square with its  $L$  side along with scale and adjust set-square at point  $P$ .

**Step 4.** Remove scale and fixed set square and draw ray  $PC$ .

So, the ray  $PC$  is the required perpendicular on  $MN$ .



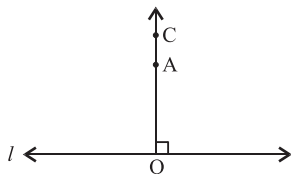
**3. Step 1.** Draw a line  $l$ .

**Step 2.** Place the scale on line  $l$  and fixed it.

**Step 3.** Place a set-square with its  $L$  side along with the scale and adjust it at a point  $A$  and fixed it.

**Step 4.** Remove the scale and draw a

ray  $\overrightarrow{OC}$  passing through the point  $A$ .

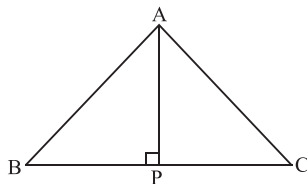


So, the required perpendicular  $\overrightarrow{OC}$  passing through the point  $A$ .

4. **Step 1.** Draw a  $\triangle ABC$  using set-square.

**Step 2.** Place the scale on side  $BC$  of  $\triangle ABC$ , and fixed it.

**Step 3.** Place a set-square along with scale and adjust it at a point  $A$  and fixed it.

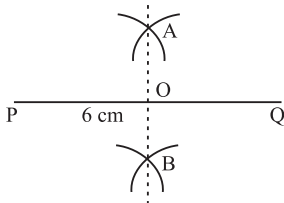


**Step 4.** Remove the scale and draw a line segment  $AD$  which is a required perpendicular from  $A$  to the side  $BC$  of the triangle.

### Exercise 11.3

1. **Step 1.** Draw a line segment  $PQ$  of length 6 cm.

**Step 2.** With  $P$  as centre and radius more than half of  $PQ$ , draw two arcs, one on either side of the line segment  $PQ$ .



**Step 3.** With  $Q$  as centre and the same radius, draw two arcs, one on either side of the line segment  $PQ$ , intersecting the first two arcs at points  $A$  and  $B$  respectively.

**Step 4.** Join  $A$  and  $B$  intersecting at  $O$ .

So,  $AB$  is the required perpendicular bisector of  $PQ$ .

**Step 5.** Measure the lengths  $OP$  and  $OQ$ , i.e.  $OP = OQ = 3$  cm.

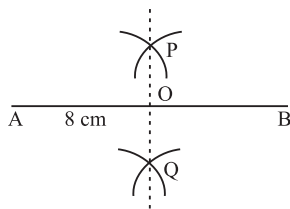
2. **Step 1.** Draw a line segment  $AB$  of length 8 cm.

**Step 2.** With  $A$  as centre and radius more than half of  $AB$ , draw two arcs, one on either side of the line segment  $AB$ .

**Step 3.** With  $B$  as centre and the same radius as in step 2. Draw two arcs intersecting at the points  $P$  and  $Q$  respectively.

**Step 4.** Join  $P$  and  $Q$  intersecting at  $O$ .

Hence,  $PQ$  is the required perpendicular bisector of  $AB$ .



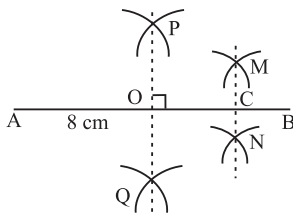
3. Here,

$$\begin{cases} AB = 8 \text{ cm.} \\ OA = OB = 4 \text{ cm.} \end{cases}$$

We obtained that,

$$BC = \frac{1}{2} AB = \frac{1}{4} \times 8^2 = 2 \text{ cm}$$

$$AC = \frac{3}{4} AB = \frac{3}{4} \times 8^2 = 6 \text{ cm.}$$



**Step 1.** Draw the line segment  $AB$  of length 8 cm.

**Step 2.** With  $A$  as centre and radius more than half of  $AB$ , draw two arcs one on either side of  $AB$ .

**Step 3.** With  $B$  as centre and same radius as in step 2, draw two arcs intersecting at the points  $P$  and  $Q$  respectively.

**Step 4.** Join  $P$  and  $Q$  intersecting at  $O$ . So,  $PQ$  is the perpendicular bisector of  $AB$ .

**Step 5.** Similarly, we construct  $MN$  perpendicular bisector of line segment  $OB$ .

4. Take  $AB = 4$  cm and obtained  $AC = \frac{3}{4} AB$ , with the help of Q.3.

**Step 1.** Draw a  $\triangle ABC$  of any lengths of its sides.

**Step 2.** Construct perpendicular bisector of  $AB$ .

**Step 3.** Construct perpendicular bisector of  $BC$ .

**Step 4.** Construct perpendicular bisector of  $CA$ .

**Step 5.** These three perpendicular bisectors intersect at  $O$  point.

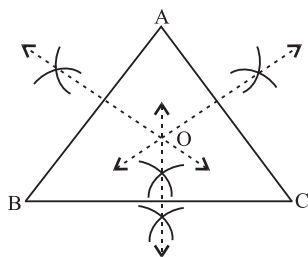
5. **Step 1.** Draw a  $\triangle ABC$  of any lengths of its sides.

**Step 2.** Construct perpendicular bisector of  $AB$ .

**Step 3.** Construct perpendicular bisector of  $BC$ .

**Step 4.** Construct perpendicular bisector of  $CA$ .

**Step 5.** These three perpendicular bisectors intersect at  $O$  point.



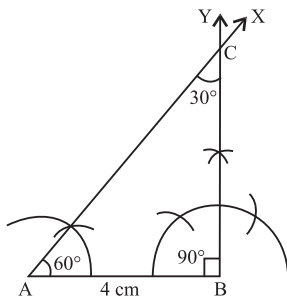
6. **Step 1.** Draw the line segment  $AB$  of length 4 cm.

**Step 2.** Construct  $\angle XAB = 60^\circ$  at the point  $A$ .

**Step 3.** Construct right angle  $\angle YBA$  of  $90^\circ$ .

**Step 4.** Arms of these angles,  $AX$  and  $BY$  intersect at the point  $C$ .

**Step 5.** Measure angle  $\angle ACB$ , it is equal to  $30^\circ$ , which is required angle.

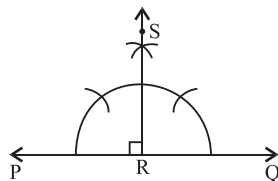


7. **Step 1.** Draw a line  $PQ$  of any length.

**Step 2.** Take a point  $R$  on it.

**Step 3.** Construct on  $\angle PRS = 90^\circ$  at the point  $R$ .

So, the required  $\angle PRS$  is of  $90^\circ$  and  $RS$  is the required perpendicular to  $PQ$ .



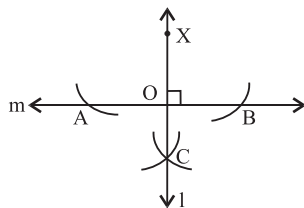
8. **Step 1.** Draw a line  $m$  and take a point  $X$  out side of it.

**Step 2.** With  $X$  as centre and any radius draw an arc intersecting the line  $m$  at  $A$  and  $B$ .

**Step 3.** With  $A$  and  $B$  as centre and radius, greater than  $AB$ , draw two arcs intersecting each other at  $C$ .

**Step 4.** Join  $X$  and  $C$  intersecting the line  $m$  at  $O$ .

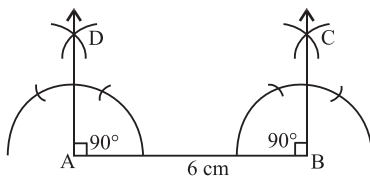
So,  $XC$  is the line  $l$ , which is perpendicular to line  $m$ .



9. **Step 1.** Draw a line segment  $AB$  of length 6 cm.

**Step 2.** Construct  $\angle DAB = 90^\circ$  at the point  $A$ , with arm  $AD$ .

**Step 3.** Construct an  $\angle CBA = 90^\circ$  at the point  $B$ , with arm  $BC$ .

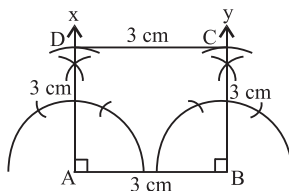


So, the required perpendiculars  $AD$  and  $BC$  on the line segment  $AB$ .

10. **Step 1.** Draw a line segment  $AB$  of length 3 cm.

**Step 2.** Construct  $\angle XAB = 90^\circ$ , at the point  $A$ , with ray  $AX$ .

**Step 3.** Construct an  $\angle YBA = 90^\circ$ , at the point  $B$ , with ray  $BY$ .



**Step 4.** Take a length of 3 cm in compass and cut the line segments from the rays  $AX$  and  $BY$  and mark the points  $D$  and  $C$ .

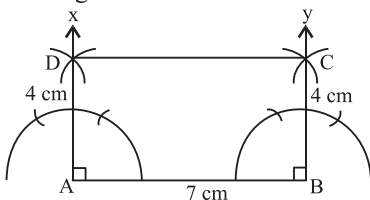
**Step 5.** Join  $D$  and  $C$ .

So, the required square is  $ABCD$  with side length 3 cm.

11. **Step 1.** Draw a line segment  $AB$  of length 7 cm.

**Step 2.** Construct an  $\angle XAB = 90^\circ$ , at the point  $A$ , with ray  $AX$ .

**Step 3.** Construct an  $\angle YBA = 90^\circ$ , at the point  $B$ , with ray  $BY$ .



**Step 4.** Take a length of 4 cm in compass and cut the line segments from the ray  $AX$  and  $BY$  and mark these points as  $D$  and  $C$ .

**Step 5.** Join  $D$  and  $C$ . So, the required rectangle is  $ABCD$ , with sides 7 cm and 4 cm.

### Exercise 11.4

1. With the help of a compass, construct a circle of radius :

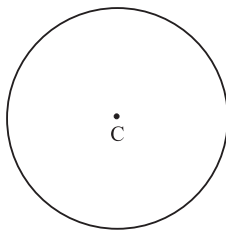
(a) 3 cm.

**Step 1.** Make a point  $C$ , as show in figure.

**Step 2.** Open the compass and take distance 3 cm apart.

**Step 3.** Place the needle point of compass at  $C$  and move the pencil point around, holding the compass from the top.

So, the required circle of radius 3 cm is completed.



(b) Do yourself.

(c) Do yourself.

2. With the help of a compass, construct a circle of diameter :

First find radius from diameter.

(a) radius =  $5 \div 2 = 2.5$  cm.

(b) radius =  $7 \div 2 = 3.5$  cm.

(c) radius =  $10 \div 2 = 5$  cm.

Now, do yourself with the help of Q.1.

3. **Step 1.** Draw a line segment  $AB$  of length 6 cm.

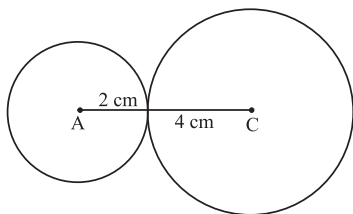
**Step 2.** Open the compass and take distance 2 cm apart.

**Step 3.** Place the needle point of compass at point  $A$  and move the pencil point around, holding the compass from the top.

**Step 4.** Again open the compass and take distance 4 cm apart..

**Step 5.** Place the needle point of compass at point  $B$  and move the pencil point around, holding the compass from the top.

So, required circles are constructed and these two circles touch each other.

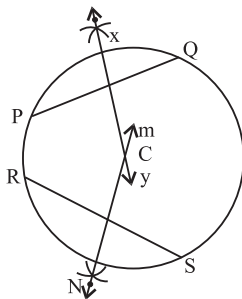


4. **Step 1.** Make a point  $C$ , as shown in figure.

**Step 2.** Open the compass and take any distance part in it.

**Step 3.** Place the needle point of compass at point  $C$  move the pencil point around, holding the compass from the top.

**Step 4.** Draw two any non-parallel chords



$PQ$  and  $RS$  in it.

**Step 5.** Construct  $XY$  and  $MN$  perpendicular bisectors of chords  $PQ$  and  $RS$  respectively.

So, these perpendicular bisectors meet at the point  $C$ , which is centre of circle.

5.

**Step 1.** Draw a circle with centre  $O$ .

**Step 2.** Draw a chord  $AB$  of it.

**Step 3.** Construct  $CD$  perpendicular bisector of chord  $AB$ .

So, this perpendicular bisector  $CD$  passes through the centre of circle  $O$ .

### Mental Ability

#### A. Multiple Choice Questions (MCQ) :

1. (a) 2. (a) 3. (c) 4. (b) 5. (a) 6. (b)

#### B. Fill in the blanks :

1. A line is bisected using **Compass and** .
2. Two parallel lines are **Parallel** through out.
3. Each bisected angle of  $90^\circ$  measures  **$45^\circ$** .
4. With a protractor, the maximum angle that can be drawn is  **$180^\circ$** .
5. Two lines are perpendicular if the angle between them is  **$90^\circ$** .

#### C. State True (T) or False (F) :

1. False 2. False 3. True 4. T 5. F

## Chapter 12 Symmetry

### Exercise 12

1. Identify each of the following as symmetrical or non-symmetrical :  
(a) Symmetrical (b) Non-symmetrical  
(c) Non-symmetrical (d) symmetrical
2. Draw the line/lines of symmetry in the following figures :

- 3.
4. (a) H, I, O, X                      (b) F, G, J, L, N, P, Q, R, S, Z
5. Draw a triangle, which has :  
No, I can not draw a triangle with exactly two lines of symmetry.
6. How many lines of symmetry are there in :  
(a) Infinite              (b) Two              (c) Two              (d) Four  
(e) No                      (f) One
7. State True (T) or False (F) :  
(a) False              (b) True              (c) True              (d) False  
(e) True                      (f) False
8. Complete the following figures along the line of symmetry :

### Mental Ability

#### A. Multiple Choice Questions (MCQ):

1. (d) 2. (b) 3. (c) 4. (d) 5. (b) 6. (d) 7. (b) 8. (d)

#### B. Fill in the blanks :

1. A scalene triangle has **no** axis of symmetry.
2. A square has **4** axis of symmetry.
3. Two alphabets **E** and **K** having only horizontal line of symmetry.
4. The letter N has **no** axis of symmetry.
5. The letter X has **2** axis of symmetry.

#### C. True/False :

1. True 2. False 3. True 4. False 5. False

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## Mensuration

### Exercise 13.1

1. Find the perimeter of the following :  
(a) Perimeter of the figure  

$$= 4 \times 2 \text{ cm} + 4 \times 3.5 \text{ cm}$$

$$= 8 \text{ cm} + 14.0 \text{ cm} = 22 \text{ cm}$$
- (b) Perimeter of the figure

$$= 12\text{ cm} + 10\text{ cm} + 10\text{ cm} + 10\text{ cm} + 7\text{ cm} + 7\text{ cm} + 10\text{ cm} + 10\text{ cm}$$

$$= 12\text{ cm} + 50\text{ cm} + 14\text{ cm} = 76\text{ cm}$$

- (c) Perimeter of the figure

$$= 11\text{ cm} + 15\text{ cm} + 2\text{ cm} + 6\text{ cm} + 2.5\text{ cm} + 4\text{ cm} + 2\text{ cm} + 4\text{ cm} + 2.5\text{ cm} + 7\text{ cm} + 2\text{ cm} + 16\text{ cm}$$

$$= 74\text{ cm}$$

- (d) Perimeter of the figure  $= 10\text{ cm} + 6 \times 2\text{ cm} + 2 \times 15\text{ cm} + 2 \times 8\text{ cm}$   
 $= 10\text{ cm} + 12\text{ cm} + 30\text{ cm} + 16\text{ cm} = 68\text{ cm}$

2. Find the perimeter of the following :

- (a) A regular pentagon of side 100 m.

We have,

Side of regular pentagon = 100 m

So, perimeter of pentagon  $= 5 \times \text{side}$

$$= 5 \times 100\text{ m}$$

$$= 500\text{ m}$$

- (b) A regular hexagon of side 60 cm.

Side of regular hexagon = 60 cm

So, Perimeter of hexagon  $= 6 \times \text{side} = 6 \times 60\text{ cm} = 360\text{ cm}$

- (c) An equilateral triangle whose side is 15 cm.

We have,

Side of an equilateral triangle = 15 cm

So, the perimeter of an equilateral triangle

$$= 3 \times \text{side}$$

$$= 3 \times 15\text{ cm} = 45\text{ cm}$$

- (d) An isosceles triangle whose equal sides are 10 cm each and unequal side is 15 cm.

We have,

Length of equal sides = 10 cm

and, length of unequal side = 15 cm

So, The perimeter of an isosceles triangle

$$= 10\text{ cm} + 10\text{ cm} + 15\text{ cm}$$

$$= 20\text{ cm} + 15\text{ cm} = 35\text{ cm}$$

3. Determine the perimeter of a triangle whose sides are :

- (a) 4 cm, 3 cm, 6 cm

$$\text{Perimeter of triangle} = 4\text{ cm} + 3\text{ cm} + 6\text{ cm} = 13\text{ cm}$$

$$\begin{aligned} \text{(b) } & 15 \text{ cm, } 20 \text{ cm, } 25 \text{ cm} \\ & = 15 \text{ cm} + 20 \text{ cm} + 25 \text{ cm} \\ & = 60 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{(c) } & 25 \text{ cm, } 26 \text{ cm, } 27 \text{ cm} \\ \text{Perimeter of triangle} & = 25 \text{ cm} + 26 \text{ cm} + 27 \text{ cm} \\ & = 78 \text{ cm} \end{aligned}$$

4. Let the third side of the triangle be 'x cm.

Now, we have,

$$\text{Perimeter of a triangle} = 75 \text{ cm}$$

$$\Rightarrow 20 \text{ cm} + 30 \text{ cm} + x = 75 \text{ cm}$$

$$\Rightarrow 50 \text{ cm} + x = 75 \text{ cm}$$

$$\Rightarrow x = 75 \text{ cm} - 50 \text{ cm} = 25 \text{ cm.}$$

Hence, the length of third side is 25 cm.

5. We have,

$$\text{Length of photograph frame} = 45 \text{ cm}$$

$$\text{and, Breadth of photograph frame} = 32 \text{ cm}$$

$$\therefore \text{ Required perimeter of wooden strip} = 2 \times (\text{length} + \text{breadth})$$

$$= 2 \times (45 \text{ cm} + 32 \text{ cm})$$

$$= 2 \times 77 \text{ cm} = 154 \text{ cm}$$

$$\text{Now, the cost of frame} = 154 \times 12$$

$$= 1848.$$

6. Perimeter of square park =  $4 \times \text{side} = 4 \times 300 \text{ m} = 1200 \text{ m}$

$$\text{Now, the cost of fencing of square park}$$

$$= ₹ 1200 \times 15$$

$$= ₹ 18000$$

7. (a) The length of side of an equilateral triangle =  $\frac{\text{Perimeter}}{3}$

$$= \frac{600 \text{ cm}}{3} = 200 \text{ cm.}$$

$$= \frac{600 \text{ cm}}{3} = 200 \text{ cm}$$

- (b) The length of side of a square =  $\frac{\text{Perimeter}}{4}$

$$= \frac{6000 \text{ cm}}{4} = 1500 \text{ cm}$$

(c) The length of side of a regular pentagon =  $\frac{\text{Perimeter}}{5}$

$$= \frac{600 \text{ cm}}{5} = 120 \text{ cm}$$

(d) The length of side of a regular hexagon =  $\frac{\text{Perimeter}}{6}$

$$= \frac{600 \text{ cm}}{6} = 100 \text{ cm}$$

(e) The length of side of a regular decagon =  $\frac{600 \text{ cm}}{10}$

$$= 60 \text{ cm}$$

8. We have,

$$\text{Perimeter of square park} = 4 \times \text{side}$$

$$= 4 \times 90 \text{ m} = 360 \text{ m}$$

$$\text{and, Perimeter of rectangular park} = 2 \times (120 + 80) \text{ m}$$

$$= 2 \times (200) \text{ m}$$

$$= 400 \text{ m}$$

$$\therefore \text{Difference in these perimeters} = 400 \text{ m} - 360 \text{ m} = 40 \text{ m}$$

Hence, Priti covers more distance by 40 m.

9. We have,

$$\text{Length of rectangular field} = 35 \text{ m.}$$

$$\text{and, breadth of rectangular field} = 15 \text{ m}$$

$$\text{So, the perimeter of rectangular field} = 2 \times (\text{length} + \text{breadth}) \text{ cm}$$

$$= 2 \times (35 \text{ m} + 15 \text{ m})$$

$$= 2 \times 50 \text{ m} = 100 \text{ m}$$

Hence, the required number of rounds of rectangular field by Javed

$$= \frac{600 \text{ m}}{100 \text{ m}} = 6$$

10. We have,

$$\text{Length of carpet} = 6 \text{ m } 20 \text{ cm}$$

$$= 6.2 \text{ m}$$

$$\text{Breadth of carpet} = 4 \text{ m } 40 \text{ cm}$$

$$= 4.4 \text{ m}$$

Now,

$$\text{Perimeter of carpet} = 2 \times (\text{length} + \text{breadth})$$

$$= 2 \times (6.2 + 4.4) \text{ m} = 2 \times 10.6 \text{ m}$$

$$= 21.2 = 21 \text{ m } 20 \text{ cm}$$

$$\text{So, the cost of ribbon} = ₹ 21.2 \times 15 = ₹ 318.0$$

Hence, the required length of ribbon is 21.2 m

and, the cost of ribbon is ₹ 318.

### Exercise 13.2

- Find the area of the following irregular shapes drawn on a graph paper :

- Here, we count more than half square = 1 square

$$\text{We count exactly half square} = \frac{1}{2} \text{ square}$$

$$\text{We count less than half square} = 0 \text{ square}$$

$$\text{We count complete square} = 1 \text{ square}$$

Now,

$$\text{Required area of irregular shape} = 38 \text{ cm}^2$$

- Required area of irregular shape =  $75 \text{ cm}^2$

- Required area of irregular shop =  $39 \text{ cm}^2$

- Required area of regular shape =  $(1 \times 16 + 4) \text{ cm}^2$   
 $= 20 \text{ cm}^2$

- Required area of regular shape

$$= \left( 1 \times 12 + \frac{1}{2} \times 6 \right) \text{ cm}^2$$

$$= (12 + 3) \text{ cm}^2$$

$$= 15 \text{ cm}^2$$

- Required area of regular shape

$$= 1 \times 6 \text{ cm}^2 = 6 \text{ cm}^2$$

- Required area of regular shape

$$= 1 \times 20 \text{ cm}^2 + \frac{1}{2} \times 8 \text{ cm}^2$$

$$= 20 \text{ cm}^2 + 4 \text{ cm}^2$$

$$= 24 \text{ cm}^2$$

$$(e) \text{ Required area of regular shape} = 1 \times 34 \text{ cm}^2 + \frac{1}{2} \times 2 \text{ cm}^2$$

$$= 34 \text{ cm}^2 + 1 \text{ cm}^2 = 35 \text{ cm}^2$$

$$(f) \text{ Required area of regular shape}$$

$$= 1 \times 10 \text{ cm}^2 + \frac{1}{2} \times 4 \text{ cm}^2$$

$$= 10 \text{ cm}^2 + 2 \text{ cm}^2 = 12 \text{ cm}^2$$

### Exercise 13.3

1. Let the breadth of the rectangular park be 'x' m.

We have,

$$\text{The area of rectangular park} = 350 \text{ m}^2$$

$$\Rightarrow \text{Length} \times \text{Breadth} = 350 \text{ m}^2$$

$$\Rightarrow 70 \text{ m} \times x = 350 \text{ m}^2$$

$$\Rightarrow x = \frac{350 \text{ m}^2}{70 \text{ m}} = 5 \text{ m}$$

Hence, the breadth of rectangular park is 5 m.

2. Let the required breadth of rectangle 'x' cm.

According to question,

$$\text{Area of square} = \text{Area of rectangle}$$

$$\Rightarrow 16 \text{ cm} \times 16 \text{ cm} = 32 \text{ cm} \times x$$

$$\Rightarrow 16 \times 16 \text{ cm}^2 = 32 \text{ cm} \times x$$

$$\therefore x = \frac{16^1 \times 16^8 \text{ cm}^2}{32 \text{ cm}} = 8 \text{ cm}$$

$$x = 8 \text{ cm}.$$

Hence, the required breadth of rectangle is 8 cm.

3. Which of the following has smaller area :

(a) Area of rectangle =  $L \times 3$   
 $= 20 \text{ cm} \times 15 \text{ cm} = 300 \text{ cm}^2$

(b) Area of square =  $(\text{side})^2$   
 $= (22)^2 \text{ cm}^2$   
 $= 464 \text{ cm}^2$

So, Rectangle has smaller area.

4. We have,

Side of a square room = 6 m.

So, the area of the square room = side  $\times$  side

$$= 6 \text{ m} \times 6 \text{ m} = 36 \text{ m}^2$$

Now,

The cost of flooring a square room at ₹ 150 per  $\text{m}^2$

$$= ₹ 36 \times 150$$

$$= ₹ 5,400$$

Hence, the required cost of flooring of the square room is ₹ 5,400.

5. We have,

Length of rectangular plot of land = 400 m

and breadth of rectangular plot of land = 200 m

So, Area of rectangular plot of land =  $400 \text{ m} \times 200 \text{ m}$

$$= 80000 \text{ m}^2$$

## Chapter 14 Data Handling

Now, The required cost of tiling of the plot = ₹  $\frac{2}{100} \times 80000$

$$= ₹ 12 \times 800$$

$$= ₹ 9600$$

Hence, the required cost of tiling of the plot is ₹ 9600.

6. We have,

Side of a square tile = 20 cm.

and side of a square bathroom = 3 m = 300 cm.

Now,

$$\begin{aligned}\text{Area of one tile} &= 20 \text{ cm} \times 20 \text{ cm} \\ &= 400 \text{ cm}^2\end{aligned}$$

$$\begin{aligned}\text{Area of square bathroom} &= 300 \text{ cm} \times 300 \text{ cm} \\ &= 90000 \text{ cm}^2\end{aligned}$$

$$\text{So, Required number of tiles} = \frac{90000 \text{ cm}^2}{400 \text{ cm}^2}$$

Hence, the required number of tiles are 225.

7. The length and breadth of three rectangles are given below. Find which one has greatest perimeter and which one has least area :

(a) Area of rectangle  $= 10 \text{ m} \times 6 \text{ m} = 60 \text{ m}^2$

$$\begin{aligned}\text{Perimeter of rectangle} &= 2(10 + 6) \text{ m} \\ &= 2 \times 16 \text{ m} = 32 \text{ m}\end{aligned}$$

(b) Area of rectangle  $= 20 \text{ m} \times 10 \text{ m} = 200 \text{ m}^2$

$$\begin{aligned}\text{Perimeter of rectangle} &= 2 \times (20 + 10) \text{ m} \\ &= 2 \times 30 \text{ m} = 60 \text{ m}\end{aligned}$$

(c) Area of rectangle  $= 15 \text{ m} \times 5 \text{ m}$   
 $= 75 \text{ m}^2$

$$\begin{aligned}\text{Perimeter of rectangle} &= 2(15 + 5) \text{ m} \\ &= 2 \times 20 \text{ m} \\ &= 40 \text{ m}\end{aligned}$$

So, (a) has least area and  
 (b) has greatest perimeter.

8. We have,

$$\text{Length of rectangular park} = 500 \text{ m}$$

$$\text{and breadth of rectangular park} = 300 \text{ m}$$

$$\begin{aligned}\therefore \text{Area of rectangular park} &= 500 \text{ m} \times 300 \text{ m} \\ &= 150000 \text{ m}^2\end{aligned}$$

Now,

$$\begin{aligned}\text{Area of one square flower bed} &= 50 \text{ m} \times 50 \text{ m} \\ &= 2500 \text{ m}^2\end{aligned}$$

So, The remaining area of the park

$$= 150000 \text{ m}^2 - 5 \times 2500 \text{ m}^2$$

$$= 150000 \text{ m}^2 - 12500 \text{ m}^2$$

$$= 137500 \text{ m}^2$$

Hence, the required remaining area of the park is  $137500 \text{ m}^2$ .

9. Area of square with side  $8 \text{ m} = 8 \text{ m} \times 8 \text{ m}$

$$= 64 \text{ m}^2$$

Area of square with side

$$5 \text{ m} = 5 \text{ m} \times 5 \text{ m}$$

$$= 25 \text{ m}^2$$

Now,

$$\text{The area of the shaded portion} = 64 \text{ m}^2 - 25 \text{ m}^2 = 39 \text{ m}^2$$

Hence, the required area of shaded portion is  $39 \text{ m}^2$ .

First split into rectangles then,

10. Find the area of the following figures by splitting into rectangles :

- (a) Area of the figure

$$= 8 \text{ m} \times 2 \text{ m} \times 6 \text{ m} \times 10 \text{ m} + 12 \text{ m} \times 2 \text{ m}$$

$$= 16 \text{ m}^2 + 60 \text{ m}^2 + 24 \text{ m}^2$$

$$= 100 \text{ m}^2$$

- (b) Area of the figure  $= 2 \text{ m} \times 2 \text{ m} + 2 \text{ m} \times 4 \text{ m} + 6 \text{ m} \times 2 \text{ m}$

$$= 4 \text{ m}^2 + 8 \text{ m}^2 + 12 \text{ m}^2$$

$$= 24 \text{ m}^2$$

- (c) Area of the figure  $= 4 \text{ m} \times 8 \text{ m} + 16 \text{ m} \times 4 \text{ m} + 4 \text{ m} \times 4 \text{ m}$

$$= 32 \text{ m}^2 + 64 \text{ m}^2 + 16 \text{ m}^2$$

$$= 112 \text{ m}^2$$

## Mental Ability

### A. Multiple Choice Questions (MCQ) :

1. (a) 2. (d) 3. (a) 4. (b) 5. (b) 6. (d)

**B. Fill in the blanks :**

1. The length of the boundary of a figure is called its **Perimeter**.
2. The area of a square field is  $324 \text{ m}^2$ . Then the perimeter of the square is **72 m**.
3. The length of a rectangle is thrice its breadth. Then the area of the rectangle  **$3b^2$** . If the breadth of Rectangle is 35 cm.
4. Units for **Area** are  $\text{cm}^2$ ,  $\text{mm}^2$ ,  $\text{m}^2$ ,  $\text{km}^2$  etc..
5. The length and breadth of a rectangle are in the ratio of 2 : 1. If its breadth is 20 m, then its perimeter is **120 m**.

**C. State True (T) or False (F) :**

1. False 2. False 3. True 4. T 5. T

**D. Match the following :**

1.  $\rightarrow$  (c) 2.  $\rightarrow$  (d) 3.  $\rightarrow$  (a) 4.  $\rightarrow$  (b)

**Higher Order Thinking Skills**

We have,

The cost of fencing of square field = ₹ 1380

Rate = ₹ 15 per metre.

$$\text{So, Perimeter of square field} = \frac{1380}{15}$$

$$= 92 \text{ m.}$$

$$\therefore \text{The side of square field} = \frac{92 \text{ m}}{4} = 23 \text{ m}$$

Hence, the required side length of square field is 23 m.

**Exercise 14.1**

1.

Grade	Tally Marks	Frequency
A		10

<i>B</i>		9
<i>C</i>		9
<i>D</i>		8
<i>E</i>		4
	Total	40

(a) 10 students (b) 4 student (c) 40 students

2.

Marks	Tally Marks	Frequency
1		1
2		3
3		5
4		8
5		6
6		4
7		2
8		1
	Total	30

(a) 13 students (b) 23 students (c) 4 marks

3.

Animals	Tally Marks	Frequency
Tiger		7
Elephant		4
Panther		5

Zebra		6
Lion		9
	Total	31

(a) 6 students (b) Elephant (c) Lion

4.

Expenses (in ₹)	Tally Marks	Frequency
62		2
64		3
66		3
68		2
70		6
72		2
74		2
76		2
78		1
80		2
	Total	25

(a) ₹ 70 (b) ₹ 78 (c) 15 students

5.

Number	Tally Marks	Frequency
1		7
2		7
3		8

4		5
5		10
6		8
	Total	45

(a) 5      (b) 4      (c) 8 times

## Exercise 14.2

1. The required pictograph, as under :

Monday	
Tuesday	
Wednesday	

One represents 50 toys.

2. The required pictograph, as under :

2005	
2006	
2007	
2008	
2009	
2010	

3. The required pictograph, as under :

Class VI	
Class VII	
Class VIII	

Class IX	
Class X	

One represents 50 rupees.

4.

2011	
2012	
2013	
2014	
2015	

One represents 500 houses.

5. The required pictograph as under :

New Delhi	
Islamabad	
Seoul	
Peking	
London	

One represents 5,00,000 people.

6. (a) 7 4 (b) Manju, 2 footballs.

(c) 28 (d) Vijay and Peter, 4

7. (a) 100 laptops (b) First day

(c) 2 days (third and fourth day)

(d) 14 laptops

8. January → 2000 Books

February → 1800 Books

March → 1600 Books

April → 2400 Books

9. (a) 450 apples tree (b) Papaya (c) Orange  
(d) 250 tree (e) 1850 trees
10. (a) 325 hand pumps (b) Village F (c) 20 handpumps  
(d) Village B and Village G.

### Exercise 14.3

- 1.
- 2.
- 3.
4. Look at the bar graph and answer the following questions :
  - (a) Bar graph shows the length of 8 different Indian rivers.
  - (b) Kaveri
  - (c) Indus, Brahma putra
  - (d) Required ratio  $= \frac{2500}{1000} = \frac{5}{2}$   
 $= 5 : 2$
5. Read the graph given below and answer the questions.
  - (a) Mathematics
  - (b) 90%
  - (c) S.St.
  - (d) the given bar graph represent the percentage of marks secured by Kavita in different subjects in half yearly examination.

### Mental Ability

#### A. Multiple Choice Question (MCQ) :

1. (a) 2. (c) 3. (a) 4. (c) 5. (c) 6. (b) 7. (a) 8. (c) 9. (b)

#### B. Fill in the blanks :

1. The singular form of data is **datum** .
2. Drawing conclusions from a bar graph is called **interpretation of the bar graph**.
3. Bar graphs are usually **vertical and horizontal** but they can also be drawn.

#### C. State True (T) or False (F) :

**1. False 2. True 3. True 4. False 5. True**