

## ASSIGNMENT

### MATHEMATICS

Name of the Student: .....

Mobile No: .....

#### MODEL - 1

#### 1. Write the number names. (Numeration form)

Ex. 1: 2, 03, 456 → Indian System

Arrange the number in place value table

L T.Th Th H T O

2, 0 3, 4 5 6

Two lakh three thousand four hundred fifty six

Ex. 2: 3, 60, 58, 704 → Indian System

Arrange the number in place value table

C T.L L T.Th Th H T O

3, 6 0, 5 8, 7 0 4

Three crore sixty lakhs fifty eight thousand seven hundred four.

Ex.3: 103, 014, 586 → International System

Arrange the number in place value table

H.M T.M M H.TH T.TH TH H T O

1 0 3, 0 1 4, 5 8 6

One hundred three million fourteen thousand five hundred eighty six

#### 2. Write the number. (Numeral form)

Ex.1: Five crore six thousand sixty

Arrange the number in place value table

C T.L L T.Th Th H T O

5, , 6, 6 0

In the remaining places, add zeroes.

The number is 5, 00, 06, 060

Ex.2: Twenty million eighty four thousand one hundred four

Arrange in place value table

T.M M H.TH T.TH TH H T O  
 2 , 8 4, 1 4

Add zeroes in the remaining places.

The number is 20, 084, 104

**I. Write in numeration form (number name)**

- a) 1,50,906
- b) 6,867,834
- c) 48, 321,002
- d) 72, 10, 492
- e) 64, 63, 12, 414

**II. Write in numeral form.**

- a) Nine crore sixteen lakh twenty thousand five hundred thirty – one
- b) One crore seventy nine lakh eleven.
- c) Ten million three hundred forty six thousands four hundred nine
- d) Eighty four million eighty
- e) Six lakh six thousand sixteen

**MODEL - 2**

**WHOLE NUMBERS**

Ex.1: Find the sum of 25,682; 4,096; 125

Arrange the numbers vertically in the place value table.

T.Th	Th	H	T	O
2	5	6	8	2
	4	0	9	6
+		1	2	5
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2	9	9	0	3

Ex.2: Subtract 4593 from 7, 82, 904

Arrange the smaller number below the bigger number in the place value table

L T.Th Th H T O (In Thousands place first do  $10 - 4 = 6$  then add 2.  $6 + 2 = 8$ )

$$\begin{array}{r}
 782904 \\
 - \quad 4593 \\
 \hline
 778311 \\
 \hline
 \end{array}$$

Ex.3: Multiply 1473 by 28

Arrange the smaller number below the bigger number as per place value table.

1 4 7 3 (First multiply the top numbers with 8. Now multiply the top number with 2.)

$$\begin{array}{r}
 \quad X 28 \\
 \hline
 \quad 11784 \\
 + 2946x \\
 \hline
 \quad 41244 \\
 \hline
 \end{array}$$

Ex.4: Divide 4872 by 12

$$\begin{array}{r}
 \quad 406 \\
 12 \overline{)4872} \\
 \underline{48} \phantom{00} \\
 \phantom{48} 007 \\
 \underline{00} \phantom{00} \\
 \phantom{48} \phantom{00} 72 \\
 \underline{72} \phantom{00} \\
 \phantom{48} \phantom{00} \phantom{72} 0 \\
 \hline
 \phantom{48} \phantom{00} \phantom{72} \phantom{0}
 \end{array}$$

$$4872 \div 12 = 406$$

remainder = 0

Dividend  $\div$  Divisor = Quotient

1. One pencil box costs Rs 19. Find the cost of 2346 boxes.
2. The cost of 35 fans is Rs 43,050. What is the cost of one fan?
3. Find the sum of the predecessor (before number) and successor (after number) of 34039.
4. Subtract 95143 from 9090396

### MODEL-3 (INTEGERS)

Ex.1. How much less than  $-4$  is  $-11$  ?

$$-4 - x = -11$$

$$-4 + 11 = x$$

$$7 = x$$

$$\Rightarrow x = 7$$

(Transposing changes the sign of the integer.)

Ex.2. What must be subtracted from  $-7$  to obtain  $-15$  ?

$$-7 - x = -15$$

$$-7 + 15 = x$$

$$8 = x$$

$$\Rightarrow x = 8$$

Ex.3. The sum of two integers is  $-6$  . If one of them is  $2$ , find the other

$$2 + x = -6$$

$$x = -6 - 2$$

$$x = -8$$

Ex.4. By how much does  $-3$  exceed  $-5$  ?

$$-5 + x = -3$$

$$x = -3 + 5$$

$$x = 2$$

5. The sum of two integers is  $-11$  if one of the number is  $77$  find the other

6. The difference of integers  $P$  and  $-11$  is  $8$  then find the value of  $P$

7. How much less than  $-7$  is  $-16$ ?

8. What must be subtracted from  $-2$  to obtain  $-8$ ?

9. The sum of two integers is  $-6$ . If one of them is ' $2$ ' Find the other.

10. The difference of integers  $P$  and  $-8$  is ' $3$ '. Find the value of  $P$ .

11. By how much does  $-100$  exceed  $-150$ ?

12. On subtracting  $4$  from  $-4$  we get.

13. By how much does  $2$  exceed  $-3$ ?

**MODEL - 4**

1. Find the L.C.M of 8, 10, 12

Sol: 
$$\begin{array}{l} 2 \overline{)8,10,12} \\ 2 \overline{)4,5,6} \\ 2 \overline{)2,5,3} \\ 5 \overline{)1,5,3} \\ 3 \overline{)1,1,3} \\ 1,1,1 \end{array}$$

L.C.M of 8, 10, 12 is  $2 \times 2 \times 2 \times 5 \times 3 = 120$

2. Find the L.C.M of 31, 7, 5

Sol: 
$$\begin{array}{l} 31 \overline{)31,7,5} \\ 7 \overline{)1,7,5} \\ 5 \overline{)1,1,5} \\ 1,1,1 \end{array}$$

L.C.M =  $31 \times 7 \times 5 = 1085$

**(Note: L.C.M of prime numbers is their product)**

3. Find the L.C.M of 20, 40, 80

Sol: L.C.M of 
$$\begin{array}{l} 2 \overline{)20,40,80} \\ 2 \overline{)10,20,40} \\ 5 \overline{)5,10,20} \\ 2 \overline{)1,2,4} \\ 2 \overline{)1,1,2} \\ 1,1,1 \end{array}$$

L.C.M =  $2 \times 2 \times 5 \times 2 \times 2 = 80$

**(Note: If c is multiple of a and b then L.C.M of a, b, c is c)**

4. Prime factorise 54

Sol: 
$$\begin{array}{l} 2 \overline{)54} \\ 3 \overline{)27} \\ 3 \overline{)9} \\ 3 \end{array} \quad 54 = 2 \times 3 \times 3 \times 3 = 2 \times 3^3$$

5. Find the L.C.M of 6,9,12.
6. Find the L.C.M of 24, 8, 6.
7. Find the L.C.M of 7,29,5.
8. Find the L.C.M of 12, 18, 28
9. Find the L.C.M of 90, 270, 360.
10. Prime factorise 540.
11. Prime factorise 1080.
12. Find the L.C.M of 15, 30,12.
13. Prime factorise 1024.

**MODEL - 5**

1. Which of the following is smallest.

i)  $\frac{2}{3}, \frac{-1}{2}, \frac{3}{5}, -1, \frac{-2}{5}$

L.C.M of 2, 3, 5 = 30

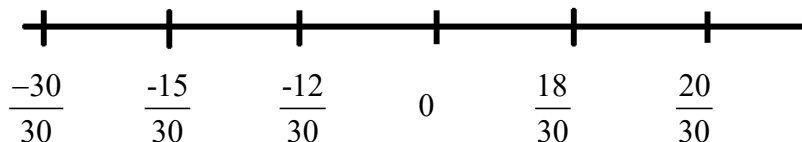
$$\frac{2}{3} = \frac{2 \times 10}{3 \times 10} = \frac{20}{30}$$

$$\frac{-1}{2} = \frac{-1 \times 15}{2 \times 15} = \frac{-15}{30}$$

$$\frac{3}{5} = \frac{3 \times 6}{5 \times 6} = \frac{18}{30}$$

$$-1 = \frac{-1 \times 30}{1 \times 30} = \frac{-30}{30}$$

$$\frac{-2}{5} = \frac{-2 \times 6}{5 \times 6} = \frac{-12}{30}$$



Smallest value = -1

2. Which of the following is smallest

$\frac{2}{5}, \frac{-11}{7}, \frac{1}{2}, \frac{6}{5}, \frac{-5}{2}$

3. Which of the following is greatest

$$\frac{-3}{7}, \frac{1}{5}, \frac{-6}{7}, \frac{3}{5}, \frac{1}{6}$$

4. Which of the following is greatest

$$\frac{-1}{2}, \frac{-6}{2}, \frac{-5}{6}, \frac{-7}{6}$$

5. Which of the following is greatest

$$\frac{1}{7}, \frac{3}{9}, \frac{-1}{2}, \frac{5}{2}, \frac{1}{9}$$

6. Write the following in ascending order

$$\frac{1}{4}, \frac{3}{5}, \frac{2}{3}, \frac{1}{2}$$

7. Write the following in descending order

$$\frac{3}{5}, \frac{4}{3}, \frac{1}{3}, \frac{9}{10}$$

8. Write the following in ascending order

$$\frac{-2}{3}, \frac{5}{6}, \frac{-3}{4}, \frac{1}{2}, \frac{-4}{5}$$

### MODEL-6 (FRACTIONS)

**Add the following Fractions**

Ex:1  $\frac{6}{11} + \frac{2}{11} = \frac{8}{11}$

numerators.)

(Hint: If the denominators are same, then simply add the

Ex.2:  $\frac{5}{7} + \frac{8}{21}$

$$= \frac{5}{7} \times \frac{3}{3} + \frac{8}{21} \times \frac{1}{1}$$

$$= \frac{5 \times 3}{21} + \frac{8 \times 1}{21}$$

$$= \frac{(5 \times 3) + (8 \times 1)}{21}$$

$$= \frac{15 + 8}{21}$$

$$= \frac{23}{21}$$

$$= 1\frac{2}{21}$$

(Hint: If the denominators are different, then find the equivalent fractions with a common denominator. The common denominator will be the LCM of the denominators.

7 is a factor of 21. So LCM = 21)

Ex.3:  $2\frac{5}{6} + 1\frac{3}{4}$

$$= (2+1) + \left(\frac{5}{6} + \frac{3}{4}\right)$$

$$= 3 + \frac{(5 \times 2) + (3 \times 3)}{12}$$

(Hint: First add the whole parts and then add

the fractions.)

$$= 3 + \left(\frac{10+9}{12}\right)$$

$$= 3 + \left(\frac{19}{12}\right)$$

$$= 3 + 1\frac{7}{12}$$

$$= 4\frac{7}{12}$$

I. Do the following

1.  $\frac{2}{7} + \frac{3}{7} + \frac{1}{7} =$



2.  $\frac{3}{8} + \frac{5}{16} =$

3.  $3\frac{3}{4} + 1\frac{1}{8} =$

4.  $1\frac{3}{8} + 3\frac{5}{12} + 2\frac{7}{16} =$

5.  $1\frac{3}{4} + \frac{1}{2} =$

**Subtract the following fractions**

Ex.1:  $\frac{7}{12} - \frac{5}{12} = \frac{2}{12} = \frac{1}{6}$

(Hint: If denominators are same, Simply subtract the numerators and write the common denominator.)

Ex.2:  $\frac{2}{3} - \frac{1}{2}$

$$= \frac{(2 \times 2) - (1 \times 3)}{6} = \frac{4 - 3}{6} = \frac{1}{6} \quad (3, 2 \text{ are co-primes so LCM} = 3 \times 2 = 6)$$

Ex.3:  $4\frac{2}{3} - 2\frac{1}{4}$

$$= (4 - 2) + \left(\frac{2}{3} - \frac{1}{4}\right) \quad (3, 4 \text{ are co-prime LCM} = 3 \times 4 = 12)$$

$$= 2 + \frac{(2 \times 4) - (1 \times 3)}{12}$$

$$= 2 + \frac{8 - 3}{12} = 2 + \frac{5}{12}$$

$$= 2\frac{5}{12}$$

**II. Do the following**

1.  $\frac{10}{11} - \frac{1}{11} =$

2.  $\frac{15}{16} - \frac{7}{24} =$

3.  $2 - \frac{5}{6} =$

4.  $6\frac{7}{8} - 2\frac{3}{4} =$

### III. MULTIPLICATION OF FRACTIONS

1. Multiply  $\frac{2}{5}$ ,  $\frac{10}{13}$  and  $\frac{5}{8}$

Sol:  $\frac{2}{5} \times \frac{10}{13} \times \frac{5}{8} = \frac{5}{26}$

2.  $\frac{11}{12} \times \frac{15}{16} \times \frac{2}{13} =$

3.  $2\frac{1}{10} \times 2\frac{2}{7} \times 3\frac{3}{4} =$

4.  $1\frac{1}{7} \times 2\frac{3}{4} \times 1\frac{3}{11} =$

5.  $5 \times 1\frac{3}{10} \times 1\frac{3}{5} =$

6.  $1\frac{1}{2} \times 6 \times 1\frac{1}{12} \times 1\frac{1}{3} =$

7.  $3 \times 1\frac{5}{6} \times 2\frac{2}{3} =$

### DIVISION OF FRACTIONS

Ex.1:  $\frac{3}{7} \div 3$

$= \frac{3}{7} \times \frac{1}{3}$  (Hint: In division of fractions, multiply the dividend by the reciprocal of the divisor.)

$= \frac{1}{7}$

Ex.2:  $\frac{2}{3} \div \frac{4}{9}$

$= \frac{2}{3} \times \frac{9}{4}$

$$= \frac{3}{2} \text{ or } 1\frac{1}{2}$$

Ex.3:  $3\frac{9}{4} \div \frac{49}{16}$

$$= \frac{21}{4} \times \frac{16}{49} \text{ (Hint : Convert the mixed fraction into improper fraction and simplify.)}$$

$$= \frac{12}{7} \text{ or } 1\frac{5}{7}$$

**IV. Do the following**

1.  $\frac{4}{5} \div 2$

2.  $9 \div \frac{3}{4}$

3.  $\frac{4}{5} \div \frac{1}{10}$

4.  $\frac{3}{4} \div \frac{3}{4}$

**MODEL - 7**

1. Find the sum of  $\frac{3}{7}$  &  $\frac{2}{5}$

Sol:  $\frac{3}{7} + \frac{2}{5} = \frac{15+14}{35} = \frac{29}{35}$

2. Find  $\frac{7}{9} - \frac{2}{3}$

3. Find  $2\frac{1}{2} + 1\frac{2}{3} - 3\frac{1}{3}$

4. Find  $1\frac{3}{7} - 2\frac{4}{5} - \frac{1}{5}$

5. Find the sum of  $\frac{2}{3}$  and  $\left(\frac{-3}{2}\right)$

6. Subtract  $\frac{5}{7}$  from  $\frac{6}{7}$

7. Subtract  $\frac{1}{4}$  from  $\frac{3}{7}$

8. Subtract  $5\frac{2}{3}$  from 8

9. Subtract 7 from  $10\frac{1}{2}$

10. Subtract  $3\frac{1}{2}$  from  $4\frac{5}{6}$

### MODEL-8 (DECIMALS)

#### **Addition of decimals**

Ex.1:  $87.326 + 9.8 + 0.123$

	T	O	t	h	th
	8	7	.	3	2 6
	0	9	.	8	0 0
(+)	0	0	.	1	2 3
<hr/>					
	9	7	.	2	4 9

(Hint : i) First convert the given decimals in to like decimals

ii) Add them to get the result.)

Ex.2:  $2.467 + 24.67 + 246.7$

	H	T	O	t	h	th
	0	0	.	2	4 6 7	
	0	2	.	4	6 7 0	
(+)	2	4	.	6	7 0 0	
<hr/>						
	2	7	.	3	8 3 7	

#### **I. Do the following**

1.  $17.46 + 19.59$

2.  $5.634 + 6.828 + 23.969$

3.  $454.98 + 3.035 + 17.28 + 1.8 + 0.05$

4. Add 5.38, 53.8, 538, 0.538

5. Add 20.002, 22.222, 20.202, 2.222

#### **Subtraction of decimals**

Ex.1: Subtract 4.87 from 10

$$\begin{array}{r} 10.00 \\ (-) 4.87 \\ \hline 5.13 \end{array}$$

(Hint: Convert the given decimals into like decimals and subtract)

Ex.2: Subtract 38.136 from 66.32

$$\begin{array}{r} 66.320 \\ (-) 38.136 \\ \hline 28.184 \end{array}$$

**II. Do the following**

1.  $22.5 - 18.6$
2.  $426.326 - 284.482$
3.  $5 - 3.009$
4. Subtract 39.09 from 42
5. Subtract 23.32 from 33.41

**Multiplication of decimals**

Ex.1: Multiply 4.38 by 39

$$\begin{array}{r} 438 \\ \times 39 \\ \hline 3942 \\ 1314\ X \\ \hline 17082 \end{array}$$

Ans: 170.82

(Hint: i) First multiply 438 with 39, by ignoring the decimal point.

ii) The multiplicand has two decimal places, place the decimal point in the product so that there are two decimal places from right to left.)

Ex.2:  $1.8 \times 1.3$

$$\begin{array}{r} 18 \\ \times 13 \\ \hline 54 \\ 18\ X \\ \hline 234 \end{array}$$

Ans: 2.34

(Hint: 1) First multiply the numbers without the decimal point

- 2) Add the number of decimal places in multiplicand and multiplier
- 3) Put the same number of digits behind the decimal in the product.)

Ex.3:  $1.02 \times 10 = 10.2$

(Hint: To multiply by 10, shift the decimal point one place to the right.)

Ex.4:  $1.02 \times 100 = 102.0$

(Hint: To multiply by 100, shift the decimal point two places to the right.)

Ex.5:  $1.0200 \times 1000 = 1020.0$

(Hint: To multiply by 1000, shift the decimal point three places to the right.)

### III. Do the following

1.  $4568.9 \times 51$

2.  $6.987 \times 23$

3.  $98.01 \times 2.3$

4.  $62.3 \times 3.48$

5.  $856.975 \times 10$

6.  $74.29 \times 10$

7.  $9.246 \times 100$

8.  $3.741 \times 100$

9.  $10.26 \times 1000$

10.  $4.1237 \times 1000$

### Division of Decimals

Ex.1:  $15.6 \div 3$

$$\begin{array}{r} 5.2 \\ 3 \overline{)15.6} \\ \underline{-15} \phantom{0} \\ 06 \\ \underline{-6} \\ 0 \end{array}$$

Quotient = 5.2

(Hint: 1) Divide as in division of numbers ignoring the decimal point

2) When you reach the tenths digit, place the decimal in the quotient)

$$\begin{array}{r} \text{Ex.2} \quad 6.8 \div 5 \quad \frac{1.36}{5 \overline{)6.80}} \\ \quad \quad \quad -5 \\ \quad \quad \quad \overline{18} \\ \quad \quad \quad -15 \\ \quad \quad \quad \overline{030} \\ \quad \quad \quad -30 \\ \quad \quad \quad \underline{0} \end{array}$$

(Hint: Insert a '0' in the hundredth place of decimal part in the dividend and continue dividing

until the remainder is zero)

$$\text{Ex.3: } 15.12 \div 3000$$

$$\frac{15.12}{3000} = \frac{15.12}{3 \times 1000} = \frac{005.04}{1000} = 0.00504$$

$$\begin{array}{r} \frac{5.04}{3 \overline{)15.12}} \\ -15 \\ \overline{001} \\ -00 \\ \overline{12} \\ -12 \\ \underline{0} \end{array}$$

(Hint: 1) Split the divisor into two factors (a whole number and a power of 10)

2) First divide by the whole number and then by 10 or 1000 etc.)

$$\text{Ex.4: } 8.96 \div 1.6$$

$$\frac{8.96 \times 10}{1.6 \times 10} = \frac{89.6}{16}$$

$$\begin{array}{r} \frac{5.6}{16 \overline{)89.6}} \\ -80 \\ \overline{96} \\ -96 \\ \underline{0} \end{array}$$

(Hint: 1) First, convert the divisor into a whole number by multiplying both numerator and denominator with 10, 100, 1000 etc depending on the number of decimal places i.e. if the divisor has one decimal place we should multiply both numerator and denominator by 10 and if the divisor has two decimal places we should multiply both numerator and denominator by 100  
2) Then, follow the division process.)

Ex.5:  $16 \div 0.4$

$$\frac{16 \times 10}{0.4 \times 10} = \frac{160}{4} = 40 \text{ Quotient} = 40$$

(OR)

$$\frac{16}{0.4} = \frac{16}{\frac{4}{10}} = 16 \times \frac{10}{4} = 40$$

(Hint: Convert the divisor into a whole number and then divide (or) Convert the divisor into a fraction and then divide)

**IV. Do the following**

1.  $8.82 \div 6$
2.  $432.18 \div 18$
3.  $46.2 \div 5$
4.  $292.2 \div 12$
5.  $959.2 \div 8000$
6.  $402.42 \div 20$
7.  $0.348 \div 0.12$
8.  $75.6 \div 0.7$
9.  $315 \div 62.5$
10.  $72 \div 1.2$



**MODEL - 9**

(Hint: BODMAS rule)

B- Bracket

O - OF

D - Division

M - Multiplication

A - Addition

S - Subtraction

1.  $14 \div 7 \times 2 + 7 - 2.$

Sol:  $2 \times 2 + 7 - 2$

$$4 + 7 - 2 = 11 - 2 = 9$$

2. Simplify  $\frac{5}{6}$  of  $\frac{3}{4} \div \frac{7}{8} \times 1\frac{1}{2}$

Sol:  $= \frac{5}{6}$  of  $\frac{3}{4} \div \frac{7}{8} \times 1\frac{1}{2}$

$$= \frac{5}{8} \div \frac{7}{8} \times \frac{3}{2}$$

$$= \frac{5}{8} \times \frac{8}{7} \times \frac{3}{2}$$

$$= \frac{15}{14}$$

3.  $9 - 49 \div 7 + 6 - 3 = \underline{\hspace{2cm}}.$

4.  $4 + 5 \times 4 \div 2 - 2 = \underline{\hspace{2cm}}.$

5.  $(3 + 2) 6 \div 3 + 2 - 7 = \underline{\hspace{2cm}}.$

6.  $5 \times 7 - 2 + 2(5 + 2) \div 7 = \underline{\hspace{2cm}}.$

7. Simplify  $\frac{1}{2} - \left(\frac{4}{5} \text{ of } \frac{5}{6}\right) + \frac{1}{4}$

8. Simplify  $\left(2 - \frac{13}{8}\right) \div \frac{27}{56} \times 1\frac{2}{7}$

9. Simplify  $222 - \left[\frac{1}{3}\{42 + (56 - \overline{8+9})\} + 108\right]$

10. Simplify  $\frac{1}{2} \times \frac{1}{7} \div \frac{2}{3}$  of  $1\frac{2}{7}$

**MODEL - 10**

1. Write all perfect squares up to 100.

Sol: Perfect squares up to 100 are  
1,4,9,16,25,36,49,64,81,100

2. Find the square of 321.

Sol: Square of 321 =  $321^2$   
=  $321 \times 321 = 103041$

3. Find the square of  $\frac{7}{5}$ .

Sol: Square of  $\frac{7}{5} = \left(\frac{7}{5}\right)^2 = \frac{49}{25}$

4. Find the square of 1.5.

Sol: Square of 1.5 =  $(1.5)^2$   
= 2.25

5. Find the square of the following numbers

- |        |                   |                     |                       |
|--------|-------------------|---------------------|-----------------------|
| i) 55  | ii) 61            | iii) 99             | iv) 1.6               |
| v) 4.5 | vi) $\frac{7}{9}$ | vii) $3\frac{1}{3}$ | viii) $20\frac{1}{3}$ |

**MODEL - 11**

1. What should be subtracted from  $2x^2 - 3y^2 + 6xy$  to get  $x^2 - y^2$ ?

Sol: In order to get the result, we subtract

$$x^2 - y^2 \text{ from } 2x^2 - 3y^2 + 6xy$$

$$2x^2 - 3y^2 + 6xy - (x^2 - y^2)$$

$$2x^2 - 3y^2 + 6xy - x^2 + y^2$$

$$x^2 - 2y^2 + 6xy$$

∴ We should subtract  $x^2 - 2y^2 + 6xy$  from  $2x^2 - 3y^2 + 6xy$  to get  $x^2 - y^2$

2. What should be added to  $5x^2 + 4x + 3$  to get  $6x^2 - 7x + 1$ ?

Sol: The required answer =  $(6x^2 - 7x + 1) - (5x^2 + 4x + 3)$

$$\begin{aligned}
&= 6x^2 - 7x + 1 - 5x^2 - 4x - 3 \\
&= (6x^2 - 5x^2) + (-7x - 4x) + (1 - 3) \\
&= x^2 - 11x - 2
\end{aligned}$$

3. Subtract the sum of  $2x - x^2 + 5$  and  $-4x - 3 + 7x^2$  from 5.

Sol: The required answer  $= 5 - [(2x - x^2 + 5) + (-4x - 3 + 7x^2)]$

$$\begin{aligned}
&= 5 - [(2x - 4x) + (-x^2 + 7x^2) + (5 - 3)] \\
&= 5 - [-2x + 6x^2 + 2] = 5 + 2x - 6x^2 - 2 \\
&= 2x - 6x^2 + 3
\end{aligned}$$

4. What should be added to  $4x^2 + 7x + 3$  to get the sum equal to  $2x^2 + 3$ ?

5. Add  $7x^2 - 4x + 5$ ,  $-3x^2 + 2x - 1$  and  $5x^2 - x + 9$ .

6. Subtract  $7x + 5y + 20$  from  $3x + 14 - y$

7. Simplify  $(12x^3 + x^2 + 3x - 1) + (2x^3 - 6x + 2) - (3x + 1)$

8. What should be subtracted from  $x^3 - 4y^2 + 9xy$  to get  $9xy$ .

9. What should be subtracted from  $x^2 - 2y^2 + 9x$  to get  $y^2 + 9x$ .

10. What should be subtracted from  $-7x^3 + 4x^2 + 6x$  to get  $x^3 + x^2$ .

11. What should be subtracted from  $5m^2 + 4xm + 2m^3$  to get  $m^2 + 2xm$ .

12. What should be subtracted from  $9y^4 - 6y^3 + 2xy + 7x^2$  to get  $6x^2 + y^3 + 2xy$ .

### MODEL - 12

1. Find the value of  $(7x^2 + 2x)(x + 1)$  when (i)  $x = -2$ , (ii)  $x = 0$

Sol: (i) If  $x = -2$ ,  $(7x^2 + 2x)(x + 1) = [7(-2)^2 + 2(-2)] [-2 + 1]$

$$= (7 \times 4 - 4) (-1) = (28 - 4) (-1) = 24 \times -1 = -24$$

24

(ii) If  $x = 0$ ,  $(7x^2 + 2x)(x + 1) = [7(0)^2 + 2(0)] [0 + 1]$

$$= (0 + 0) (1) = 0 \times 1 = 0$$

2. Find the value of  $2a^2 + b^2 + 1$  when  $a = 0, b = -1$

Sol:  $= 2a^2 + b^2 + 1, a = 0, b = -1$

$$= 2(0)^2 + (-1)^2 + 1$$

$$= 0 + 1 + 1 = 2$$

3. Find the value of  $(3m^2 + \frac{1}{2} + m)$  when  $m = -3$  and  $m = 3$
4. Find the value of  $7p^2 + 15p + \frac{3}{2}$  when  $p = -1$  and  $p = 0$
5. Find the value of  $(8x^2 + 7x) - (3x^2 - 2x + 1)$  when  $x = 2$  and  $x = 3$
6. Find the value of  $3a^3 - 5a^2 + 6a - 1$  when  $a = \frac{1}{2}$  and  $a = \frac{1}{3}$
7. Find the value of  $2a^2b + 2ab^2 + ab$  when  $a = 2, b = 3$
8. Find the value of  $2a^2 + b^2 + 1$ , when  $a = -1, b = 3$ .

### MODEL - 13

1. Multiply  $\frac{1}{2}xy \times \frac{2}{3}x^2yz^2$

Sol: 
$$\frac{1}{2}xy \times \frac{2}{3}x^2yz^2 = \left(\frac{1}{2} \times \frac{2}{3}\right) \times (x \times x^2) \times (y \times y) \times z^2$$
$$= \frac{1}{3}x^3y^2z^2$$

2. Find the product of  $-5x^2y, \frac{-2}{3}xy^2z, \frac{8}{15}xyz^2$  and  $\frac{-1}{4}z$

Sol: The required product 
$$= (-5x^2y) \times \left(-\frac{2}{3}xy^2z\right) \times \left(\frac{8}{15}xyz^2\right) \times \left(-\frac{1}{4}z\right)$$
$$= \left(-5 \times \frac{-2}{3} \times \frac{8}{15} \times \frac{-1}{4}\right) \times (x^2 \times x \times x) \times (y \times y^2 \times y) \times (z \times z^2 \times z)$$
$$= \frac{-4}{9}x^4y^4z^4$$

3. Multiply  $(7a + 3b)$  and  $(2a + 5b)$

Sol: The required product 
$$= (7a + 3b)(2a + 5b)$$
$$= 7a(2a + 5b) + 3b(2a + 5b)$$

$$= 14a^2 + 35ab + 6ab + 15b^2$$

$$= 14a^2 + 41ab + 15b^2$$

4. Multiply  $\frac{7}{9}ab^2, \frac{15}{7}ac^2b$  and  $-\frac{3}{5}a^2c$
5. Find the product  $\left(\frac{4}{3}pq^2\right) \times \left(-\frac{1}{4}p^2r\right) \times (16p^2q^2r^2)$
6. Multiply  $\left(3x - \frac{4}{5}y^2x\right)$  by  $\frac{1}{2}xy$
7. Multiply  $(2x + 3y)$  and  $(4x - 5y)$
8. Find the product  $\left(\frac{1}{5}x - \frac{1}{4}y\right) \times (5x^2 - 4y^2)$
9. Multiply  $(3x^2 + y^2) \times (x^2 + 2y^2)$
10. Multiply  $(4x^2 + y^2)(4x^2 - y^2)$

#### **MODEL - 14**

1. If  $A : B = 5 : 6$  and  $B : C = 8 : 9$  then  $A : B : C$  is

Sol: Given,  $A:B=5:6$

Multiplying it with 4, we get  $A:B=20:24$

And,  $B:C=8:9$

Multiplying it with 3, we get  $A:B=24:27$

In the given ratios "B" is the common term, and the values of B in both ratios are equal.

Therefore,  $A:B:C=20:24:27$

2. If  $A:B = 4:5$  Find  $A+B : 2A-B$

Sol: let  $A = 4X$   $B=5X$

$A+B : 2A-B$

$4X+5X : 2(4X)-5X$

$9X : 8X-5X$

$9X : 3X$

$3:1$

$$A+B : 2A-B = 3:1$$

3. If  $A:B = 4:5$  and  $B:C = 2:3$  Find  $A:C$

Sol: Given  $A:B = 4:5$

Multiplying it with '2' we get  $A:B = 8:10$

$$B : C = 2:3$$

Multiplying it with '5' we get  $B:C = 10:15$

In the given ratio 'B' is the common term and the values of B in both ratios are equal

$$A:B:C = 8:10:15$$

$$A:C = 8:15$$

4. If  $A:B:C = 3:4:6$  Find  $2A + B : 2B + C$
5. If  $A:B = 9:7$  Find  $3A-2B : 3B-2A$
6. If  $A:B:C = 1:2:3$  Find  $A+B+C : 2B+2C$
7. If  $C:D = 1:3$  and  $D:E = 4:1$  Find  $C:E$
8. If  $P:Q = 2:5$  and  $Q:R = 2:5$  Find  $P:R$
9. If  $X:Y = 2:7$  and  $Y:Z = 1:3$  Find  $X:Z$
10. If  $C : D = 4 : 6$  and  $D : E = 7 : 9$  then  $C : D : E$  is
11. If  $A : B = 5 : 9$  and  $B : C = 9 : 4$  then  $A : B : C$  is
12. If  $E : F = 2 : 3$  and  $F : G = 9 : 12$  then  $E : F : G$  is
13. If  $X : Y = 4 : 7$  and  $Y : Z = 2 : 9$  then  $X : Y : Z$  is
14. If  $A : B = 7 : 8$  and  $B : C = 2 : 5$  then  $A : B : C$  is

### MODEL -15

1. Solve  $3x + 2 = 14$

Sol:  $3x + 2 = 14$

$$3x = 14 - 2$$

$$3x = 12$$

$$\frac{3x}{3} = \frac{12}{3}$$

$$x = 4$$

2. Solve  $\frac{3x}{4} + \frac{7}{3} = \frac{1}{3}$

Sol:  $\frac{3x}{4} = \frac{1}{3} - \frac{7}{3}$

$$\frac{3x}{4} = \frac{1-7}{3}$$

$$\frac{3x}{4} = \frac{-6}{3}$$

$$3x = -2 \times 4$$

$$x = \frac{-8}{3}$$

3. Solve  $\frac{x}{2} + \frac{x}{3} = \frac{5}{6}$

Sol:  $\frac{x}{2} + \frac{x}{3} = \frac{5}{6}$

L.C.M of 2,3 is 6

$$\frac{3x+2x}{6} = \frac{5}{6}$$

$$\frac{5x}{6} = \frac{5}{6}$$

$$x = \frac{5}{6} \times \frac{6}{5}$$

$$x = 1$$

4.  $\frac{x}{2} + \frac{x}{3} - \frac{x}{4} = 7$

Sol: L.C.M of 2, 3, 4 is 12

$$\frac{6x+4x-3x}{12} = 7$$

$$\frac{7x}{12} = 7$$

$$x = \frac{7 \times 12}{7}$$

$$x = 12$$

5. Length of a rectangle is 3cm more than its breadth. If its perimeter is 23cm. Find the dimensions of rectangle.

Sol: Let the breadth of rectangle =  $x$  cm

Given that length is 3 cm more than its breadth

$$\therefore \text{length} = (x + 3) \text{ cm}$$

Given that perimeter of rectangle = 23cm

$$2(\text{length} + \text{breadth}) = 2(x + x + 3) = 23$$

$$2(2x + 3) = 23$$

$$2x + 3 = \frac{23}{2}$$

$$2x = \frac{23}{2} - \frac{3}{1}$$

$$2x = \frac{23 - 6}{2}$$

$$2x = \frac{17}{2}$$

$$x = \frac{17}{4}$$

$$\text{Breadth} = \frac{17}{4} \text{ cm}$$

$$\text{Length} = \frac{17}{4} + 3 = \frac{17 + 12}{4} = \frac{29}{4} \text{ cm.}$$

6. Find a number whose double is 45 greater than its half.

7. Solve  $3x + 7 = 37$

8. Solve  $\frac{x+3}{4} = 5$

9. Solve  $\frac{x}{2} + \frac{2x}{5} = 9$

10. Solve  $\frac{x+3}{7} = \frac{x-1}{10}$



**MODEL - 16**

1. If  $\frac{y-1}{3} - \frac{y-2}{4} = 1$ , then 'y' is \_\_\_\_\_.

Sol: In order to find the value of 'y' we need to do L.C.M

So. L.C.M of 3, 4 is 12

$$\frac{4(y-1) - 3(y-2)}{12} = 1$$

$$4y - 4 - 3y + 6 = 12$$

$$y + 2 = 12$$

$$y = 12 - 2$$

$$y = 10$$

2. Solve  $\frac{5x-4}{8} - \frac{x-3}{5} = \frac{x+6}{4}$

Sol: We have

$$\frac{5x-4}{8} - \frac{x-3}{5} = \frac{x+6}{4}$$

LCM of 8, 5 and 4 we get 40

$$\frac{5(5x-4) - 8(x-3)}{40} = \frac{x+6}{4}$$

$$5(5x-4) - 8(x-3) = 10(x+6)$$

$$25x - 20 - 8x + 24 = 10x + 60$$

$$17x + 4 = 10x + 60$$

$$17x - 10x = 60 - 4$$

$$7x = 56$$

$$x = \frac{1}{7} \times 56$$

$$x = 8$$

3. Solve  $0.3x + 0.4 = 0.28x + 1.16$

Sol: We have

$$0.3x + 0.4 = 0.28x + 1.16$$

$$0.3x - 0.28x = 1.16 - 0.4 \text{ [by transposition]}$$

$$0.02x = 0.76 ; \quad x = \frac{0.76}{0.02} = \frac{76}{2} = 38 \therefore x = 38$$

4. Solve :  $\frac{x}{2} + \frac{x}{4} = \frac{1}{8}$

5. Solve :  $\frac{3x-1}{5} - \frac{x}{7} = 3$

6. Solve :  $0.18(5x-4) = 0.5x + 0.8$

7. Solve :  $0.5x - (0.8 - 0.2x) = 0.2 - 0.3x$

8. Solve :  $\frac{2x-3}{5} + \frac{x+3}{4} = \frac{4x+1}{7}$

9. If  $\frac{x+5}{3} - \frac{x-2}{7} = 9$ , then find 'x'

10. Find the value of y if  $\frac{y+3}{6} - \frac{y-7}{5} = 2$

11. If  $\frac{y+1}{2} - \frac{y+2}{9} = 5$ , then find 'y'

12. If  $\frac{x-7}{4} - \frac{x+9}{12} = 1$ , then find 'x'

13. If  $\frac{y+9}{5} - \frac{y-2}{4} = 4$ , then find 'y'

14. If  $\frac{9+y}{2} - \frac{y-7}{3} = 1$ , then find 'y'

### MODEL - 17

1. The sum of two consecutive multiples of 3 is 69, then find numbers.

Sol: Let the two consecutive numbers are x, x + 1

The two consecutive multiples of 3 are 3x, 3(x + 1)

As per the question

$$3x + 3x + 3 = 69$$

$$6x + 3 = 69$$

$$6x = 69 - 3$$

$$6x = 66$$

$$X = 11$$

∴ The numbers are  $3(11) = 33$ ,  $3(11 + 1) \Rightarrow 3(12) = 36$

2. The sum of 3 consecutive odd numbers is 69, then find the numbers.

Sol: Let the three consecutive odd numbers are  $x$ ,  $x+2$ ,  $x+4$

As per the question

$$X+x+2+x+4 = 69$$

(two even numbers (or) two odd numbers are differ

$$3x+6 = 69$$

by '2' always (4-2 =2, 3-1=2))

$$3x = 69-6$$

$$3x = 63$$

$$X = 21$$

The numbers are 21, (21+2), (21+4)

21, 23, 25

3. Two numbers are in the ratio 5:3 if they differ by 18. Find the numbers

Sol: Let the two numbers are  $5x$  and  $3x$

As per the question

$$5x-3x = 18$$

$$2x = 18$$

$$X = 9$$

The numbers are  $3(9)$  and  $5(9)$

27 and 45

4. The sum of two consecutive multiples of 2 is 78, then find the numbers .
5. The sum of two consecutive multiples of 4 is 92, then find the numbers .
6. The sum of two consecutive multiples of 3 is 105. Find the numbers.
7. The sum of two consecutive numbers is 45 what are the numbers?
8. The sum of two consecutive even numbers is 10 find the numbers.
9. The sum of 3 consecutive numbers is 54, Find the numbers.
10. The sum of 3 consecutive even numbers is 300. Find the numbers.
11. The sum of 3 consecutive multiples of 5 is 150. Find the numbers.
12. Two numbers are in the ratio 7:3, if they differ by 32, Find the numbers.
13. Two numbers are in the ratio 9:5, if they differ by 44, Find the numbers.

**MODEL - 18**

1. After 12 years I shall be 3 times as old as I was 4 years ago. Find my present age.

Sol: Let my present age =  $x$  years.

After 12 years my age will be  $x+12$  years.

4 years ago my age was  $x-4$  years.

$$\text{So } x+12=3(x-4)$$

$$\Rightarrow x+12=3x-12$$

$$\Rightarrow 3x-x=12+12$$

$$\Rightarrow 2x=24$$

$$\therefore x=12 \text{ years}$$

Therefore, the present age is 12 years.

2. A father is twice as old as his daughter. If 20 years ago, the age of the father was 4 times the age of the daughter what is the present age of the father and daughter.

Sol: Let the present age of the daughter is ' $x$ ' years

Present age of the father is ' $2x$ ' years

'20' years ago

$$\text{Age of father} = 2x-20$$

$$\text{Age of daughter} = x-20$$

As per question

$$2x-20 = 4(x-20)$$

$$2x-20 = 4x-80$$

$$80-20 = 4x-2x$$

$$60 = 2x$$

$$X=30$$

Present age of daughter = 30 years

Present age of father =  $2(30) = 60$  years

3. What is Ravi's present age, if after 20 years his age will be 10 times his age 7 years back.
4. 18 years ago, a man was three times as old as his son. Now the man is twice as old as his son. Find the present ages of the man and his son.
5. John is 4 times as old as his son, 4 years later the sum of their ages will be 43 years, the present age of son is.
6. 20 years ago my age was  $\frac{1}{3}$  of what it is now. What is my present age.

7. A grand father is 10 times older than his grand daughter. He is also 54 years older than her. Find their present age.
8. What is John's present age, 10 years later his age will be 5 times his age 6 years ago?
9. Rajeev's age after 15 years will be 5 times his age 5 years back what is the present age of Rajeev?
10. A father is 16 times older than his son's present age. Eight years hence the father was 4 times as old as his son age. Find their present age

**MODEL - 19**

1. Expand using identity  $(2x + 3)^2$

Sol: We know that  $(a + b)^2 = a^2 + 2ab + b^2$

$$\begin{aligned}(2x + 3)^2 &= (2x)^2 + 2 \times 2x \times 3 + 3^2 \\ &= 4x^2 + 12x + 9\end{aligned}$$

2. Expand using identity  $\left(\frac{1}{2}p - \frac{1}{3}\right)^2$

Sol: We know that  $(a - b)^2 = a^2 - 2ab + b^2$

$$\begin{aligned}\left(\frac{1}{2}p - \frac{1}{3}\right)^2 &= \left(\frac{1}{2}p\right)^2 - 2 \times \frac{1}{2}p \times \frac{1}{3} + \left(\frac{1}{3}\right)^2 \\ &= \frac{1}{4}p^2 - \frac{1}{3}p + \frac{1}{9}\end{aligned}$$

3. Expand using suitable identity :  $(2x + 3)(2x + 4)$

Sol: We know that  $(x + a)(x + b) = x^2 + (a + b)x + ab$

$$\begin{aligned}\therefore (2x + 3)(2x + 4) &= (2x)^2 + (3 + 4) \times 2x + 3 \times 4 \\ &= 4x^2 + 14x + 12\end{aligned}$$

4. Expand using suitable identity :  $(4x + 3)(4x - 3)$

Sol: We know that  $(a + b)(a - b) = a^2 - b^2$

$$(4x+3)(4x-3) = (4x)^2 - 3^2 \\ = 16x^2 - 9$$

**Expand the following using suitable identity:**

5.  $\left(\frac{4}{3}x - 1\right)^2$

6.  $\left(x - \frac{7}{4}\right)^2$

7.  $(5x - 1)(5x - 6)$

8.  $(8x + 1)(8x - 1)$

9.  $(mx + ny)^2$

10.  $\left(\frac{3x}{4} - 1\right)^2$

11.  $(10x + 7)^2$

12.  $(15m^2n^2 - 1)^2$

13.  $\left(31p^2q - \frac{3}{4}\right)^2$

14.  $\left(\frac{25}{7}x^4 - 1\right)^2$

#### **MODEL - 20**

1. An article was bought for Rs. 400 and sold for Rs. 336. Find the loss and percentage of loss.

Sol: CP = Rs. 400

SP = Rs. 336

Since  $SP < CP$  there is a loss

Loss = CP - SP

= 400 - 336 = 64

$$\text{Loss \%} = \frac{\text{loss}}{\text{CP}} \times 100 = \frac{64}{400} \times 100$$

$$= 16\%$$

2. If the cost price of 6 pencils is equal to the selling price of 5 pencils find the gain percent.

Sol: Let the cost price of each pencil is Rs.  $x$

$$\therefore \text{C.P of 5 pencils} = \text{Rs. } 5x$$

Given that C.P of 5 pencils = S.P of 6 pencils

$$\therefore \text{S.P of 6 pencils} = \text{Rs. } 6x$$

Here S.P > C.P  $\Rightarrow$  gain

$$\therefore \text{Gain} = \text{S.P} - \text{C.P}$$

$$6x - 5x = x$$

$$\text{Gain percentage} = \frac{\text{gain}}{\text{CP}} \times 100 = \frac{x}{5x} \times 100$$

$$= 20\%$$

3. Find the S.P when C.P = Rs. 90 gain = 6%

Sol: C.P = Rs. 90

$$\text{Gain} = 90 \times \frac{6}{100} = 5.4$$

$$\text{Selling price} = \text{Rs. } 5.4 + 90 = \text{Rs. } 95.4$$

4. A tricycle was purchased for Rs. 1120 and sold in Rs. 1260. Find the gain and gain percentage.
5. If the cost price of Rs. 15 is equal to the S.P of Rs. 20 pens. Find the loss percentage.
6. Find the S.P of an article for which C.P is Rs. 650 and gain percentage is 6%.
7. Find the S.P of a table whose C.P is Rs. 3300 and sold at a loss of 10%.

### MODEL - 21

#### CONCEPT

Work done = men x days x hours (w=mdh)

$$\frac{w_1}{w_2} = \frac{m_1 d_1 h_1}{m_2 d_2 h_2}$$

If work is constant  $m_1d_1h_1=m_2d_2h_2$

If work and days are constant  $m_1h_1=m_2h_2$

If work and hours are constant  $m_1d_1 = m_2d_2$

1. If 52 men can do a piece of work in 35 days in how many days 28 men will do it?

Sol: Given  $m_1 = 52$ men,  $m_2 = 28$ men

$$d_1 = 35 \text{ days, } d_2=?$$

$$m_1d_1 = m_2d_2$$

$$52 \times 35 = 28 \times x$$

$$d_2 = \frac{52 \times 35}{28} = \frac{52 \times 5}{4}$$

$$= 13 \times 5 = 65 \text{ days}$$

Hence 28men will do the work in 65 days

2. If  $\frac{4}{5}$  of water tank is filled in 1 minute, how much more time will be required to fill the rest of the tank?

Sol: Time taken to fill  $\frac{4}{5}$  of water tank = 1 min.

By unitary method:

Time taken to fill the one empty tank =  $1 \times \frac{5}{4} = \frac{5}{4}$  min = 1 min 15 sec.

15 sec. required to fill the rest of the tank.

3. 10 persons can Fill up a water tank in 20 hours. How many persons are needed to fill it up in 5 hours?
4. A water pipe can fill half of the water tank in 45 minutes. How much time taken to fill 4 such water tanks?
5. If a pipe fills the tank in 10 minutes, how many minutes it will take to half fill the tank if we connect two pipes?
6. If 6 oil tankers can be filled by a pipe in  $4 \frac{1}{2}$  hours, how long does the pipe take to fill 4 such oil tankers?
7. If 48 men can dig a trench in 14 days, how long will 28 men take to dig a similar trench.
8. If 56 men can do a piece of work in 42 days. How many men will do it in 14 days?
9. If 36 men can do pieces of work in 25 days in how many days will 15 men do it?
10. 18 men can reap a field in 35 days. For reaping the same field in 15 days how many men are required.



### MODEL - 22

1. Find the simple interest on Rs. 7200 at 5% per annum for 8 months. Also find the amount.

Sol:  $P = \text{Rs. } 7200$

$R = 5\%$

$T = 8 \text{ months} = \frac{8}{12} \text{ years} = \frac{2}{3} \text{ years}$

$$SI = \frac{PRT}{100}$$

$$= 7200 \times 5 \times \frac{2}{3} \times \frac{1}{100}$$

$$= \text{Rs. } 240$$

Amount =  $P + SI$

$$= 7200 + 240 = \text{Rs. } 7440$$

2. At what rate percent per annum simple interest will a sum triple itself in 16 years?

Sol: Let the sum be Rs.  $x$

Then amount be Rs.  $3x$

S.I = Rs.  $(3x - x) = \text{Rs. } 2x$

Time = 16 years

$P = \text{Rs. } x, S.I = \text{Rs. } 2x, T = 16 \text{ years}$

$$S.I = \frac{PTR}{100}$$

$$2x = \frac{x \times 16 \times R}{100}$$

$$R = \frac{2x \times 100}{x \times 16} = \frac{100}{8}$$

$$= 12.5\% \text{ p.a}$$

Required rate is 12.5% p.a

3. Simple interest on a certain sum is  $\frac{16}{25}$  of the sum. Find the rate percent and the time if both

are numerically equal.

4. A sum of money becomes  $\frac{8}{5}$  of itself in 5 years at a certain rate of simple interest. Find the rate of interest.

5. In what time will Rs. 3600 amounts to Rs. 4320 at 8% per annum simple interest.

6. Divide Rs. 12000 into two parts such that the simple interest on the first part for 2 years at 6% per annum is equal to the simple interest on the second part for 3 years at 8% per annum. Find the two parts.
7. At what rate percent per annum simple interest will a sum double itself in 12 years.
8. A sum of money becomes  $\frac{4}{3}$  of itself in 6 years at a certain rate of simple interest. Find the rate of interest.
9. In what time will Rs. 3600 amount to Rs. 4410 at 9% per annum simple interest?

### MODEL - 23

1. Find the mean of 8, 12, 6, 2, 8, 10.

Sol: 
$$\text{Mean} = \frac{\text{Sum of the observations}}{\text{number of observations}}$$

$$\frac{8+12+6+2+8+10}{6} = \frac{46}{6} = 7.67 \text{ (approx.)}$$

2. Find the mean of first 8 multiples of 5.

Sol: 
$$\text{Mean} = \frac{\text{Sum of the observations}}{\text{number of observations}}$$

$$\Rightarrow \frac{5+10+15+20+25+30+35+40}{8} = \frac{180}{8} = 22.5$$

3. Find the mean of all factors of 24.

Sol: The factors of 24 are 1,2,3,4,6,8,12,24

$$\text{Mean} = \frac{\text{Sum of the observations}}{\text{number of observations}}$$

$$\Rightarrow \frac{1+2+3+4+6+8+12+24}{8} = \frac{60}{8} = 7.5$$

4. Find the mean of first 6 multiples of 9.
5. Find the mean of first 9 multiples of 7.
6. Find the mean of all factors of 36.
7. Find the mean of all factors of 17.
8. The mean of marks 5 subjects of a student's is 82. What is the sum of marks in all the five subjects?
9. The runs scored in a cricket match by 11 players are as follows 6,15,120,50,100,80,10,15,8,10,10. Find the mean.

- 10 Find the mean of first eight natural numbers.
11. Find the mean of first five odd natural numbers.
12. Find the mean of all factors of 100.
13. Find the mean of first ten prime numbers.

**MODEL - 24**

1. Find x such that  $\left(\frac{3}{5}\right)^3 \times \left(\frac{3}{5}\right)^{-6} = \left(\frac{3}{5}\right)^{2x-1}$

$$\left(\frac{3}{5}\right)^{-3} = \left(\frac{3}{5}\right)^{2x-1} \Rightarrow 2x-1 = -3$$

$$2x = -2$$

$$x = -1$$

2.  $\sqrt{5 + \sqrt[3]{x}} = 3$  then find the value of x

Sol: Given  $\sqrt{5 + \sqrt[3]{x}} = 3$

Squaring on both sides

$$\left(\sqrt{5 + \sqrt[3]{x}}\right)^2 = (3)^2$$

$$5 + \sqrt[3]{x} = 9$$

$$\sqrt[3]{x} = 9-5$$

$$\sqrt[3]{x} = 4$$

Cubing on both sides

$$\left(\sqrt[3]{x}\right)^3 = (4)^3$$

$$X=64$$

3. Find  $\left(\frac{x^l}{x^m}\right)^n \times \left(\frac{x^m}{x^n}\right)^l \times \left(\frac{x^n}{x^l}\right)^m$ ; (Where  $x \neq 0$ )

Sol:  $\left(\frac{x^l}{x^m}\right)^n \times \left(\frac{x^m}{x^n}\right)^l \times \left(\frac{x^n}{x^l}\right)^m$   $\left(\frac{a^m}{a^n} = a^{m-n}\right)$

$$= (x^{l-m})^n \times (x^{m-n})^l \times (x^{n-l})^m$$

$$= x^{(l-m) \times n} \times x^{(m-n) \times l} \times x^{(n-l) \times m} \quad \left( (a^m)^n = a^{mn} \right)$$

$$= x^{ln-mn} \times x^{ml-nl} \times x^{nm-lm} \quad (a^m \times a^n = a^{m+n})$$

$$= x^{ln-mn+ml-nl+nm-lm}$$

$$= x^0$$

$$= 1$$

4. Simplify  $\frac{5^7 \times 6^7}{10^5 \times 3^5}$ .

Sol:  $\frac{5^7 \times (2 \times 3)^7}{(2 \times 5)^5 \times 3^5} = \frac{5^7 \times 2^7 \times 3^7}{5^5 \times 2^5 \times 3^5} = 5^{7-5} \times 2^{7-5} \times 3^{7-5} = 5^2 \times 2^2 \times 3^2 = 900$

$$((ab)^m = a^m \times b^m)$$

$$\left( \frac{a^m}{a^n} = a^{m-n} \right)$$

5. Simplify  $\left\{ \left( -\frac{3}{2} \right)^2 \right\}^{-3}$

Sol:  $\left\{ \left( -\frac{3}{2} \right)^2 \right\}^{-3} = \left( -\frac{3}{2} \right)^{2 \times (-3)}$   $\left[ \because \left\{ \left( \frac{a}{b} \right)^m \right\}^n = \left( \frac{a}{b} \right)^{mn} \right]$

$$= \left( \frac{-3}{2} \right)^{-6} = \left( \frac{2}{-3} \right)^6$$
  $\left[ \because \left( \frac{a}{b} \right)^{-n} = \left( \frac{b}{a} \right)^n \right]$

$$= \frac{2^6}{(-3)^6} = \frac{64}{729}$$

6. Simplify  $(6^{-1} - 8^{-1})^{-1} + (2^{-1} - 3^{-1})^{-1}$   $\left[ \because a^{-1} = \frac{1}{a} \right]$

Sol:  $(6^{-1} - 8^{-1})^{-1} + (2^{-1} - 3^{-1})^{-1}$

$$= \left(\frac{1}{6} - \frac{1}{8}\right)^{-1} + \left(\frac{1}{2} - \frac{1}{3}\right)^{-1}$$

$$= \left(\frac{4-3}{24}\right)^{-1} + \left(\frac{3-2}{6}\right)^{-1}$$

$$= \left(\frac{1}{24}\right)^{-1} + \left(\frac{1}{6}\right)^{-1}$$

$$= \left(\frac{24}{1}\right) + \left(\frac{6}{1}\right)$$

$$= 24 + 6$$

$$= 30$$

7.  $\left(\frac{1}{2}\right)^{-2} + \left(\frac{1}{3}\right)^{-2} + \left(\frac{1}{4}\right)^{-2}$

8. Simplify  $\left[\left\{\left(-\frac{1}{4}\right)^2\right\}^{-2}\right]^{-1}$

9. Simplify  $\left\{\left(-\frac{2}{3}\right)^2\right\}^3$

10. Simplify  $\left\{6^{-1} + \left(\frac{3}{2}\right)^{-1}\right\}^{-1}$

11. Simplify  $\frac{14^3 \times 6^3 \times 5^3}{(21)^2 \times (35)^2 \times (2)^2}$

12. Simplify  $\frac{3^7 \times 2^8 \times 5^9}{5^7 \times 2^7 \times 243}$

13. Simplify  $\frac{10^4 \times (35)^2}{(14)^2 \times (125)^2}$

14. Simplify  $\frac{4^6 \times 125 \times 3^5}{8^3 \times 25 \times 81}$
15. Simplify  $\frac{3^6 \times 10^6 \times 125}{5^8 \times 6^8}$
16. Find  $(x^{m+n})^{m-n} \times (x^{n+p})^{n-p} \times (x^{p+m})^{p-m}$   
Hint:  $(a+b)(a-b) = a^2 - b^2$
17.  $(x^m)^{n-p} \times (x^n)^{p-m} \times (x^p)^{m-n}$
18.  $\sqrt[3]{32} = 2^x$  then find the value of x ?
19.  $\sqrt{2^n} = 64$  then find the value of n?
20. Find n when  $8 \times 2^{n+2} = 32$ .
21. Find n when  $6^{n+2} \div 36 = 6^3$ .
22. If  $2^{n-7} \times 5^{n-4} = 1250$  find the value of n.
23. Find the value of n if  $25^{n-1} + 100 = 5^{2n-1}$
24. If  $\frac{9^n \times 3^2 \times 3^n - (27)^n}{(3^3)^5 \times 2^3} = \frac{1}{27}$  find the value of n.

#### MODEL - 25

1. The total cost of 24 chairs is Rs. 9255.60. Find the cost of 5 such chairs.

Sol: Cost of each chair =  $\frac{9255.60}{24} = 385.65 / -$

Cost of 5 chairs =  $5 \times 385.65 = \text{Rs. } 1928.25$

2. Monica cuts 46m of cloth into pieces of 1.15m each. How many pieces does she get?

Sol: length of total cloth = 46m

length of each piece = 1.15m

The number of pieces she get =  $\frac{46}{1.15} = 40$  pieces

3. The product of two decimals is 1.5008 if one of them is 0.56 find the other

Sol: Product of given decimal = 1.5008

One of the decimal = 0.56

The other decimal =  $\frac{1.5008}{0.56}$

$$= \frac{1.5008}{0.56} \times \frac{100}{100}$$

$$= \frac{150.08}{56}$$

$$= 2.68$$

The other decimal is 2.68

4. A bowler took 15 wickets for 321 runs what is his average score per wicket?
5. Mrs Boss bought 15.5 liters of refined oil for Rs. 1122.20. find its cost per liter?
6. A tin holds 16.5 liters of oil . How many such tins will be required to hold for 478.5 liters of oil?
7. The weight of 37 bags of sugar is 3644.5kg. If all the bags weigh equally. What is the weight of 10 such Bags?
8. Each side of a regular polygon is 2.9cm in length and its perimeter is 17.4cm. How many sides does the polygon have?

### MODEL - 26

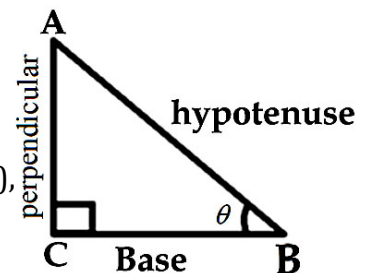
Pythagoras Theorem: In a right angled triangle the square of the hypotenuse is equal to the sum of squares of the other two sides.

In the figure  $c^2 = a^2 + b^2$

Examples of Pythagorean triplets.

(3, 4, 5), (5, 12, 13), (7, 24, 25), (8, 15, 17), (9, 40, 41), (11, 60, 61),

(12, 35, 37), (16, 63, 65)



1. Find the length of the hypotenuse of a right triangle whose other two sides are 12cm and 16cm.

Sol: We have,  $c^2 = a^2 + b^2$  where c is the hypotenuse

$$c^2 = 12^2 + 16^2$$

$$c^2 = 144 + 256 = 400$$

$$c = \sqrt{400} = 20$$

$$\therefore \text{Hypotenuse} = 20 \text{ cm}$$

2. In  $\Delta ABC$  right angled at B. AC = 26cm, AB = 10cm find the length BC.

Sol:  $AC^2 = AB^2 + BC^2$  (by Pythagorouss theorem)

$$\Rightarrow 26^2 = 10^2 + BC^2$$

$$\Rightarrow 676 - 100 = BC^2$$

$$BC^2 = 576$$

$$BC = \sqrt{576} = 24\text{cm}$$

3. In  $\Delta PQR$  right angled at Q, PR = 12cm, PQ = 5cm find the length of QR.
4. In  $\Delta ABC$  right angled at C, AC = 8cm, BC = 15cm find the length of AB.
5. In  $\Delta XYZ$ , right angled at Y, XY = 9cm, XZ = 41cm, find the measure of YZ.
6. Each side of square is 10cm, find the length of its diagonal.
7. The sides of a rectangle are 12 cm and 35 cm. find the length of its diagonal.

### MODEL - 27

1. Express 50grams as the percentage of 5kg.

Sol:  $5\text{kg} = 5000\text{g}$

$$\begin{aligned}\text{Required percentage} &= \frac{50\text{g}}{5000\text{g}} \times 100\% = \frac{5000}{5000} \\ &= 1\%\end{aligned}$$

2. Express 5cm in metre and kilometer.

Sol:  $1\text{m} = 100\text{cm}$

$$\Rightarrow 1\text{cm} = \frac{1}{100}\text{m}$$

$$\therefore 5\text{cm} = \frac{5}{100}\text{m}$$

$$5\text{cm} = 0.05\text{m}$$

$$1\text{km} = 1000\text{m}$$

$$\Rightarrow 1\text{m} = \frac{1}{1000}\text{km} \quad \therefore 5\text{cm} = 0.05\text{m} = \frac{0.05}{1000}\text{km}$$

$$5\text{cm} = 0.00005\text{km}$$

3. Express 7 rupees 7 paise in rupees

Sol:  $\text{Rs. } 1 = 100\text{ paise}$

$$\therefore 1\text{ paise} = \text{Rs. } \frac{1}{100}$$



$$\therefore 7 \text{ rupees } 7 \text{ paise} = \text{Rs. } 7 + \text{Rs. } \frac{7}{100}$$

$$= \text{Rs. } 7 + \text{Rs. } 0.07$$

$$= \text{Rs. } 7.07$$

4. Express 5 mm in cm, m and km
5. Express 77 rupees 77 paise in rupees
6. Express 235 paise in rupees
7. Express 18 minutes as the percentage of 10 hours.
8. Express 3.5 days as the percentage of 2 weeks
9. Express 76cm as the percentage of 1km
10. What percentage of 5m is 20cm?
11. If there are 20 boys and 30 girls in a class. What is the percentage of girls in the class?
12. In an auditorium, 60% seats are filled. If the total number of seats in the auditorium is 420, then how many seats are not filled?

### MODEL - 28

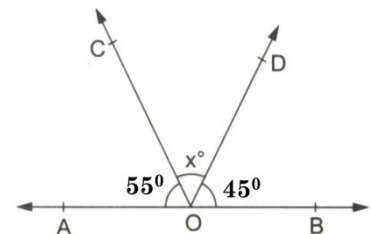
1. In the figure, if AOB is a straight line, find the value of x.

Sol: Since AOB is a straight line

$$\angle AOC + \angle COD + \angle BOD = 180^\circ$$

$$\Rightarrow 55 + x + 45 = 180$$

$$X = 180 - 100 = 80^\circ$$



2. In the given figure,  $l \parallel m$  and 't' is transversal. If  $\angle 5 = 70^\circ$ . Find the measure of each of the angles  $\angle 1, \angle 3, \angle 4, \angle 8$ .

Sol: given  $\angle 5 = 70^\circ$ ,  $l \parallel m$ , 't' is transversal

Now

$$\angle 5 + \angle 4 = 180^\circ \text{ (sum of co-interior angles is } 180^\circ)$$

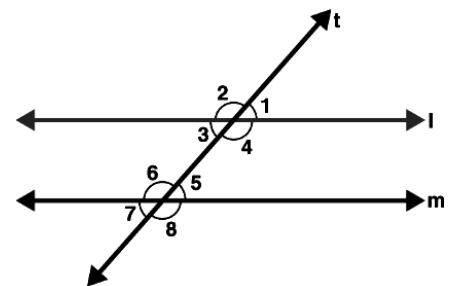
$$\Rightarrow 70^\circ + \angle 4 = 180^\circ \Rightarrow \angle 4 = 180^\circ - 70^\circ$$

$$\Rightarrow \angle 4 = 110^\circ$$

$$\angle 8 = \angle 4 = 110^\circ \text{ (corresponding angles)} \Rightarrow \angle 8 = 110^\circ$$

$$\angle 1 = \angle 5 = 70^\circ \text{ (corresponding angles)} \Rightarrow \angle 1 = 70^\circ$$

$$\angle 3 = \angle 1 = 70^\circ \text{ (vertically opposite angles)} \therefore \angle 3 = 70^\circ$$



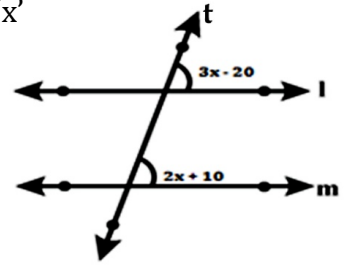
3. In the given figure  $l \parallel m$  and 't' is a transversal then find 'x'

Sol: given  $l \parallel m$

$$\therefore 3x - 20 = 2x + 10 \text{ ( corresponding angles)}$$

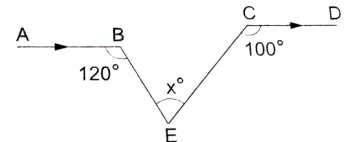
$$\Rightarrow 3x - 2x = 10 + 20$$

$$\Rightarrow x = 30^\circ$$



4. In the given figure  $AB \parallel CD$ .  $\angle ABE = 120^\circ$ ,  $\angle DCE = 100^\circ$

then find the value of x.



Sol: Draw a line XY parallel to AB and CD through E

$$120 + \angle BEX = 180^\circ \text{ [ co- interior angles]}$$

$$\angle BEX = 180 - 120 = 60^\circ$$

$$100 + \angle CEY = 180^\circ \text{ [ co- interior angles]}$$

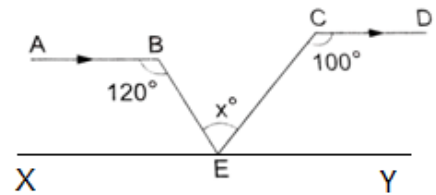
$$\angle CEY = 180 - 100 = 80^\circ$$

Since XEY is a straight line,

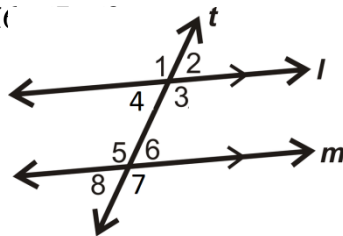
$$\angle BEX + \angle BEC + \angle CEY = 180^\circ$$

$$\text{That is : } 60 + x + 80 = 180$$

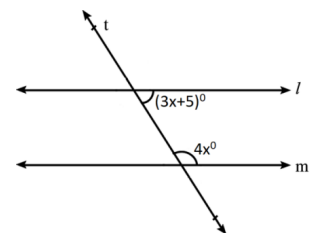
$$\Rightarrow x = 180 - 140 = 40^\circ$$



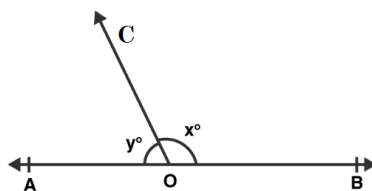
5. In the given figure,  $l \parallel m$  and 't' is transversal such that  $\angle 1 = 135^\circ$  find measure of each of the angles  $\angle 2, \angle 3, \angle 4, \angle 5, \angle 6, \angle 7, \angle 8$



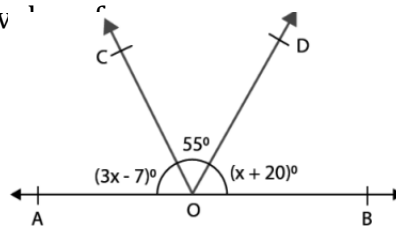
6. In the given figure  $l \parallel m$  and 't' is a transversal then find x



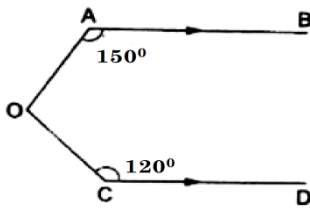
7. In the figure AOB is a straight line and  $4x = 5y$ . What is the value of x.



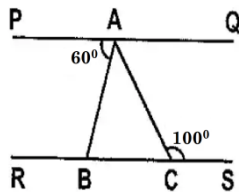
8. In the figure AOB is a straight line  $\angle AOC = (3x - 7)^\circ$ ,  $\angle COD = 55^\circ$  and  $\angle BOD = (x + 20)^\circ$ . Find the value of  $x$ .



9. In the given figure  $AB \parallel CD$ . If  $\angle OAB = 150^\circ$  and  $\angle OCD = 120^\circ$  then find  $\angle AOC$ .

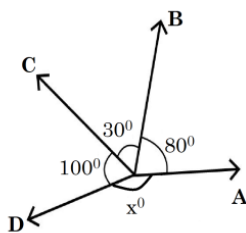


10. In the figure,  $PQ \parallel RS$   $\angle PAB = 60^\circ$  and  $\angle ACS = 100^\circ$  then find  $\angle ABR$ .

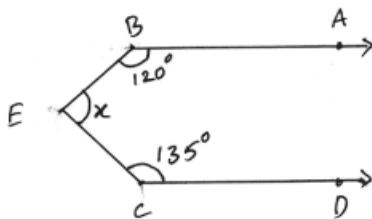


11. The angles of a triangle are  $(3x)^\circ$ ,  $(2x - 7)^\circ$  and  $(4x - 11)^\circ$ , then find the value of  $x$ .

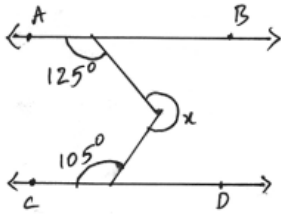
12. From the figure, find the value of  $x$ .



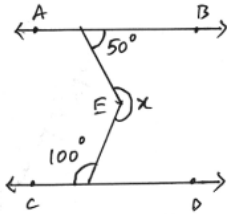
13. In the given figure  $AB \parallel CD$ . Find  $x$ .



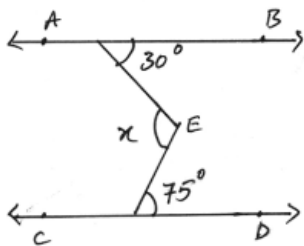
14. In the given figure  $AB \parallel CD$ . Find  $x$



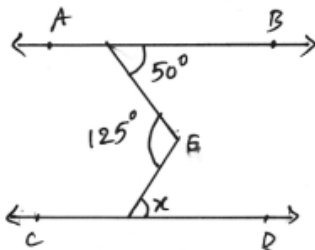
15. In the given figure  $AB \parallel CD$ . Find  $x$



16. In the given figure  $AB \parallel CD$ . Find  $x$



17. In the given figure  $AB \parallel CD$ . Find  $x$



### MODEL - 29

1. Find the area of an equilateral triangle whose each side is 15cm.

Sol: Given:  $a = 15\text{cm}$

$$\begin{aligned} \text{Area of equilateral triangle} &= \frac{\sqrt{3}}{4} a^2 \\ &= \frac{\sqrt{3}}{4} 15 \times 15 \\ &= \frac{225\sqrt{3}}{4} = 56.25\sqrt{3} \text{ cm}^2 \end{aligned}$$

2. Area of an equilateral triangle is  $25\sqrt{3}cm^2$ . Find its perimeter.

Sol: Given Area of equilateral triangle =  $25\sqrt{3}cm^2$

$$\Rightarrow \frac{\sqrt{3}}{4}a^2 = 25\sqrt{3} \quad \Rightarrow a^2 = 25\sqrt{3} \times \frac{4}{\sqrt{3}}$$

$$\Rightarrow a^2 = 100$$

$$\Rightarrow a = \sqrt{100} = 10$$

Perimeter of equilateral triangle =  $3a$

$$3 \times 10 = 30 \text{ cm}$$

3. The base and corresponding height of a triangle are 12 cm and 15 cm respectively, Find its area

Sol: Given:  $b = 12 \text{ cm}$ ,  $h = 15 \text{ cm}$

$$\begin{aligned} \text{Area of the triangle} &= \frac{1}{2}bh \\ &= \frac{1}{2} \times 12 \times 15 \\ &= 90cm^2 \end{aligned}$$

4. Area of a triangle is  $1000cm^2$ . If one side  $50cm$ . Find the length of the corresponding height.

Sol: Given: Area of triangle =  $1000cm^2$ ,  $b = 50cm$

$$\Rightarrow \frac{1}{2}bh = 1000$$

$$\Rightarrow \frac{1}{2} \times 50 \times h = 1000$$

$$h = \frac{1000}{25} = 40$$

Required height = 40 cm

5. One side of a triangle and the corresponding height are 50 cm and 40 cm respectively. In that triangle find the height corresponding to the side 80 cm.

Sol: Taking base = 50cm, and height = 40cm

$$\text{Area of the triangle} = \frac{1}{2}bh$$

$$= \frac{1}{2} \times 50 \times 40$$

$$= 1000 \text{ cm}^2$$

Taking base as 80 cm,  $\frac{1}{2} \times 80 \times h = 1000$

$$h = \frac{1000}{40} = 25$$

$\therefore$  The required height = 25 cm

6. Area of an equilateral triangle is  $100\sqrt{3} \text{ cm}^2$ . Find its perimeter.
7. The base and corresponding height of a triangle are 8cm and 9cm respectively. Find its area.
8. Area of a triangle is  $630 \text{ cm}^2$ . If one side is 21cm, find the length of the corresponding height.
9. Perimeter of an equilateral triangle is 36cm. Find its area.
10. Find the area of an equilateral triangle whose each side is 20cm.
11. Find the area of an equilateral triangle whose each side is  $10\sqrt{3} \text{ cm}$
12. If one side and the corresponding height of a triangle are 8cm and 6cm respectively in that triangle find the height corresponding to the side of length 6cm.
13. Find the perimeter of an equilateral triangle whose area is  $36\sqrt{3} \text{ cm}^2$

### MODEL - 30

1. In  $\triangle ABC$ ,  $AB = BC = CA$  then  $\angle ABC$  is

Sol:  $AB = BC = CA \Rightarrow \angle A = \angle B = \angle C$

$$\angle A + \angle B + \angle C = 180^\circ \text{ (sum of angles of a triangle)}$$

$$\angle A + \angle A + \angle A = 180^\circ$$

$$3\angle A = 180^\circ$$

$$\angle A = 60^\circ$$

$$\therefore \angle ABC = 60^\circ$$

2. In  $\square PQR$ ,  $PQ = PR$  and  $\angle Q = 50^\circ$  find  $\angle P$  and  $\angle R$

Sol: Given  $PQ = PR$  [ Angles opposite to equal sides of an isosceles triangle are equal ]

$$\Rightarrow \angle Q = \angle R$$

$$\Rightarrow \angle R = \angle Q = 50^\circ$$

We know that  $\angle P + \angle Q + \angle R = 180^\circ$  [ Angle sum property of triangle]

$$\Rightarrow \angle P + 50^\circ + 50^\circ = 180^\circ$$

$$\Rightarrow \angle P + 100^\circ = 180^\circ$$

$$\Rightarrow \angle P = 180^\circ - 100^\circ = 80^\circ$$

Thus:  $\angle P = 80^\circ$  and  $\angle R = 50^\circ$

3. In  $\triangle PQR$  right angled at  $Q$ ,  $\angle P = 2\angle R$ . Find  $\angle P$

Sol: Let  $\angle R = x^\circ$

$$\therefore \angle P = (2x)^\circ$$

$$\angle Q = 90^\circ \quad \text{[ Given as right angle]}$$

$$\angle P + \angle Q + \angle R = 180^\circ \quad \text{[ Angle sum property of triangle]}$$

$$\Rightarrow 2x + 90 + x = 180^\circ$$

$$\Rightarrow 3x = 180^\circ - 90^\circ$$

$$\Rightarrow 3x = 90^\circ$$

$$\Rightarrow x = 30^\circ$$

$$\therefore \angle P = 2x = 2 \times 30 = 60^\circ$$

4. In  $\triangle ABC$ ,  $\angle A : \angle B : \angle C = 1 : 2 : 3$ . Find the angles

Sol: Given  $\angle A : \angle B : \angle C = 1 : 2 : 3$

Let  $\angle A = x^\circ$ ,  $\angle B = 2x^\circ$  and  $\angle C = 3x^\circ$

We know that,

$$\therefore \angle A + \angle B + \angle C = 180^\circ \quad \text{[ Angle sum property of triangle]}$$

$$x + 2x + 3x = 180^\circ$$

$$6x = 180^\circ$$

$$x = 30^\circ$$

$$\angle A = x^\circ = 30^\circ$$

$$\angle B = 2x^\circ = 2 \times 30^\circ = 60^\circ$$

$$\angle C = 3x^\circ = 3 \times 30^\circ = 90^\circ$$

5. In a triangle two angles are in the ratio 3 : 4. If the third angle is  $110^{\circ}$ , find the first two angles.
6. If the vertical angle of an isosceles triangle is  $80^{\circ}$ , find the measures of other two angles.
7. If the angles of a triangle are in the ratio 2 : 3 : 4. Find the angles.
8. In  $\triangle ABC$ ,  $\angle B = 110^{\circ}$ .  $\angle A$  is  $10^{\circ}$  more than twice  $\angle C$ . Find  $\angle A$ .
9. Angles of a triangle are  $x^{\circ}$ ,  $(x+10)^{\circ}$  and  $(x+20)^{\circ}$ . Find the measure of each angle.
10. In  $\triangle PQR$ , if  $PQ = QR$ ,  $\angle R = 44$  then  $\angle Q =$  \_\_\_\_\_
11. In  $\triangle DEF$ , if  $EF = FD$ ,  $\angle F = 110^{\circ}$  then  $\angle E =$  \_\_\_\_\_
12. In Right angled Isosceles triangle ABC  $\angle A = 90^{\circ}$  the  $\angle B =$  \_\_\_\_\_.
13. In  $\triangle ABC$ , if  $\angle A = \angle C$ ,  $\angle C = 55^{\circ}$  then  $\angle B =$  \_\_\_\_\_
14. In  $\triangle ABC$ , if  $\angle B = 70^{\circ}$  and  $AB = AC$  then  $\angle A =$  \_\_\_\_\_

### MODEL - 31

1. Find the area of a rectangular plot, one side of which measures 35 m and the diagonal is 37 m.

Solution: Let ABCD be the rectangular plot.

Then  $AB = 35$  m and  $AC = 37$  m.

Let  $BC = x$  m

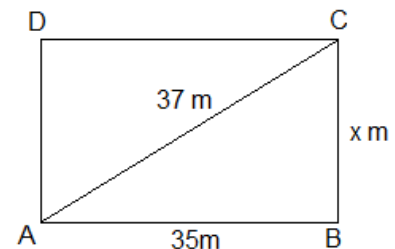
From right triangle ABC we have :

$$AC^2 = AB^2 + BC^2 \quad \Rightarrow \quad 37^2 = 35^2 + x^2$$

$$\Rightarrow x^2 = 37^2 - 35^2 = (37+35)(37-35) = 72 \times 2 = 144$$

$$\Rightarrow x = \sqrt{144} = 12 ; x = BC = 12 \text{ m}$$

Hence area of the plot =  $35 \times 12 = 420 \text{ m}^2$



2. Find the perimeter of rhombus whose area is  $336 \text{ cm}^2$  and one of the diagonal is 14 cm.

Sol: Given one diagonal of a rhombus =  $d_1 = 14$  cm

Let other diagonal of a rhombus =  $d_2 = x$  cm

$$\text{Area of a rhombus} = \frac{1}{2} \times d_1 \times d_2 = 336$$



$$= \frac{1}{2} \times 14 \times x = 336$$

$$x = \frac{336 \times 2}{14}$$

$$x = \frac{336}{7} = 48 \text{ cm}$$

**Side of a rhombus**  $s = \frac{1}{2} \sqrt{d_1^2 + d_2^2}$

$$= \frac{1}{2} \sqrt{48^2 + 14^2}$$

$$= \frac{1}{2} \sqrt{2304 + 196}$$

$$= \frac{1}{2} \sqrt{2500} = \frac{1}{2} \times 50 = 25 \text{ cm}$$

**Perimeter of a rhombus = 4 x side**

$$= 4 \times 25 = 100 \text{ cm}$$

3. Find the perimeter of the rhombus if the diagonals are 24 cm and 10 cm.
4. Find the area of the rectangle if the diagonal is 41 cm and one side is 40 cm.
5. Find the perimeter of the rhombus whose area is 120 cm<sup>2</sup> and one of the diagonal is 10 cm.
6. Find the area of the rectangle whose one of the diagonal is 10 cm and one side is 8 cm.
7. Find the area of a rectangle whose diagonal is 25cm and one side is 24cm?
8. Find the area of rectangle whose side is 5cm and one of the diagonal is 10cm.
9. Find the perimeter of rhombus if the diagonals are 14 cm and 48 cm.

**MODEL - 32**

1. If the diagonal of a square is 10 cm , find its area.

Sol: given  $d = 10$  cm

$$\text{Area of a square} = \frac{d^2}{2} = \frac{10 \times 10}{2} = 50 \text{ cm}^2$$

2. If the area of a rhombus is  $96\text{cm}^2$  and one of its diagonal is 16 cm. Find its perimeter.

Sol: Given that area of rhombus =  $96\text{cm}^2$

$$\frac{1}{2}d_1d_2 = 96 \Rightarrow d_1d_2 = 96 \times 2$$

$$\text{One diagonal } (d_1) = 16$$

$$\text{Second diagonal } (d_2) = ?$$

$$\therefore 16 \times d_2 = 96 \times 2$$

$$d_2 = \frac{96 \times 2}{16}$$

$$d_2 = 12\text{cm}$$

$$\text{Second diagonal} = 12\text{cm}$$

$$\text{Perimeter} = 4 \times 10 = 40 \text{ cm}$$

3. The area of a square is  $16200\text{m}^2$ . Find the length of its diagonal.

Sol: Given that area of a square =  $16200\text{m}^2$

$$\frac{d^2}{2} = 16200$$

$$d^2 = 16200 \times 2$$

$$d^2 = 32400$$

$$d = \sqrt{32400} = 180\text{m}$$

$$\text{Length of diagonal} = 180\text{m}$$

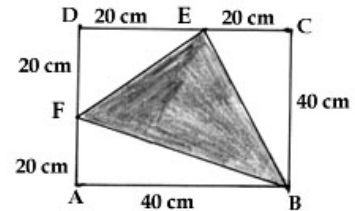
4. If the area of a square is  $625\text{cm}^2$  . Find the length of its diagonal.
5. If the area of a rhombus is  $220\text{cm}^2$  and one of the diagonal is 5cm. Find the other diagonal.
6. If the diagonal of a square is 12cm , then find its area.
7. If the perimeter of a square is 100cm, then find its area.
8. If the diagonals of a rhombus are 10cm and 8cm , then find its area.
9. If the diagonal of a square is 18cm, then find its area.

**MODEL - 33**

1. Find the area of the shaded region in the given figure.

Sol: Area of  $\Delta BEF$  = area of square ABCD - (Area of  $\Delta ABF$  + Area of  $\Delta BCE$  + Area of  $\Delta DEF$ )

$$\begin{aligned}
 &= 40 \times 40 - \left( \frac{1}{2} \times 40 \times 20 + \frac{1}{2} \times 40 \times 20 + \frac{1}{2} \times 20 \times 20 \right) \\
 &= 1600 - (400 + 400 + 200) \\
 &= 1600 - 1000 = 600 \text{ cm}^2
 \end{aligned}$$



2. A circular park, 42m in diameter, has a path 3.5 m wide running round it on the outside. Find the cost of gravelling the path at Rs. 4 per  $m^2$ .

Given radius of circular park  $r = \frac{d}{2} = \frac{42}{2} = 21m$

Radius of outer circle  $R = 21 + 3.5$

$$= 24.5 \text{ m}$$

Area of the circular path = outer area - inner area

$$= \pi R^2 - \pi r^2$$

$$= \pi (R^2 - r^2)$$

$$= \pi (R + r)(R - r)$$

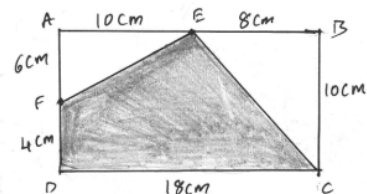
$$= \frac{22}{7} (24.5 + 21)(24.5 - 21)$$

$$= 11 \times 45.5$$

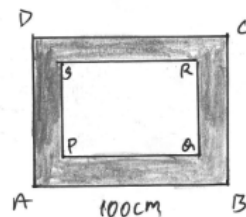
$$= 500.5 m^2$$

Cost of gravelling the path at 4/- per  $m^2$  = Rs. 2002 /-

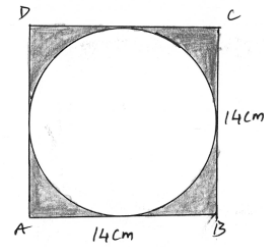
3. Find the area of the shaded region in the given figure.



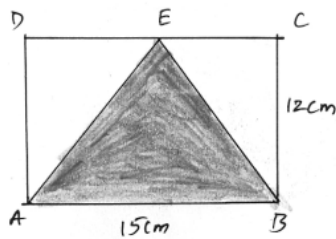
4. A path 5 cm wide runs along inside a square park of side 100 cm. Find the area of the path.



5. Find the area of the shaded region in the given figure.



6. Find the area of the shaded region in the given figure.



7. A road which is 7m wide surrounds a circular park whose circumference is 352m. Find the area of the road.
8. A race track is in the form of a ring whose inner and outer circumferences are 407m and 506m respectively. Find the width of the track and also its area.

#### **MODEL - 34**

1. If the area of a circle is  $154 \text{ cm}^2$  then find its circumference.

Solution: Given area of the circle = 154

That is,  $\pi r^2 = 154$

$$\Rightarrow \frac{22}{7} \times r^2 = 154$$

$$\Rightarrow r^2 = 154 \times \frac{7}{22} = 7^2$$

$$\Rightarrow r = 7$$

$$\text{Circumference of the circle} = 2\pi r = 2 \times \frac{22}{7} \times 7 = 44 \text{ cm}$$

2. The ratio of the radius of two circles 3:4 Find the ratio of their circumference

Sol: Given that ratio of radii = 3:4

Let the radius of the first circle  $r_1$

The radius of the first circle  $r_2$

$$r_1:r_2 = 3:4$$

ratio of circumferences of two circles are  $2\pi r_1 : 2\pi r_2$

$$r_1 : r_2$$

$$3 : 4$$

3. If the circumference of a circle is 88 cm. Find its area.
4. If the diameter of a circle is 7 cm, find its area.
5. If the circumference of a circle is 31.4 cm, find its area. (take  $\pi = 3.14$ )
6. Find the perimeter of a semicircle including diameter whose radius is 35 cm.
7. If the area of the circle is  $616 \text{ cm}^2$ , find its circumference.
8. The circumference of two circles are in the ratio 3:4 Find the ratio of their areas.
9. The ratio of the radius of two circles 7:12 find the ratio of their circumferences.
10. Find the perimeter of semicircle whose radius is 7 cm.

# FUNDAMENTAL TEST

SUB: MATHEMATICS

MARKS: 30

TIME: 1 Hr

Name of the Student: ..... Mobile No: .....

I. Answer the following questions.

20 X 1 = 20

1.  $3\frac{1}{4} + \frac{5}{6} + 2 =$  \_\_\_\_\_.

2. Subtract  $\frac{2}{9}$  from  $\frac{7}{12}$  : \_\_\_\_\_.

3.  $\frac{14}{3} \div \frac{7}{15} =$  \_\_\_\_\_.

4.  $47 + 4.7 + 0.47 =$  \_\_\_\_\_.

5.  $1000 - 64.56 =$  \_\_\_\_\_.

6.  $72.72 \div 72 =$  \_\_\_\_\_.

7.  $\frac{16.5}{1000} =$  \_\_\_\_\_.

8.  $(-3) + (-7) + (-2) + (-2) =$  \_\_\_\_\_.

9.  $-18 - (-14) =$  \_\_\_\_\_.

10.  $(-1) \times (-1) \times (-1) \times (-1) \times (-1) \times (-1) \times (-1) \times (-1) \times (-1) \times (-1) =$  \_\_\_\_\_.

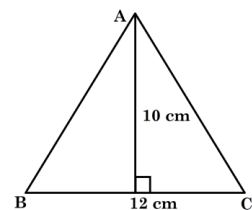
11.  $10 + 6 \div 2 - 2 \times 1 =$  \_\_\_\_\_.

12. If  $2 : 3 :: 6 : x$ , then  $x =$  \_\_\_\_\_.

13. If  $2x + 5 = 22$ , then  $x =$  \_\_\_\_\_.

14. If the length and breadth of a rectangle are 12cm and 6cm respectively, then its perimeter is \_\_\_\_\_.

15. Area of triangle given in the figure is \_\_\_\_\_.



16.  $60\%$  of 15000 = \_\_\_\_\_.

17. If two angles of a triangle are  $55^\circ$  and  $75^\circ$ , then the measure of the third angle is \_\_\_\_\_.

18. Write an equation for the following statement:  
"When I subtracted 11 from twice a number, the result was 15" \_\_\_\_\_.

19. The mean of first 10 natural numbers is \_\_\_\_\_.

20.  $(343 - 21)^0 =$  \_\_\_\_\_.

**II. Answer the following questions.**

**10 X 1 = 10**

21. Cost of one toffee is Rs  $2\frac{1}{2}$ , then the cost of 16 toffees are \_\_\_\_\_.

22. If weight of 6 rice bags is 147 kg, then the weight 1 bag is \_\_\_\_\_.

23. If  $x + 9 - (3 - 2x) = 0$ , then  $x =$  \_\_\_\_\_.

24. Sum of all factors of 20 is \_\_\_\_\_.

25.  $(2x - 4y + 3z) - (x - 5y) =$  \_\_\_\_\_.

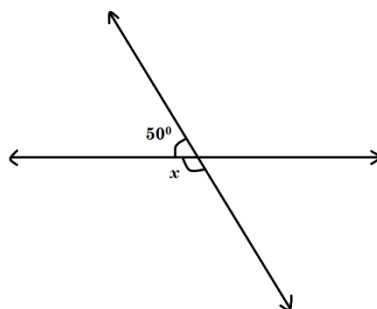
26. The value of  $x^3 + 3x^2 + 4x - 2$  when  $x = -2$  is \_\_\_\_\_.

27. Then value  $\frac{3^4 \times 3^5}{9^2}$  \_\_\_\_\_.

28. If the diameter of a circle 14cm, then its circumference is \_\_\_\_\_.

29. The perimeter of a right triangle whose legs are 3cm and 4cm is \_\_\_\_\_.

30. From the figure, the value of  $x$  is \_\_\_\_\_.



# FUNDAMENTAL TEST

SUB: MATHEMATICS

MARKS: 30

TIME: 1 Hr

Name of the Student: ..... Mobile No: .....

## KEY

- |     |                 |     |                         |
|-----|-----------------|-----|-------------------------|
| 1.  | $\frac{73}{12}$ | 15. | 60 cm <sup>2</sup>      |
| 2.  | $\frac{13}{36}$ | 16. | 9000                    |
| 3.  | 10              | 17. | 50 <sup>0</sup>         |
| 4.  | 52.17           | 18. | 2x - 11 = 15            |
| 5.  | 935.44          | 19. | 5.5                     |
| 6.  | 1.01            | 20. | 1                       |
| 7.  | 0.0165          | 21. | Rs. 40                  |
| 8.  | -14             | 22. | 24.5 kg                 |
| 9.  | -4              | 23. | -2                      |
| 10. | 1               | 24. | 42                      |
| 11. | 11              | 25. | x + y + 3z              |
| 12. | 9               | 26. | -6                      |
| 13. | $\frac{17}{2}$  | 27. | 243 (or) 3 <sup>5</sup> |
| 14. | 36 cm           | 28. | 44 cm                   |
|     |                 | 29. | 12 cm                   |
|     |                 | 30. | 130 <sup>0</sup>        |



# APPLICATION LEVEL TEST

SUB: MATHEMATICS

MARKS: 30

TIME: 1 Hr

Name of the Student: ..... Mobile No: .....

## SECTION - A

I. Answer the following questions.

30 X 1 = 30

1.  $20 + 36 \div 9 \times 14 - 14 =$  \_\_\_\_\_.

2.  $\frac{14}{3} \div$  \_\_\_\_\_  $= 4$

3. Sum of  $\frac{3}{4}$  and the reciprocal of  $1\frac{5}{7}$  is \_\_\_\_\_.

4.  $73.46 + \frac{536}{1000} - \frac{431}{50} =$  \_\_\_\_\_.

5. Which among the following is the smallest?

$-2, -\frac{13}{6}, \frac{8}{-3}, \frac{-7}{9}$  : \_\_\_\_\_.

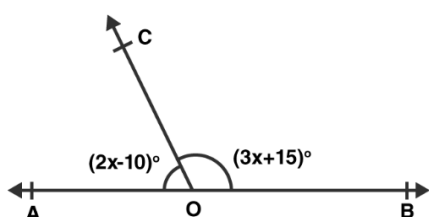
6. If  $9 \times 3^n = 729$ , then 'n' is \_\_\_\_\_.

7. The value of  $(-3y)(xy + y^2)$  when  $x = 4$  and  $y = 5$  is \_\_\_\_\_.

8. Ratio of angles of a triangle is 1:2:3, then it is \_\_\_\_\_ triangle.

9. Express 18 hours as a percentage of 3 days: \_\_\_\_\_.

10. In the figure, the value of  $x$  is \_\_\_\_\_.



11. The area of an equilateral triangle whose each side is 10cm is \_\_\_\_\_.

12. Mean of first 10 prime numbers is \_\_\_\_\_.

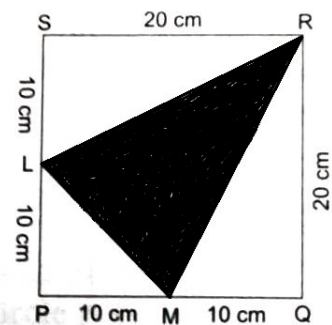
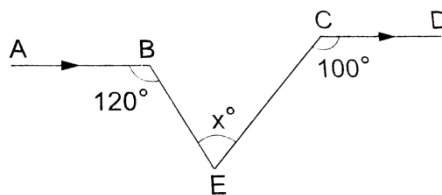
13.  $2.08 \div 0.16 =$  \_\_\_\_\_.

14.  $3\frac{4}{7} \times 2\frac{2}{5} \times 1\frac{3}{4} =$  \_\_\_\_\_.

15. In  $\triangle ABC$ ,  $AB = AC$ . If  $\angle B = 53^\circ$ , the  $\angle A =$  \_\_\_\_\_.

**SECTION - B**

16. How much less than  $-2$  is  $-8$ ? \_\_\_\_\_.
17. The cost of 24 toys of the same kind is ₹783.60, then the cost of 5 such toys is \_\_\_\_\_.
18. Value of  $\frac{3^5 \times 10^5 \times 25}{5^7 \times 6^7}$  is \_\_\_\_\_.
19. What should be subtracted from  $2x^2 - 3y^2 + 6xy$  to get  $x^2 - y^2$ ? \_\_\_\_\_.
20. If  $\frac{y-1}{3} - \frac{y-2}{4} = 1$ , then 'y' is \_\_\_\_\_.
21. The sum of two consecutive multiples of 3 is 69. The numbers are: \_\_\_\_\_ and \_\_\_\_\_.
22. After 12 years, Manoj will be 3 times as old as he was 4 years ago, then his present age is \_\_\_\_\_.
23. If  $A : B = 5 : 6$  and  $B : C = 8 : 9$  then  $A : B : C$  is \_\_\_\_\_.
24. If  $\frac{4}{5}$  of water tank is filled in 1 minute, how much more time will be required to fill the rest of the tank? \_\_\_\_\_.
25. At What rate percent per annum simple interest will a sum triple itself in 16 years is \_\_\_\_\_.
26. A perimeter of a rhombus whose diagonals are 48cm and 14cm is \_\_\_\_\_.
27. If the diagonal of a square is 8cm, then its area is \_\_\_\_\_.
28. In the given figure  $AB \parallel CD$ .  $\angle ABE = 120^\circ$ ,  $\angle DCE = 100^\circ$  then the value of  $x$  \_\_\_\_\_.



29. Area of the shaded region in the figure is \_\_\_\_\_.
30. Area of a circle is  $38.5\text{cm}^2$  and then its circumference is \_\_\_\_\_.

# APPLICATION LEVEL TEST

SUB: MATHEMATICS

MARKS: 30  
TIME: 1 Hr

Name of the Student: ..... Mobile No: .....

## KEY

- |                      |                        |
|----------------------|------------------------|
| 1. 62                | 15. $74^0$             |
| 2. $\frac{7}{6}$     | 16. 6                  |
| 3. $\frac{4}{3}$     | 17. Rs. 163.25         |
| 4. 65.376            | 18. $\frac{1}{36}$     |
| 5. $-\frac{8}{3}$    | 19. $x^2 - 2y^2 + 6xy$ |
| 6. 4                 | 20. 10                 |
| 7. -675              | 21. 33 & 36            |
| 8. Right angle       | 22. 12                 |
| 9. 25%               | 23. 20:24:27           |
| 10. 35               | 24. 15 seconds         |
| 11. $25\sqrt{3}cm^2$ | 25. 12.5%              |
| 12. 12.9             | 26. 100cm              |
| 13. 13               | 27. $32cm^2$           |
| 14. 15               | 28. $40^0$             |
|                      | 29. $150 cm^2$         |
|                      | 30. 22cm               |