

# MODEL QUESTION BANK

## FIRST TERM

### CLASS – VI

### MATHEMATICS

## NUMBER SYSTEM

### [CHAPTER – 1]

Question 1:

Write the numeral for each of the following numbers:

- (i) Nine thousand nineteen
- (ii) Fifty-four thousand seventy-three
- (iii) Three lakh two thousand five hundred six
- (iv) Twenty lakh ten thousand eight
- (v) Six crore five lakh fifty-seven
- (vi) Two crore two lakh two thousand two hundred two
- (vii) Twelve crore twelve lakh twelve thousand twelve
- (viii) Fifteen crore fifty lakh twenty thousand sixty-eight

ANSWER:

- (i) Nine thousand eighteen = 9018
- (ii) Fifty-four thousand seventy-three = 54073
- (iii) Three lakh two thousand five hundred six = 302506
- (iv) Twenty lakh ten thousand eight = 2010008
- (v) Six crore five lakh fifty-seven = 60500057
- (vi) Two crore two lakh two thousand two hundred two = 20202202
- (vii) Twelve crore twelve lakh twelve thousand twelve = 121212012
- (viii) Fifteen crore fifty lakh twenty thousand sixty-eight = 155020068

Question 2:

Write each of the following numbers in words:

- (i) 63,005
- (ii) 7,07,075
- (iii) 34,20,019
- (iv) 3,05,09,012
- (v) 5,10,03,604
- (vi) 6,18,05,008
- (vii) 19,09,09,900
- (viii) 6,15,30,807
- (ix) 6,60,60,060

**ANSWER:**

- (i) 63,005 = Sixty-three thousand five
- (ii) 7,07,075 = Seven lakh seven thousand seventy-five
- (iii) 34,20,019 = Thirty-four lakh twenty thousand nineteen
- (iv) 3,05,09,012 = Three crore five lakh nine thousand twelve
- (v) 5,10,03,604 = Five crore ten lakh three thousand six hundred four
- (vi) 6,18,05,008 = Six crore eighteen lakh five thousand eight
- (vii) 19,09,09,900 = Nineteen crore nine lakh nine thousand nine hundred
- (viii) 6,15,30,807 = Six crore fifteen lakh thirty thousand eight hundred seven
- (ix) 6,60,60,060 = Six crore sixty lakh sixty thousand sixty

**Question 3:**

Write each of the following numbers in expanded form:

- (i) 15,768
- (ii) 3,08,927
- (iii) 24,05,609
- (iv) 5,36,18,493
- (v) 6,06,06,006
- (iv) 9,10,10,510

**ANSWER:**

- (i)  $15,768 = (1 \times 10000) + (5 \times 1000) + (7 \times 100) + (6 \times 10) + (8 \times 1)$
- (ii)  $3,08,927 = (3 \times 100000) + (8 \times 1000) + (9 \times 100) + (2 \times 10) + (7 \times 1)$
- (iii)  $24,05,609 = (2 \times 1000000) + (4 \times 100000) + (5 \times 1000) + (6 \times 100) + (9 \times 1)$
- (iv)  $5,36,18,493 = (5 \times 10000000) + (3 \times 1000000) + (6 \times 100000) + (1 \times 10000) + (8 \times 1000) + (4 \times 100) + (9 \times 10) + (3 \times 1)$
- (v)  $6,06,06,006 = (6 \times 10000000) + (6 \times 100000) + (6 \times 1000) + (6 \times 1)$
- (iv)  $9,10,10,510 = (9 \times 10000000) + (1 \times 1000000) + (1 \times 10000) + (5 \times 100) + (1 \times 10)$

**Question 4:**

Write the corresponding numeral for each of the following:

- (i)  $6 \times 10000 + 2 \times 1000 + 5 \times 100 + 8 \times 10 + 1$
- (ii)  $5 \times 100000 + 8 \times 10000 + 1 \times 1000 + 6 \times 100 + 2 \times 10 + 3 \times 1$
- (iii)  $2 \times 10000000 + 5 \times 100000 + 7 \times 1000 + 9 \times 100 + 5 \times 1$
- (iv)  $3 \times 1000000 + 4 \times 100000 + 6 \times 1000 + 5 \times 100 + 7 \times 1$

**ANSWER:**

- (i)  $6 \times 10000 + 2 \times 1000 + 5 \times 100 + 8 \times 10 + 4 \times 1 = 62,584$
- (ii)  $5 \times 100000 + 8 \times 10000 + 1 \times 1000 + 6 \times 100 + 2 \times 10 + 3 \times 1 = 5,81,623$
- (iii)  $2 \times 10000000 + 5 \times 100000 + 7 \times 1000 + 9 \times 100 + 5 \times 1 = 2,05,07,905$

$$(iv) 3 \times 1000000 + 4 \times 100000 + 6 \times 1000 + 5 \times 100 + 7 \times 1 = 34,06,507$$

**Question 5:**

**Find the difference between the place values of the two nines in 79520986.**

**ANSWER:**

**The place value of 9 at ten lakhs place = 90 lakhs = 9000000**

**The place value of 9 at hundreds place = 9 hundreds = 900**

$$\therefore \text{Required difference} = (9000000 - 900) = 8999100$$

**Question 6:**

**Find the difference between the place value and the face value of 7 in 27650934.**

**ANSWER:**

**The place value of 7 in 27650934 = 70 lakhs = 70,00,000**

**The face value of 7 in 27650934 = 7**

$$\therefore \text{Required difference} = (7000000 - 7) = 69,99,993$$

**Question 7:**

**How many 6-digit numbers are there in all?**

**ANSWER:**

**The largest 6-digit number = 999999**

**The smallest 6-digit number = 100000**

$$\begin{aligned} \therefore \text{Total number of 6-digit numbers} &= (999999 - 100000) + 1 \\ &= 899999 + 1 \\ &= 900000 \\ &= 9 \text{ lakhs} \end{aligned}$$

**Question 8:**

**How many 7-digit numbers are there in all?**

**ANSWER:**

**The largest 7-digit number = 9999999**

**The smallest 7-digit number = 1000000**

$$\begin{aligned} \therefore \text{Total number of 7-digit numbers} &= (9999999 - 1000000) + 1 \\ &= 8999999 + 1 \\ &= 9000000 \\ &= \text{Ninety lakhs} \end{aligned}$$

**Question 9:**

How many thousands make a lakh?

ANSWER:

One lakh (1,00,000) is equal to one hundred thousand ( $100 \times 1000$ ).  
Thus, one hundred thousands make a lakh.

Question 10:

Find the difference between the number 738 and that obtained on reversing its digits.

ANSWER:

The given number is 738.

On reversing the digits of this number, we get 837.

$\therefore$  Required difference =  $837 - 738 = 99$

## OPERATION ON WHOLE NUMBERS

### [CHAPTER – 2]

Question 1:

Find the sum by suitable rearrangement:

(a)  $837 + 208 + 363$  (b)  $1962 + 453 + 1538 + 647$

ANSWER:

(a)  $837 + 208 + 363 = (837 + 363) + 208$

$= 1200 + 208 = 1408$

(b)  $1962 + 453 + 1538 + 647 = (1962 + 1538) + (453 + 647)$

$= 3500 + 1100 = 4600$

Question 2:

Find the product by suitable rearrangement:

(a)  $2 \times 1768 \times 50$  (b)  $4 \times 166 \times 25$

(c)  $8 \times 291 \times 125$  (d)  $625 \times 279 \times 16$

(e)  $285 \times 5 \times 60$  (f)  $125 \times 40 \times 8 \times 25$

ANSWER:

(a)  $2 \times 1768 \times 50 = 2 \times 50 \times 1768$

$$= 100 \times 1768 = 176800$$

$$(b) 4 \times 166 \times 25 = 4 \times 25 \times 166$$

$$= 100 \times 166 = 16600$$

$$(c) 8 \times 291 \times 125 = 8 \times 125 \times 291$$

$$= 1000 \times 291 = 291000$$

$$(d) 625 \times 279 \times 16 = 625 \times 16 \times 279$$

$$= 10000 \times 279 = 2790000$$

$$(e) 285 \times 5 \times 60 = 285 \times 300 = 85500$$

$$(f) 125 \times 40 \times 8 \times 25 = 125 \times 8 \times 40 \times 25$$

$$= 1000 \times 1000 = 1000000$$

**Question 3:**

**Find the value of the following:**

$$(a) 297 \times 17 + 297 \times 3 \quad (b) 54279 \times 92 + 8 \times 54279$$

$$(c) 81265 \times 169 - 81265 \times 69 \quad (d) 3845 \times 5 \times 782 + 769 \times 25 \times 218$$

**ANSWER:**

$$(a) 297 \times 17 + 297 \times 3 = 297 \times (17 + 3)$$

$$= 297 \times 20 = 5940$$

$$(b) 54279 \times 92 + 8 \times 54279 = 54279 \times 92 + 54279 \times 8$$

$$= 54279 \times (92 + 8)$$

$$= 54279 \times 100 = 5427900$$

$$(c) 81265 \times 169 - 81265 \times 69 = 81265 \times (169 - 69)$$

$$= 81265 \times 100 = 8126500$$

$$(d) 3845 \times 5 \times 782 + 769 \times 25 \times 218$$

$$= 3845 \times 5 \times 782 + 769 \times 5 \times 5 \times 218$$

$$= 3845 \times 5 \times 782 + 3845 \times 5 \times 218$$

$$= 3845 \times 5 \times (782 + 218)$$

$$= 19225 \times 1000 = 19225000$$

**Question 4:**

**A taxi driver filled his car petrol tank with 40 litres of petrol on Monday. The next day, he filled the tank with 50 litres of petrol. If the petrol costs Rs 44 per litre, how much did he spend in all on petrol?**

**ANSWER:**

**Quantity of petrol filled on Monday = 40 l**

**Quantity of petrol filled on Tuesday = 50 l**

**Total quantity filled = (40 + 50) l**

**Cost of petrol (per l) = Rs 44**

**Total money spent = 44 × (40 + 50)**

**= 44 × 90 = Rs 3960**

**Question 5:**

**A vendor supplies 32 litres of milk to a hotel in the morning and 68 litres of milk in the evening. If the milk costs Rs 15 per litre, how much money is due to the vendor per day?**

**ANSWER:**

**Quantity of milk supplied in the morning = 32l**

**Quantity of milk supplied in the evening = 68l**

**Total of milk per litre = (32 + 68) l**

**Cost of milk per litre = Rs 15**

**Total cost per day = 15 × (32 + 68)**

**= 15 × 100 = Rs 1500**

**Question 6:**

**Which of the following will not represent zero?**

**(a) 1 + 0 (b) 0 × 0**

**(c)  $\frac{0}{2}$  (d)  $\frac{10-10}{2}$**

**ANSWER:**

**(a) 1 + 0 = 1**

It does not represent zero.

(b)  $0 \times 0 = 0$

It represents zero.

(c)  $\frac{0}{2} = 0$

It represents zero.

(d)  $\frac{10-10}{2} = 0$

It represents zero.

**Question 7:**

If the product of two whole numbers is zero, can we say that one or both of them will be zero? Justify through examples.

**ANSWER:**

If the product of 2 whole numbers is zero, then one of them is definitely zero.

For example,  $0 \times 2 = 0$  and  $17 \times 0 = 0$

If the product of 2 whole numbers is zero, then both of them may be zero.

$0 \times 0 = 0$

However,  $2 \times 3 = 6$

(Since numbers to be multiplied are not equal to zero, the result of the product will also be non-zero.)

## **INTEGERS**

### **[CHAPTER – 3]**

**Question 1:**

Write opposites of the following:

(a) Increase in weight (b) 30 km north

(c) 326 BC (d) Loss of Rs 700

(e) 100 m above sea level

**ANSWER:**

(a) Decrease in weight

(b) 30 km south

(c) 326 A.D.

(d) Gain of Rs 700

(e) 100 m below sea level

**Question 2:**

Represent the following numbers as integers with appropriate signs.

(a) An aeroplane is flying at a height two thousand metre above the ground.

(b) A submarine is moving at a depth, eight hundred metre below the sea level.

(c) A deposit of rupees two hundred.

(d) Withdrawal of rupees seven hundred.

**ANSWER:**

(a) +2000

(b) -800

(c) +200

(d) -700

**Question 3:**

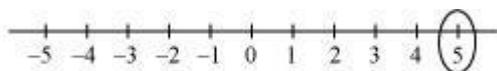
Represent the following numbers on a number line:

(a) + 5 (b) - 10 (c) + 8

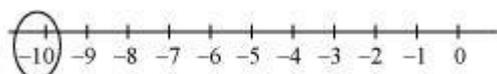
(d) - 1 (e) - 6

**ANSWER:**

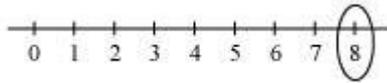
(a)



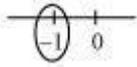
(b)



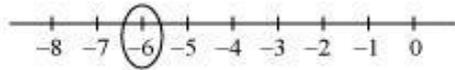
(c)



(d)



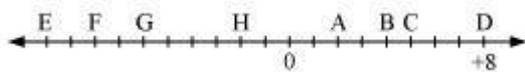
(e)



**Question 4:**

Adjacent figure is a vertical number line, representing integers. Observe it and locate the following points:

- (a) If point D is + 8, then which point is - 8?
- (b) Is point G a negative integer or a positive integer?
- (c) Write integers for points B and E.
- (d) Which point marked on this number line has the least value?
- (e) Arrange all the points in decreasing order of value.



**ANSWER:**

- (a) F
- (b) Negative integer (-6)
- (c) Point B represents 4 and point E represents -10.
- (d) E has the least value as it represents -10.
- (e)  $D > C > B > A > O > H > G > F > E$

**Question 5:**

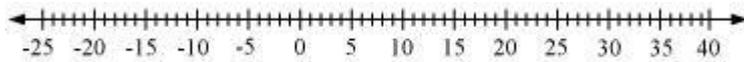
Following is the list of temperatures of five places in India on a particular day of the year.

Place	Temperature
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Siachin	10°C below 0°C .....
Shimla	2°C below 0°C .....
Ahmedabad	30°C above 0°C .....
Delhi	20°C above 0°C .....
Srinagar	5°C below 0°C .....

(a) Write the temperatures of these places in the form of integers in the blank column.

(b) Following is the number line representing the temperature in degree Celsius.



Plot the name of the city against its temperature.

(c) Which is the coolest place?

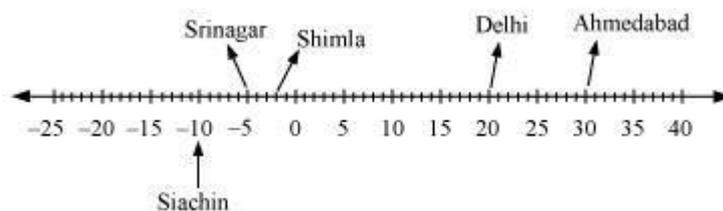
(d) Write the names of the places where temperatures are above 10°C.

**ANSWER:**

(a)

Siachin	-10°C
Shimla	-2°C
Ahmedabad	+30°C
Delhi	+20°C
Srinagar	-5°C

(b)



(c) Siachin

(d) Delhi, Ahmedabad

**Question 6:**

In each of the following pairs, which number is to the right of the other on the number line?

(a) 2, 9 (b) - 3, - 8 (c) 0, - 1

(d) - 11, 10 (e) - 6, 6 (f) 1, - 100

**ANSWER:**

(a) 9 (9 > 2)

(b) -3 (-3 > -8)

(c) 0 (0 > -1)

(d) 10 (10 > -11)

(e) 6 (6 > -6)

(f) 1 (1 > -100)

**Question 7:**

Write all the integers between the given pairs (write them in the increasing order.)

(a) 0 and - 7 (b) - 4 and 4

(c) - 8 and - 15 (d) - 30 and - 23

**ANSWER:**

(a) -6, -5, -4, -3, -2, -1

(b) -3, -2, -1, 0, 1, 2, 3

(c) -14, -13, -12, -11, -10, -9

(d) -29, -28, -27, -26, -25, -24

**Question 8**

Add without using number line:

(a)  $11 + (-7)$   $11 + (-7)$

(b)  $(-13) + (+18)$   $(-13) + (+18)$

(c)  $(-10) + (+19)$   $(-10) + (+19)$

(d)  $(-250) + (+150)$   $(-250) + (+150)$

(e)  $(-380) + (-270)$   $(-380) + (-270)$

(f)  $(-217) + (-100)$   $(-217) + (-100)$

**Answer**

We have to take important note of this principle

1) When one positive and one negative integers are added, we subtract the smaller number from bigger number and put the sign of the bigger integer. The bigger integer is decided by ignoring the signs of the integers

For example,  $(+11) + (-5) = +6$   $(+11) + (-5) = +6$  and  $(-12) + (+1) = -11$

$(-12) + (+1) = -11$

2) When two negative integers are added, we add both the number and put the negative sign on the number=

For example,  $(-11)+(-5)=-16$   $(-11)+(-5)=-16$  and  $(-12)+(-1)=-13$   
 $(-12)+(-1)=-13$

With this in mind, lets solve all the questions given above

a)	$11+(-7)$ $11+(-7)$	Subtracting 7 from 11= 4 +4
b)	$(-13) +(+18)$ $(-13)+(+18)$	Subtracting 13 from 18= 5 +5
c)	$(-10) + (+19)$ $(-10)+(+19)$	Subtracting 10 from 19= 9 +9
d)	$(-250)$ $+(+150)$ $(-250)+(+150)$	Subtracting 150 from 250= 100 -100
e)	$(-380)+(-270)$ $(-380)+(-270)$	Adding 380 and 270=650 -650
f)	$(-217)+(-100)$ $(-217)+(-100)$	Adding 217 and 100=317 -317

#### Question 9

Use number line and add the following integers:

- (a)  $9+(-6)$   
 (b)  $5+(-11)$   
 (c)  $(-1)+(-7)$   
 (d)  $(-5)+10$   
 (e)  $(-1)+(-2)+(-3)$   
 (f)  $(-2)+8+(-4)$

Answer

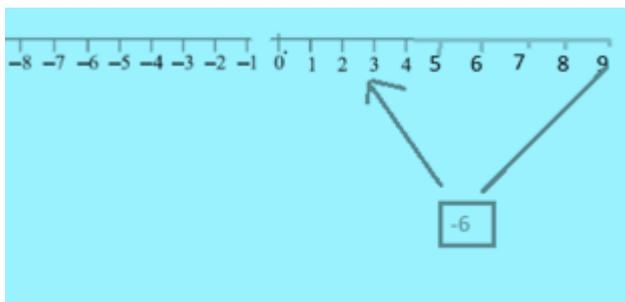
Two important things to remember

When we add positive integer, we move to the right

When we add negative integer, we move to the left

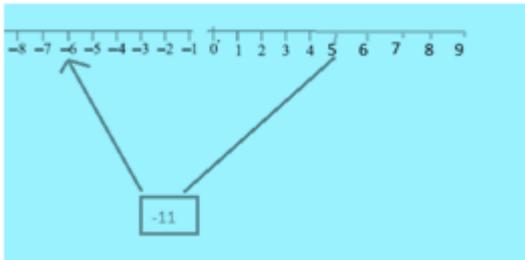
a)  $9+(-6)$

We start with number 9 and move to left six steps and we reach the number 3



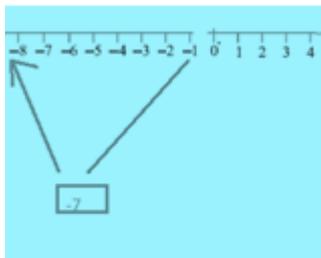
b)  $5+(-11)$

We start with number 5 and move to left 11 steps and we reach the number -6



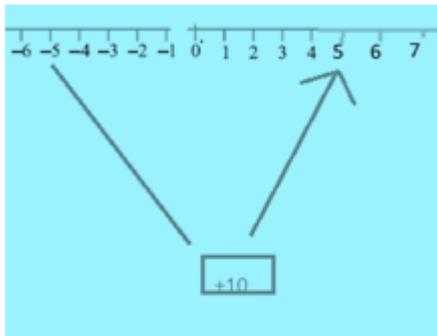
c)  $(-1)+(-7)(-1)+(-7)$

We start with number -1 and move to left 7 steps and we reach the number -8



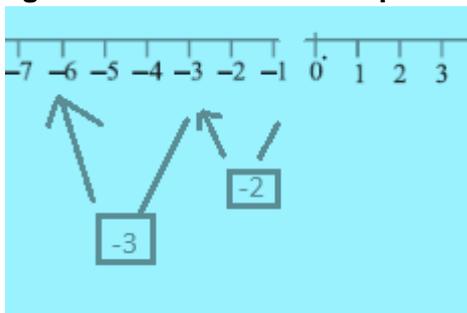
d)  $(-5)+10(-5)+10$

We start with number -5 and move to right 10 steps and we reach the number 5



e)  $(-1)+(-2)+(-3)(-1)+(-2)+(-3)$

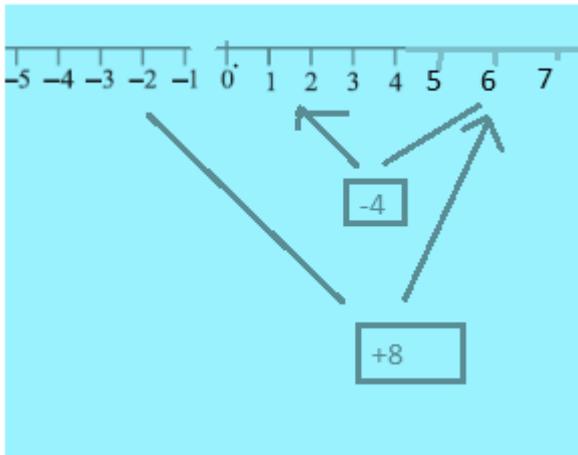
We start with number -1 and move to left 2 steps and we reach the number -3. Then again we move to left 3 steps and we reach finally -6



f)  $(-2)+8+(-4)(-2)+8+(-4)$

We start with number -2 and move to right 8 steps and we reach the number 6. Then

again we move to left 4 steps and we reach finally 2



## RATIO AND PROPORTION

### [CHAPTER – 8]

#### RATIO

Question 1:

There are 20 girls and 15 boys in a class.

(a) What is the ratio of number of girls to the number of boys?

(b) What is the ratio of number of girls to the total number of students in the class?

ANSWER:

Number of girls = 20

Number of boys = 15

Total number of students = 20 + 15 = 35

(a) Ratio of number of girls to boys =  $\frac{20}{15} = \frac{4}{3}$

(b) Ratio of number of girls to total students =  $\frac{20}{35} = \frac{4}{7}$

Question 2:

Out of 30 students in a class, 6 like football, 12 like cricket and remaining like tennis. Find the ratio of

(a) Number of students liking football to number of students liking tennis.

(b) Number of students liking cricket to total number of students.

ANSWER:

Number of students who like football = 6

Number of students who like cricket = 12

Number of students who like tennis =  $30 - 6 - 12 = 12$

(a) Ratio of the number of students liking football to the number of students

liking tennis =  $\frac{6}{12} = \frac{1}{2}$

(b) Ratio of the number of students liking cricket to the total number of

students =  $\frac{12}{30} = \frac{2}{5}$

Question 3:

Distances travelled by Hamid and Akhtar in an hour are 9 km and 12 km. Find the ratio of speed of Hamid to the speed of Akhtar.

ANSWER:

The distance travelled in an hour by a certain object is called the speed of that object.

Distance travelled by Hamid in one hour = 9 km

Distance travelled by Akhtar in one hour = 12 km

Hamid's speed = 9 km/hr

Akhtar's speed = 12 km/hr

Ratio of speed of Hamid to the speed of Akhtar =  $\frac{9}{12} = \frac{3}{4}$

Question 4:

Fill in the following blanks:

$\frac{15}{18} = \frac{\square}{6} = \frac{10}{\square} = \frac{\square}{30}$  [Are these equivalent ratios?]

ANSWER:

$$\frac{15}{18} = \frac{5 \times 3}{6 \times 3} = \frac{5}{6}$$

$$\frac{5}{6} = \frac{5}{6} \times \frac{2}{2} = \frac{10}{12}$$

$$\frac{5}{6} = \frac{5}{6} \times \frac{5}{5} = \frac{25}{30}$$

Therefore, 5, 12, 25 will come in the blanks respectively.

Yes, all these are equivalent ratios.

Question 5:

Find the ratio of the following:

(a) 81 to 108 (b) 98 to 63

(c) 33 km to 121 km (d) 30 minutes to 45 minutes

ANSWER:

$$(a) \frac{81}{108} = \frac{3 \times 3 \times 3 \times 3}{2 \times 2 \times 3 \times 3 \times 3} = \frac{3}{4}$$

$$(b) \frac{98}{63} = \frac{14 \times 7}{9 \times 7} = \frac{14}{9}$$

$$(c) \frac{33}{121} = \frac{3 \times 11}{11 \times 11} = \frac{3}{11}$$

$$(d) \frac{30}{45} = \frac{2 \times 3 \times 5}{3 \times 3 \times 5} = \frac{2}{3}$$

Question 6

Divide 20 pens between Sheela and Sangeeta in the ratio of 3:2.

Answer

The two parts are 3 and 2. Sum of the parts is 5.

So, Sheela gets 3 parts and Sangeetha gets 2 parts out of every 5 parts.

So we can say that

Sheela gets  $\frac{3}{5}$  of the total pens and Sangeeta gets  $\frac{2}{5}$  of the total pens.

Number of pens Sheela gets =  $(\frac{3}{5}) \times 20 = 12$

Number of pens Sangeeta gets =  $(\frac{2}{5}) \times 20 = 8$

Therefore, Sheela gets 12 pens and Sangeeta gets 8 pens.

## PROPORTIONS

Question 1:

Determine if the following are in proportion.

(a) 15, 45, 40, 120 (b) 33, 121, 9, 96

(c) 24, 28, 36, 48 (d) 32, 48, 70, 210

(e) 4, 6, 8, 12 (f) 33, 44, 75, 100

**ANSWER:**

(a) 15, 45, 40, 120

$$\frac{15}{45} = \frac{1}{3}, \quad \frac{40}{120} = \frac{1}{3}$$

Therefore, 15: 45 = 40: 120

Hence, these are in proportion.

(b) 33, 121, 9, 96

$$\frac{33}{121} = \frac{3}{11}, \quad \frac{9}{96} = \frac{3}{32}$$

Therefore, 33: 121  $\neq$  9: 96

Hence, these are not in proportion.

(c) 24, 28, 36, 48

$$\frac{24}{28} = \frac{6}{7}, \quad \frac{36}{48} = \frac{3}{4}$$

Therefore, 24: 28  $\neq$  36: 48

Hence, these are not in proportion.

(d) 32, 48, 70, 210

$$\frac{32}{48} = \frac{2}{3}, \quad \frac{70}{210} = \frac{1}{3}$$

Therefore, 32: 48  $\neq$  70: 210

Hence, these are not in proportion.

(e) 4, 6, 8, 12

$$\frac{4}{6} = \frac{2}{3}, \quad \frac{8}{12} = \frac{2}{3}$$

Therefore, 4: 6 = 8: 12

Hence, these are in proportion.

(f) 33, 44, 75, 100

$$\frac{33}{44} = \frac{3}{4}, \quad \frac{75}{100} = \frac{3}{4}$$

Therefore, 33: 44 = 75: 100

Hence, these are in proportion.

**Question 2:**

Write True (T) or False (F) against each of the following statements:

(a) 16:24::20:30 (b) 21:6::35:10

(c) 12:18::28:12 (d) 8:9::24:27

(e) 5.2:3.9::3:4 (f) 0.9:0.36::10:4

**ANSWER:**

(a) 16: 24:: 20: 30

$$\frac{16}{24} = \frac{2}{3}, \quad \frac{20}{30} = \frac{2}{3}$$

Therefore, 16: 24 = 20: 30

Hence, True

(b) 21: 6:: 35: 10

$$\frac{21}{6} = \frac{7}{2}, \quad \frac{35}{10} = \frac{7}{2}$$

Therefore, 21: 6 = 35: 10

Hence, True

(c) 12: 18:: 28: 12

$$\frac{12}{18} = \frac{2}{3}, \quad \frac{28}{12} = \frac{7}{3}$$

Therefore, 12: 18  $\neq$  28: 12

Hence, False

(d) 8: 9 :: 24: 27

$$\text{As } \frac{24}{27} = \frac{3 \times 8}{3 \times 9} = \frac{8}{9},$$

Therefore, True

(e) 5.2: 3.9 :: 3: 4

$$\text{As } \frac{5.2}{3.9} = \frac{4}{3},$$

Therefore, 5.2: 3.9  $\neq$  3: 4

Hence, False

(f) 0.9: 0.36 :: 10: 4

$$\frac{0.9}{0.36} = \frac{90}{36} = \frac{10}{4}$$

Therefore, 0.9: 0.36 = 10: 4

Hence, True.

**Question 3:**

Determine if the following ratios form a proportion. Also, write the middle terms and extreme terms where the ratios form a proportion.

(a) 25 cm: 1 m and Rs 40 : Rs 160

(b) 39 litres: 65 litres and 6 bottles: 10 bottles

(c) 2 kg: 80 kg and 25 g: 625 g

(d) 200 mL: 2.5 litre and Rs 4: Rs 50

**ANSWER:**

(a) 25cm: 1 m and Rs 40: Rs 160

$$25 \text{ cm} = \frac{25}{100} \text{ m} = 0.25 \text{ m}$$

$$\frac{0.25}{1} = \frac{1}{4} \text{ and } \frac{40}{160} = \frac{1}{4}$$

Yes. These are in proportion.

Middle terms are 1m, Rs 40.

Extreme terms are 25 cm, Rs 160.

(b) 39 l : 65 l and 6 bottles : 10 bottles

$$\frac{39}{65} = \frac{3}{5} \text{ and } \frac{6}{10} = \frac{3}{5}$$

Yes. These are in proportion.

Middle terms are 65 l, 6 bottles.

Extreme terms are 39 l, 10 bottles.

(c) 2 kg : 80 kg and 25g : 625 g

$$\frac{2}{80} = \frac{1}{40} \text{ and } \frac{25}{625} = \frac{1}{25}$$

No. These are not in proportion.

(d) 200 mL : 2.5 l and Rs 4 : Rs 50

1 l = 1000 mL

2.5 l = 2500 mL

$$\frac{200}{2500} = \frac{2}{25} \text{ and } \frac{4}{50} = \frac{2}{25}$$

Yes. These are in proportion.

Middle terms are 2.5 l, Rs 4.

Extreme terms are 200 mL, Rs 50.

Question 4:

Three terms a, b, c are said to be in proportion if \_\_\_\_\_ .

a. a:b = b:c

b. b:a = c:a

c. a:b = c:b

d. c:a = a:b

ANSWER:

a:b = b:c

Explanation: Three terms(a ,b and c) are said to be in proportion if the ratio of the first and the second is equal to the ratio of the second and third.

a:b=b:c

Question 5:

Find X in the proportion X : 6 = 25 : 5

**ANSWER:**

$$X:6 = 25:5$$

$$X6=255 \Rightarrow X6=255$$

$$X6=51 \Rightarrow X6=51 \text{ (Dividing 255 by 5)}$$

$$X=5 \times 6=30 \Rightarrow X=5 \times 6=30$$

$$X=30$$

## FUNDAMENTAL CONCEPT OF ALGEBRA

### [CHAPTER – 12]

**Question 1**

Give expressions for the following cases.

(a) 7 added to p

(b) 7 subtracted from p

(c) p multiplied by 7

(d) p divided by 7

(e) 7 subtracted from - m (f) - p multiplied by 5

(g) - p divided by 5

(h) p multiplied by - 5

**Answer**

a) 7 added to p	$p+7$
b) 7 subtracted from p	$p-7$
c) p multiplied by 7	$p \times 7 = 7p$
d) p divided by 7	$p/7$
e) 7 subtracted from - m	$-m-7$
f) - p multiplied by 5	$-p \times 5 = -5p$
g) - p divided by 5	$-p/5$
h) p multiplied by - 5	$p \times (-5) = -5p$

**Question 2**

Write down the degrees of the following polynomials: -

i.  $3x^3 - x^5$

ii.  $X^2Y^4 + XY^2 + 11XY$

iii.  $7a^2 + 11b^2 + b^6$

iv.  $a^3 + b^3 + c^3 - 3abc$

**Answer**

i. 5

ii. 6

iii. 6

iv. 3

**Question 3**

Subtract  $2x + 3y - 6z$  from the sum of  $5x - y - 2z$  &  $2y - 6x - 3z$ .

**Answer:**

$$\begin{array}{r} 5x - y - 2z \\ + \quad -6x + 2y - 3z \end{array}$$

---


$$\begin{array}{r}
 -x+y-5z \\
 - \quad 2x+3y-6z \\
 - \quad - \quad +
 \end{array}$$


---

$$-3x-2y+z$$

#### Question 4

What Should be added to  $x^2 - 8x + 3$  to get  $3x + 2$ ?

Answer:

$$(x^2 - 8x + 3) - (3x-2) = x^2 - 8x + 3 - 3x + 2 = x^2 - 8x - 3x + 3 + 2 = x^2 - 11x + 5$$

#### Question 5

Find the value of  $a^2 + 2ab + b^2$ . When  $a= 5$ ,  $b=3$ .

Answer:

$$a^2 + 2ab + b^2 = (5)^2 + 2 \times 5 \times 3 + (3)^2 = 25 + 30 + 9 = 55 + 9 = 64$$

## SIMPLE EQUATIONS

### [CHAPTER – 13]

#### Question 1:

Write each of the following statements as an equation:

- (i) 5 times a number equals 40.
- (ii) A number increased by 8 equals 15.
- (iii) 25 exceeds a number by 7.
- (iv) A number exceeds 5 by 3.
- (v) 5 subtracted from thrice a number is 16.

ANSWER:

(i) Let the required number be  $x$ .

So, five times the number will be  $5x$ .

$$\therefore 5x = 40$$

(ii) Let the required number be  $x$ .

So, when it is increased by 8, we get  $x + 8$ .

$$\therefore x + 8 = 15$$

(iii) Let the required number be  $x$ .

So, when 25 exceeds the number, we get  $25 - x$ .

$$\therefore 25 - x = 7$$

(iv) Let the required number be  $x$ .

So, when the number exceeds 5, we get  $x - 5$ .

$$\therefore x - 5 = 3$$

(v) Let the required number be  $x$ .

So, thrice the number will be  $3x$ .

$$\therefore 3x - 5 = 16$$

$$\therefore x = 8$$

**Question 2:**

Write a statement for each of the equations, given below:

(i)  $x - 7 = 14$

(ii)  $2y = 18$

(iii)  $11 + 3x = 17$

(iv)  $2x - 3 = 13$

(v)  $12y - 30 = 6$

(vi)  $2z = 8$

**ANSWER:**

(i) 7 less than the number  $x$  equals 14.

(ii) Twice the number  $y$  equals 18.

(iii) 11 more than thrice the number  $x$  equals 17.

(iv) 3 less than twice the number  $x$  equals 13.

(v) 30 less than 12 times the number  $y$  equals 6.

(vi) When twice the number  $z$  is divided by 2, it equals 8.

**Question 3:**

Verify by substitution that

(i) the root of  $3x - 5 = 7$  is  $x = 4$

(ii) the root of  $3 + 2x = 9$  is  $x = 3$

(iii) the root of  $5x - 8 = 2x - 2$  is  $x = 2$

(iv) the root of  $8 - 7y = 1$  is  $y = 1$

(v) the root of  $z = 8$  is  $z = 8$

**ANSWER:**

(i)

$$3x - 5 = 7$$

Substituting  $x = 4$  in the given equation:

$$\text{L.H.S.} : 3 \times 4 - 5 \text{ or } 12 - 5 = 7 = \text{R.H.S.}$$

L.H.S. = R.H.S. Hence,  $x = 4$  is the root of the given equation.

Substituting  $x = 4$  in the given equation:

L.H.S. :  $3 \times 4 - 5$  or,  $12 - 5 = 7 =$  R.H.S. L.H.S. = R.H.S.

Hence,  $x = 4$  is the root of the given equation.

(ii)

$$3 + 2x = 9$$

Substituting  $x = 3$  in the given equation:

$$\text{L.H.S. : } 3 + 2 \times 3 \text{ or, } 3 + 6 = 9 = \text{R.H.S.}$$

L.H.S. = R.H.S. Hence,  $x = 3$  is the root of the given equation.

$3 + 2x = 9$  Substituting  $x = 3$  in the given equation: L.H.S. :  $3 + 2 \times 3$  or,  $3 + 6 = 9 =$  R.H.S. L.H.S. = R.H.S. Hence,  $x = 3$  is the root of the given equation.

(iii)

$$5x - 8 = 2x - 2$$

Substituting  $x = 2$  in the given equation:

$$\text{L.H.S. : R.H.S. : } 5 \times 2 - 8 = 2 \times 2 - 2 \text{ or, } 10 - 8 = 2 = 4 - 2 = 2$$

L.H.S. = R.H.S. Hence,  $x = 2$  is the root of the given equation.  $5x - 8 = 2x - 2$  Substituting  $x = 2$  in the given equation: L.H.S. : R.H.S. :  $5 \times 2 - 8 = 2 \times 2 - 2$  or,  $10 - 8 = 2 = 4 - 2 = 2$

L.H.S. = R.H.S. Hence,  $x = 2$  is the root of the given equation.

(iv)

$8 - 7y = 1$  Substituting  $y = 1$  in the given equation:

L.H.S. :  $8 - 7 \times 1$  or,  $8 - 7 = 1 =$  R.H.S. L.H.S. = R.H.S. Hence,  $y = 1$  is the root of the given equation.  $8 - 7y = 1$  Substituting  $y = 1$  in the given equation: L.H.S. :  $8 - 7 \times 1$  or,  $8 - 7 = 1 =$  R.H.S. L.H.S. = R.H.S. Hence,  $y = 1$  is the root of the given equation.

(v)

$z^7 = 8$  Substituting  $z = 56$  in the given equation: L.H.S. :  $56^7 = 8 =$  R.H.S.

L.H.S. = R.H.S. Hence,  $z = 56$  is the root of the given equation.

Question 4:

*Solve each of the following equations and verify the answer in each case:*

$$x + 5 = 12$$

ANSWER:

$$x + 5 = 12$$

Subtracting 5 from both the sides:

$$\Rightarrow x + 5 - 5 = 12 - 5$$

$$\Rightarrow x = 7$$

Verification:

Substituting  $x = 7$  in the L.H.S.:

$$\Rightarrow 7 + 5 = 12 = \text{R.H.S.}$$

L.H.S. = R.H.S.

Hence, verified.

Question 5:

Solve each of the following equations and verify the answer in each case:

$$x + 3 = -2$$

ANSWER:

$$x + 3 = -2$$

Subtracting 3 from both the sides:

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

$$\Rightarrow x = -5$$

Verification:

Substituting  $x = -5$  in the L.H.S.:

$$\Rightarrow -5 + 3 = -2 = \text{R.H.S.}$$

L.H.S. = R.H.S.

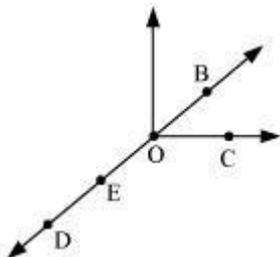
Hence, verified.

## FUNDAMENTAL GEOMETRICAL CONCEPT

### [CHAPTER – 14]

Question 1:

Use the figure to name:



(a) Five points

(b) A line

(c) Four rays

(d) Five line segments

ANSWER:

(a) The five points are D, E, O, B, and C.

(b)  $\overline{BD}$

(c)  $\overline{OD}, \overline{OB}, \overline{OC}, \overline{OE}$

(d)  $\overline{DE}, \overline{EO}, \overline{OB}, \overline{OC}, \overline{BE}$

Question 2:

Name the line given in all possible (twelve) ways, choosing only two letters at a time from the four given.

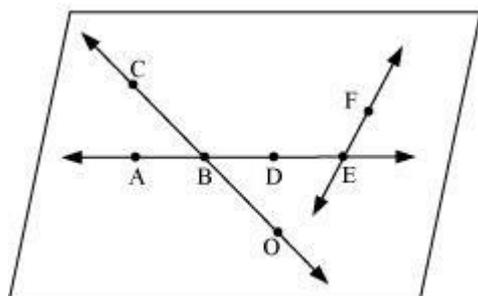


ANSWER:

$\overline{AB}, \overline{BC}, \overline{CD}, \overline{BA}, \overline{CB}, \overline{DC}, \overline{AD}, \overline{DA}, \overline{AC}, \overline{CA}, \overline{BD}, \overline{DB}$

Question 3:

Use the figure to name:



(a) Line containing point E.

(b) Line passing through A.

(c) Line on which O lies

(d) Two pairs of intersecting lines.

ANSWER:

(a)  $\overline{AE}$

(b)  $\overline{AE}$

(c)  $\overline{OC}$

(d)  $\overline{OC}$  and  $\overline{AE}$ ,  $\overline{AE}$  and  $\overline{EF}$

**Question 4:**

How many lines can pass through (a) one given point? (b) Two given points?

**ANSWER:**

(a) Infinite number of lines can pass through a single point.

(b) Only one line can pass through two given points.

**Question 5:**

Draw a rough figure and label suitably in each of the following cases:

(a) Point P lies on  $\overline{AB}$ .

(b)  $\overline{XY}$  and  $\overline{PQ}$  intersect at M.

(c) Line l contains E and F but not D.

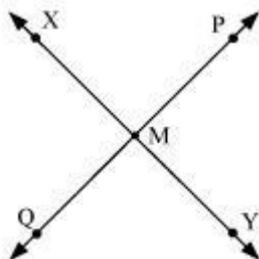
(d)  $\overline{OP}$  and  $\overline{OQ}$  meet at O.

**ANSWER:**

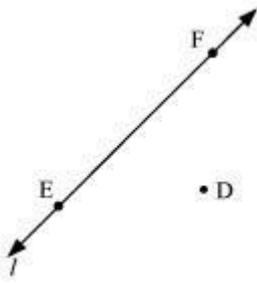
(a)



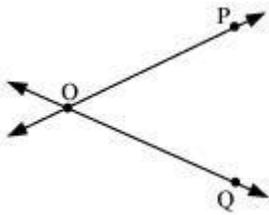
(b)



(c)



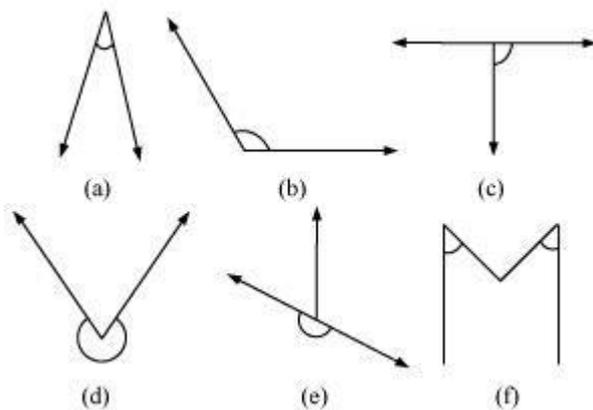
(d)



## ANGLES [CHAPTER – 15]

**Question 1:**

**Classify each one of the following angles as right, straight, acute, obtuse or reflex:**



**ANSWER:**

(a) Acute angle as its measure is less than  $90^\circ$ .

(b) Obtuse angle as its measure is more than  $90^\circ$  but less than  $180^\circ$ .

(c) Right angle as its measure is  $90^\circ$ .

(d) Reflex angle as its measure is more than  $180^\circ$  but less than  $360^\circ$ .

(e) Straight angle as its measure is  $180^\circ$ .

**(f) Acute angle as its measure is less than  $90^\circ$ .**

**Question 2:**

**What is the measure of (i) a right angle? (ii) a straight angle?**

**ANSWER:**

**(i) The measure of a right angle is  $90^\circ$ .**

**(ii) The measure of a straight angle is  $180^\circ$ .**

**Question 3:**

**Say True or False:**

**(a) The measure of an acute angle  $< 90^\circ$**

**(b) The measure of an obtuse angle  $< 90^\circ$**

**(c) The measure of a reflex angle  $> 180^\circ$**

**(d) The measure of one complete revolution =  $360^\circ$**

**(e) If  $m\angle A = 53^\circ$  and  $m\angle B = 35^\circ$ , then  $m\angle A > m\angle B$ .**

**ANSWER:**

**(a) True**

**The measure of an acute angle is less than  $90^\circ$ .**

**(b) False**

**The measure of an obtuse angle is greater than  $90^\circ$  but less than  $180^\circ$ .**

**(c) True**

**The measure of a reflex angle is greater than  $180^\circ$ .**

**(d) True**

**The measure of one complete revolution is  $360^\circ$ .**

**(e) True**

**Question 4:**

**Write down the measures of**

**(a) Some acute angles. (b) Some obtuse angles.**

**(Give at least two examples of each).**

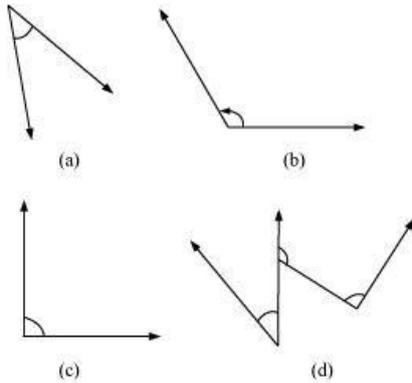
**ANSWER:**

**(a)  $45^\circ$ ,  $70^\circ$**

**(b)  $105^\circ$ ,  $132^\circ$**

**Question 5:**

**Measure the angles given below using the Protractor and write down the measure.**



**ANSWER:**

**(a)  $45^\circ$**

**(b)  $120^\circ$**

**(c)  $90^\circ$**

**(d)  $60^\circ$ ,  $90^\circ$ , and  $130^\circ$**

## **PLAYING WITH NUMBERS**

### **[CHAPTER – 6]**

**Question 1:**

**Write all the factors of the following numbers:**

**(a) 24**

**(b) 15**

**(c) 21**

**(d) 27**

**(e) 12**

**(f) 20**

**(g) 18**

**(h) 23**

**(i) 36**

**ANSWER:**

**(a) 24**

$$24 = 1 \times 24 \quad 24 = 2 \times 12 \quad 24 = 3 \times 8$$

$$24 = 4 \times 6 \quad 24 = 6 \times 4$$

**∴ Factors of 24 are 1, 2, 3, 4, 6, 8, 12, and 24**

**(b) 15**

$$15 = 1 \times 15 \quad 15 = 3 \times 5 \quad 15 = 5 \times 3$$

**∴ Factors of 15 are 1, 3, 5, and 15**

**(c) 21**

$$21 = 1 \times 21 \quad 21 = 3 \times 7 \quad 21 = 7 \times 3$$

**∴ Factors of 21 are 1, 3, 7, and 21**

**(d) 27**

$$27 = 1 \times 27 \quad 27 = 3 \times 9 \quad 27 = 9 \times 3$$

**∴ Factors of 27 are 1, 3, 9, and 27**

**(e) 12**

$$12 = 1 \times 12 \quad 12 = 2 \times 6 \quad 12 = 3 \times 4 \quad 12 = 4 \times 3$$

**∴ Factors of 12 are 1, 2, 3, 4, 6, and 12**

**(f) 20**

$$20 = 1 \times 20 \quad 20 = 2 \times 10 \quad 20 = 4 \times 5 \quad 20 = 5 \times 4$$

**∴ Factors of 20 are 1, 2, 4, 5, 10, and 20**

**(g) 18**

$$18 = 1 \times 18 \quad 18 = 2 \times 9 \quad 18 = 3 \times 6 \quad 18 = 6 \times 3$$

**∴ Factors of 18 are 1, 2, 3, 6, 9, and 18**

**(h) 23**

$$23 = 1 \times 23 \quad 23 = 23 \times 1$$

**∴ Factors of 23 are 1 and 23**

**(i) 36**

$$36 = 1 \times 36 \quad 36 = 2 \times 18 \quad 36 = 3 \times 12 \quad 36 = 4 \times 9$$

$$36 = 6 \times 6$$

∴ Factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, and 36

**Question 2:**

Write first five multiples of:

(a) 5 (b) 8 (c) 9

**ANSWER:**

$$(a) 5 \times 1 = 5 \quad 5 \times 2 = 10 \quad 5 \times 3 = 15 \quad 5 \times 4 = 20 \quad 5 \times 5 = 25$$

∴ The required multiples are 5, 10, 15, 20, and 25.

$$(b) 8 \times 1 = 8 \quad 8 \times 2 = 16 \quad 8 \times 3 = 24 \quad 8 \times 4 = 32 \quad 8 \times 5 = 40$$

∴ The required multiples are 8, 16, 24, 32, and 40.

$$(c) 9 \times 1 = 9 \quad 9 \times 2 = 18 \quad 9 \times 3 = 27 \quad 9 \times 4 = 36 \quad 9 \times 5 = 45$$

∴ The required multiples are 9, 18, 27, 36, and 45.

**Question 3:**

State whether the following statements are True or False:

- (a) The sum of three odd numbers is even.
- (b) The sum of two odd numbers and one even number is even.
- (c) The product of three odd numbers is odd.
- (d) If an even number is divided by 2, the quotient is always odd.
- (e) All prime numbers are odd.
- (f) Prime numbers do not have any factors.
- (g) Sum of two prime numbers is always even.
- (h) 2 is the only even prime number.
- (i) All even numbers are composite numbers.
- (j) The product of two even numbers is always even.

**ANSWER:**

(a) False  $3 + 5 + 7 = 15$ , i.e., odd

(b) True  $3 + 5 + 6 = 14$ , i.e., even

- (c) True  $3 \times 5 \times 7 = 105$ , i.e., odd
- (d) False  $4 \div 2 = 2$ , i.e., even
- (e) False 2 is a prime number and it is also even
- (f) False 1 and the number itself are factors of the number
- (g) False  $2 + 3 = 5$ , i.e., odd
- (h) True
- (i) False 2 is a prime number
- (j) True  $2 \times 4 = 8$ , i.e., even

**Question 4:**

Write down separately the prime and composite numbers less than 20.

**ANSWER:**

Prime numbers less than 20 are

2, 3, 5, 7, 11, 13, 17, 19

Composite numbers less than 20 are

4, 6, 8, 9, 10, 12, 14, 15, 16, 18

**Question 5:**

Using divisibility tests, determine which of the following numbers are divisible by 4; by 8:

- (a) 572 (b) 726352 (c) 5500 (d) 6000
- (e) 12159 (f) 14560 (g) 21084 (h) 31795072
- (i) 1700 (j) 2150

**ANSWER:**

(a) 572

The last two digits are 72. Since 72 is divisible by 4, the given number is also divisible by 4.

The last three digits are 572. Since 572 is not divisible by 8, the given number is also not divisible by 8.

(b) 726352

The last two digits are 52. As 52 is divisible by 4, the given number is also divisible by 4.

The last three digits are 352. Since 352 is divisible by 8, the given number is also divisible by 8.

(c) 5500

Since last two digits are 00, it is divisible by 4.

The last 3 digits are 500. Since 500 is not divisible by 8, the given number is also not divisible by 8.

(d) 6000

Since the last 2 digits are 00, the given number is divisible by 4.

Since the last 3 digits are 000, the given number is divisible by 8.

(e) 12159

The last 2 digits are 59. Since 59 is not divisible by 4, the given number is also not divisible by 4.

The last 3 digits are 159. Since 159 is not divisible by 8, the given number is not divisible by 8.

(f) 14560

The last two digits are 60. Since 60 is divisible by 4, the given number is divisible by 4.

The last 3 digits are 560. Since 560 is divisible by 8, the given number is divisible by 8.

(g) 21084

The last two digits are 84. Since 84 is divisible by 4, the given number is divisible by 4.

The last three digits are 084. Since 084 is not divisible by 8, the given number is not divisible by 8.

(h) 31795072

The last two digits are 72. Since 72 is divisible by 4, the given number is divisible by 4.

The last three digits are 072. Since 072 is divisible by 8, the given number is divisible by 8.

(i) 1700

The last two digits are 00. Since 00 is divisible by 4, the given number is divisible by 4.

The last three digits are 700. Since 700 is not divisible by 8, the given number is not divisible by 8.

(j) 2150

The last two digits are 50. Since 50 is not divisible by 4, the given number is not divisible by 4.

The last three digits are 150. Since 150 is not divisible by 8, the given number is not divisible by 8

**Question 6:**

Using divisibility tests, determine which of following numbers are divisible by 6:

(a) 297144

(b) 1258

**ANSWER:**

(a) 297144

Since the last digit of the number is 4, it is divisible by 2.

On adding all the digits of the number, the sum obtained is 27. Since 27 is divisible by 3, the given number is also divisible by 3.

As the number is divisible by both 2 and 3, it is divisible by 6.

(b) 1258

Since the last digit of the number is 8, it is divisible by 2.

On adding all the digits of the number, the sum obtained is 16. Since 16 is not divisible by 3, the given number is also not divisible by 3.

As the number is not divisible by both 2 and 3, it is not divisible by 6.

**Question 7:**

Using divisibility tests, determine which of the following numbers are divisible by 11:

(a) 5445 (b) 10824

**ANSWER:**

(a) 5445

Sum of the digits at odd places =  $5 + 4 = 9$

**Sum of the digits at even places =  $4 + 5 = 9$**

**Difference =  $9 - 9 = 0$**

**As the difference between the sum of the digits at odd places and the sum of the digits at even places is 0, therefore, 5445 is divisible by 11.**

**(b) 10824**

**Sum of the digits at odd places =  $4 + 8 + 1 = 13$**

**Sum of the digits at even places =  $2 + 0 = 2$**

**Difference =  $13 - 2 = 11$**

**The difference between the sum of the digits at odd places and the sum of the digits at even places is 11, which is divisible by 11. Therefore, 10824 is divisible by 11.**

**Sum of the digits at even places =  $5 + 1 + 9 = 15$**

**Difference =  $15 - 4 = 11$**

**The difference between the sum of the digits at odd places and the sum of the digits at even places is 11, which is divisible by 11. Therefore, 901153 is divisible by 11.**

**Question 8:**

**Find the common factors of:**

**(a) 20 and 28 (b)**

**ANSWER:**

**(a) Factors of 20 = 1, 2, 4, 5, 10, 20**

**Factors of 28 = 1, 2, 4, 7, 14, 28**

**Common factors = 1, 2, 4**

**(b) Factors of 15 = 1, 3, 5, 15**

**Factors of 25 = 1, 5, 25**

**Common factors = 1, 5**

**Question 9:**

**Find all prime factors of 1729 and arrange them in ascending order. Now state the relation, if any; between two consecutive prime factors.**

**ANSWER:**

7	1729
13	247
19	19
	1

$$1729 = 7 \times 13 \times 19$$

$$13 - 7 = 6, 19 - 13 = 6$$

The difference of two consecutive prime factors is 6.

**Question 10:**

Find the HCF of the following numbers:

(a) 18, 48 (b) 30, 42 (c) 18, 60

(d) 27, 63 (e) 36, 84 (f) 34, 102

(g) 70, 105, 175 (h) 91, 112, 49 (i) 18, 54, 81

(j) 12, 45, 75

**ANSWER:**

(a) 18, 48

2	18
3	9
3	3
	1
2	48
2	24
2	12
2	6
3	3
	1

$$18 = 2 \times 3 \times 3$$

$$48 = 2 \times 2 \times 2 \times 2 \times 3$$

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

**(b) 30, 42**

2	30
3	15
5	5
	1
2	42
3	21
7	7
	1

$$30 = 2 \times 3 \times 5$$

$$42 = 2 \times 3 \times 7$$

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

**(c) 18, 60**

2	18
3	9
3	3
	1
2	60
2	30
3	15
5	5
	1

$$18 = 2 \times 3 \times 3$$

$$60 = 2 \times 2 \times 3 \times 5$$

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

**(d) 27, 63**

3	27
3	9

3	3
	1
3	63
3	21
7	7
	1

$$27 = 3 \times 3 \times 3$$

$$63 = 3 \times 3 \times 7$$

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

(e) 36, 84

2	36
2	18
3	9
3	3
	1
2	84
2	42
3	21
7	7
	1

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

$$84 = 2 \times 2 \times 3 \times 7$$

$$\text{HCF} = 2 \times 2 \times 3 = 12$$

(f) 34, 102

2	34
17	17
	1
2	102

3	51
17	17
	1

$$34 = 2 \times 17$$

$$102 = 2 \times 3 \times 17$$

$$\text{HCF} = 2 \times 17 = 34$$

(g) 70, 105, 175

2	70
5	35
7	7
	1
3	105
5	35
7	7
	1
5	175
5	35
7	7
	1

$$70 = 2 \times 5 \times 7$$

$$105 = 3 \times 5 \times 7$$

$$175 = 5 \times 5 \times 7$$

$$\text{HCF} = 5 \times 7 = 35$$

(h) 91, 112, 49

7	91
13	13
	1
2	112

2	56
2	28
2	14
7	7
	1
7	49
7	7
	1

$$91 = 7 \times 13$$

$$112 = 2 \times 2 \times 2 \times 2 \times 7$$

$$49 = 7 \times 7$$

$$\text{HCF} = 7$$

(i) 18, 54, 81

2	18
3	9
3	3
	1
2	54
3	27
3	9
3	3
	1
3	81
3	27
3	9
3	3
	1

$$18 = 2 \times 3 \times 3$$

$$54 = 2 \times 3 \times 3 \times 3$$

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

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

(j) 12, 45, 75

2	12
2	6
3	3
	1
3	45
3	15
5	5
	1
3	75
5	25
5	5
	1

$$12 = 2 \times 2 \times 3$$

$$45 = 3 \times 3 \times 5$$

$$75 = 3 \times 5 \times 5$$

$$\text{HCF} = 3$$

Question 11:

Three boys step off together from the same spot. Their steps measure 63 cm, 70 cm and 77 cm respectively. What is the minimum distance each should cover so that all can cover the distance in complete steps?

ANSWER:

Step measure of 1<sup>st</sup> Boy = 63 cm

Step measure of 2<sup>nd</sup> Boy = 70 cm

Step measure of 3<sup>rd</sup> Boy = 77 cm

LCM of 63, 70, 77

2	63, 70, 77
3	63, 35, 77
3	21, 35, 77
5	7, 35, 77
7	7, 7, 77
11	1, 1, 11
	1, 1, 1

$$\text{LCM} = 2 \times 3 \times 3 \times 5 \times 7 \times 11 = 6930$$

Hence, the minimum distance each should cover so that all can cover the distance in complete steps is 6930 cm.

Question 12 :

The length, breadth and height of a room are 825 cm, 675 cm and 450 cm respectively. Find the longest tape which can measure the three dimensions of the room exactly.

ANSWER:

$$\text{Length} = 825 \text{ cm} = 3 \times 5 \times 5 \times 11$$

$$\text{Breadth} = 675 \text{ cm} = 3 \times 3 \times 3 \times 5 \times 5$$

$$\text{Height} = 450 \text{ cm} = 2 \times 3 \times 3 \times 5 \times 5$$

$$\text{Longest tape} = \text{HCF of } 825, 675, \text{ and } 450 = 3 \times 5 \times 5 = 75 \text{ cm}$$

Therefore, the longest tape is 75 cm.

Question 13:

Determine the smallest 3-digit number which is exactly divisible by 6, 8 and 12.

ANSWER:

$$\text{Smallest number} = \text{LCM of } 6, 8, 12$$

2	6, 8, 12
2	3, 4, 6
2	3, 2, 3
3	3, 1, 3

	1, 1, 1
--	---------

$$\text{LCM} = 2 \times 2 \times 2 \times 3 = 24$$

We have to find the smallest 3-digit multiple of 24.

It can be seen that  $24 \times 4 = 96$  and  $24 \times 5 = 120$ .

Hence, the smallest 3-digit number which is exactly divisible by 6, 8, and 12 is 120.

# MODEL QUESTION BANK

## SECOND TERM

### CLASS – VI

### MATHEMATICS

## FRACTIONS

### [CHAPTER – 4]

Question 1:

What fraction of a day is 8 hours?

ANSWER:

There are 24 hours in a day. Therefore, 8 hours of a day represent  $\frac{8}{24}$ .

Question 2:

Arya, Abhimanyu, and Vivek shared lunch. Arya has brought two sandwiches, one made of vegetable and one of jam. The other two boys forgot to bring their lunch. Arya agreed to share his sandwiches so that each person will have an equal share of each sandwich.

(a) How can Arya divide his sandwiches so that each person has an equal share?

(b) What part of a sandwich will each boy receive?

ANSWER:

(a) Arya will divide each sandwich in three equal parts. Then, he will

give one part of each sandwich to each one of them.

(b) Each boy will receive  $\frac{1}{3}$  part of each sandwich.

Question 3:

Kanchan dyes dresses. She had to dye 30 dresses. She has so far finished 20 dresses. What fraction of dresses has she finished?

ANSWER:

Dress dyed so far = 20

Total dresses = 30

$$\text{Fraction} = \frac{20}{30} = \frac{2}{3}$$

**Question 4:**

Write the natural numbers from 2 to 12. What fraction of them are prime numbers?

**ANSWER:**

Natural numbers from 2 to 12 are 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12.

Prime numbers among these are 2, 3, 5, 7, and 11.

Therefore, out of 11 numbers, 5 are prime numbers. It represents a fraction  $\frac{5}{11}$ .

**Question 5:**

Kristin received a CD player for her birthday. She bought 3 CDs and received 5 others as gifts. What fraction of her total CDs did she buy and what fraction did she receive as gifts?

**ANSWER:**

Total CDs Kristin had on her birthday =  $3 + 5 = 8$

Out of 8 CDs, she bought 3 CDs and also got 5 CDs as gifts. Therefore, she bought and received CDs as gifts in a fraction of  $\frac{3}{8}$  and  $\frac{5}{8}$  respectively.

**Question 6**

Express the following as improper fractions:

(a)  $7\frac{3}{4}$

(b)  $5\frac{6}{7}$

(c)  $2\frac{5}{6}$  (d)  $10\frac{3}{5}$

(e)  $9\frac{3}{7}$

(f)  $8\frac{4}{9}$

**Answer**

We can express a mixed fraction as improper fraction in this way

$$\frac{(\text{whole} \times \text{denominator}) + \text{Numerator}}{\text{Denominator}}$$

S.no	Question	Calculation	Answer
a)	$7\frac{3}{4}$	$(28+3)/4$	$31/4$
b)	$5\frac{6}{7}$	$(35+6)/7$	$41/7$
c)	$2\frac{5}{6}$	$(12+5)/6$	$17/6$
d)	$10\frac{3}{5}$	$(50+3)/5$	$53/5$
e)	$9\frac{3}{7}$	$(63+3)/7$	$66/7$
f)	$8\frac{4}{9}$	$(72+4)/9$	$76/9$

### Question 7

Salil wants to put a picture in a frame. The picture is  $7\frac{3}{5}$  cm wide. To fit in the frame the picture cannot be more than  $7\frac{3}{10}$  cm wide. How much should the picture be trimmed?

Answer

Width of picture =  $7\frac{3}{5}$  cm

Required width of picture =  $7\frac{3}{10}$  cm

The picture should be trimmed by

$$= 7\frac{3}{5} - 7\frac{3}{10}$$

$$= 3\frac{8}{5} - 7\frac{3}{10}$$

$$= 7\frac{6}{10} - 7\frac{3}{10} = (76 - 73) \div 10 = 3\frac{3}{10} \text{ cm}$$

### Question 8

Michael finished colouring a picture in  $7\frac{1}{12}$  hour. Vaibhav finished colouring the same picture in  $3\frac{3}{4}$  hour. Who worked longer? By what fraction was it longer?

Answer

Time taken by Michael =  $7\frac{1}{12}$  hour

Time taken by Vaibhav =  $3\frac{3}{4}$  hour

Changing the fractions into like fractions, we get

$7\frac{1}{12}$ ,  $3\frac{3}{4}$

$$7\frac{1}{12}, (3 \times 3) \div (4 \times 3)$$

$7\frac{1}{12}$ ,  $9\frac{9}{12}$

Since,  $9\frac{9}{12} > 7\frac{1}{12}$ , Vaibhav worked longer.

$$\text{Difference} = 9\frac{9}{12} - 7\frac{1}{12} = (9 - 7) \div 12 = 2\frac{8}{12} = 1\frac{2}{3} \text{ hours longer}$$

### Question 9

Vidya and Pratap went for a picnic. Their mother gave them a water bottle that contained 5 litres of water. Vidya consumed  $\frac{2}{5}$  of the water. Pratap consumed the remaining water.

a. How much water did Vidya drink?

b. What [fraction](#) of the total quantity of water did Pratap drink?

Answer

a. Water consumed by Vidya =  $\frac{2}{5}$  of 5 litres =  $\frac{2}{5} \times 5 = 2$  litres

b. Water consumed by Pratap =  $1 - \frac{2}{5} = (5 - 2) \div 5 = \frac{3}{5}$  of the total water

Therefore, the fraction of total quantity of water =  $\frac{3}{5}$

## UNITARY METHOD

### [CHAPTER – 9]

#### Question 1:

If the cost of 7 m of cloth is Rs 294, find the cost of 5 m of cloth.

ANSWER:

Cost of 7 m cloth = Rs 294

$$\text{Cost of 1 m cloth} = \frac{294}{7} = \text{Rs } 42$$

Therefore, cost of 5 m cloth =  $42 \times 5 = \text{Rs } 210$

**Question 2:**

Ekta earns Rs 1500 in 10 days. How much will she earn in 30 days?

**ANSWER:**

Money earned in 10 days = Rs 1500

$$\text{Money earned in 1 day} = \frac{1500}{10} = \text{Rs } 150$$

Therefore, money earned in 30 days =  $150 \times 30 = \text{Rs } 4500$

**Question 3:**

If it has rained 276 mm in the last 3 days, how many cm of rain will fall in one full week (7 days)? Assume that the rain continues to fall at the same rate.

**ANSWER:**

Measure of rain in 3 days = 276 mm

$$\text{Measure of rain in 1 day} = \frac{276}{3} = 92 \text{ mm}$$

Therefore, measure of rain in 7 days =  $92 \times 7 = 644 \text{ mm}$

**Question 4:**

Cost of 5 kg of wheat is Rs 30.50.

(a) What will be the cost of 8 kg of wheat?

(b) What quantity of wheat can be purchased in Rs 61?

**ANSWER:**

(a) Cost of 5 kg wheat = Rs 30.50

$$\text{Cost of 1 kg wheat} = \frac{30.50}{5} = \text{Rs } 6.10$$

Therefore, cost of 8 kg wheat =  $6.10 \times 8 = \text{Rs } 48.80$

(b) Wheat purchased in Rs 30.50 = 5 kg

$$\text{Wheat purchased in Re } 1 = \frac{5}{30.50} \text{ kg}$$

Therefore, wheat purchased in Rs 61 =  $\frac{5}{30.50} \times 61 = 10$  kg

**Question 5:**

The temperature dropped 15 degree Celsius in the last 30 days. If the rate of temperature drop remains the same, how many degrees will the temperature drop in the next ten days?

**ANSWER:**

Temperature drop in 30 days = 15°C

Temperature drop in 1 day =  $\frac{15}{30} = \left(\frac{1}{2}\right)^\circ\text{C}$

Therefore, temperature drop in next 10 days =  $\frac{1}{2} \times 10 = 5^\circ\text{C}$

Thus, there will be a temperature drop of 5°C in the next ten days.

**Question 6:**

Shaina pays Rs 7500 as rent for 3 months. How much does she has to pay for a whole year, if the rent per month remains same?

**ANSWER:**

Rent for 3 months = Rs 7500

Rent for 1 month =  $\frac{7500}{3} = \text{Rs } 2500$

Therefore, rent for 12 months =  $2500 \times 12 = 30000$

Thus, she has to pay Rs 30000 for a whole year.

## DECIMAL FRACTIONS

### [CHAPTER – 5]

**Question 1:**

Write each of the following as decimals:

- (a) Seven-tenths (b) Two tens and nine-tenths
- (c) Fourteen point six (d) One hundred and two ones
- (e) Six hundred point eight

**ANSWER:**

(a) Seven-tenths =  $\frac{7}{10} = 0.7$

(b) Two tens and nine-tenths =  $20 + \frac{9}{10} = 20.9$

(c) Fourteen point six = 14.6

(d) One hundred and two ones =  $100 + 2 = 102.0$

(e) Six hundred point eight = 600.8

**Question 2:**

Write each of the following as decimals:

(a)  $\frac{5}{10}$  (b)  $3 + \frac{7}{10}$

(c)  $200 + 60 + 5 + \frac{1}{10}$  (d)  $70 + \frac{8}{10}$

(e)  $\frac{88}{10}$  (f)  $4 \frac{2}{10}$

**ANSWER:**

(a)  $\frac{5}{10} = 0.5$

(b)  $3 + \frac{7}{10} = 3 + 0.7 = 3.7$

(c)  $200 + 60 + 5 + \frac{1}{10} = 265 + 0.1 = 265.1$

(d)  $70 + \frac{8}{10} = 70 + 0.8 = 70.8$

(e)  $\frac{88}{10} = \frac{80}{10} + \frac{8}{10} = 8 + 0.8 = 8.8$

**Question 3:**

Write the following decimals as fractions. Reduce the fractions to lowest form.

(a) 0.6 (b) 2.5 (c) 1.0 (d) 3.8

(e) 13.7 (f) 21.2 (g) 6.4

**ANSWER:**

(a)  $0.6 = \frac{6}{10} = \frac{3}{5}$

(b)  $2.5 = \frac{25}{10} = \frac{5}{2}$

(c)  $1.0 = 1$

(d)  $3.8 = \frac{38}{10} = \frac{19}{5}$

(e)  $13.7 = \frac{137}{10}$

(f)  $21.2 = \frac{212}{10} = \frac{106}{5}$

(g)  $6.4 = \frac{64}{10} = \frac{32}{5}$

**Question 4:**

Express the following as cm using decimals.

(a) 2 mm (b) 30 mm

(c) 116 mm (d) 4 cm 2 mm

(e) 162 mm (f) 83 mm

**ANSWER:**

It is known that  $1\text{ cm} = 10\text{ mm}$

(a)  $2\text{ mm} = \frac{2}{10}\text{ cm} = 0.2\text{ cm}$

(b)  $30\text{ mm} = \frac{30}{10}\text{ cm} = 3.0\text{ cm}$

(c)  $116\text{ mm} = \frac{116}{10}\text{ cm} = 11.6\text{ cm}$

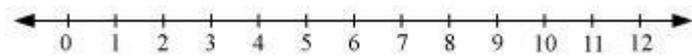
(d)  $4\text{ cm } 2\text{ mm} = \left(4 + \frac{2}{10}\right)\text{ cm} = 4.2\text{ cm}$

(e)  $162 \text{ mm} = \frac{162}{10} \text{ cm} = 16.2 \text{ cm}$

(f)  $83 \text{ mm} = \frac{83}{10} \text{ cm} = 8.3 \text{ cm}$

**Question 5:**

**Between which two whole numbers on the number line are the given numbers lie? Which of these whole numbers is nearer the number?**



(a) 0.8

(b) 5.1

(c) 2.6

(d) 6.4

(e) 9.1

(f) 4.9

**ANSWER:**

(a) 0.8 lies between 0 and 1, and is nearer to 1.

(b) 5.1 lies between 5 and 6, and is nearer to 5.

(c) 2.6 lies between 2 and 3, and is nearer to 3.

(d) 6.4 lies between 6 and 7, and is nearer to 6.

(e) 9.1 lies between 9 and 10, and is nearer to 9.

(f) 4.9 lies between 4 and 5, and is nearer to 5.

**Question 6**

**Which is greater?**

(a) 0.3 or 0.4

(b) 0.07 or 0.02

(c) 3 or 0.8

(d) 0.5 or 0.05

(e) 1.23 or 1.2

(f) 0.099 or 0.19

(g) 1.5 or 1.50

(h) 1.431 or 1.490

(i) 3.3 or 3.300

(j) 5.64 or 5.603

**Answer**

To find larger number, we can follow these steps

**1. When comparing two positive decimals, here are the tips**

a) If two numbers have unequal number of digits on the whole part, then the number with the greater number of digits is greater.

b) If two numbers have equal number of digits on the whole part then, the number with greater valued digit on the extreme left is greater. If the digits on extreme left of the numbers are equal, then the digits to the right of the extreme left digits are compared and so on.

c) if the whole part is same, then the number with a greater value digit at tenth part is greater, if the digits on tenth part are equal, then the digit on hundredth part compared and so on

**2. When comparing two negative decimals, we can remove the sign and compare them as positive integer given above, the smallest of them would be the greater when we put the sign back**

**3. When comparing two different sign decimals, the number with positive sign is larger**

With that in mind, let's solve the above questions

a) 0.3 and 0.4

Apply the same principle as given above

The whole number part is the same. It can be seen that the tenth part (3) of 0.3 is less than the tenth part (4) of 0.4.

So, 0.4 is greater.

b) 0.07 and 0.02

Apply the same principle as given above

The whole number part is the same. It can be seen that the hundredth part (7)

of 0.07 is greater than the hundredth part (2) of 0.02.

So, 0.07 is greater.

c) 3 or 0.8

Apply the same principle as given above

The whole part 3 is greater than the decimal 0.8

So, 3 is greater

d) 0.5 or 0.05

Apply the same principle as given above

The whole part is the same. Tenth part of 0.5 is 5 and the tenth part of 0.05 is 0. So, we see that the tenth part of 0.5 is greater than the tenth part of 0.05. So, 0.5 is greater.

e) 1.23 or 1.2

Apply the same principle as given above

Whole part is 1 and is the same. The tenth part is also the same. The hundredth part of 1.23 is 3 and the hundredth part of 1.2 is 0. So, we see that 1.23 is greater.

f) 0.099 or 0.19

Apply the same principle as given above

Whole number part is the same. The tenth part of 0.099 is 0 and that of 0.19 is 1. So, the tenth part of 0.19 is greater than 0.099. Hence, 0.19 is greater.

g) 1.5 or 1.50

Apply the same principle as given above

Whole number is the same. The tenth part is the same. So, the numbers are equal.

h) 1.431 or 1.490

Apply the same principle as given above

The whole number is the same. The number in the tenth part is also the same. The hundredth part of 1.431 is 3 and that of 1.491 is 9. We see that  $3 < 9$  and hence 1.431 is lesser than 1.490.

Hence, 1.490 is greater.

i) 3.3 or 3.300

Apply the same principle as given above

The whole number part and the tenth part are the same. When there are no digits in the hundredths and the thousandths place of the number, we know that the digits are zero.

So, the numbers are the same.

j) 5.64 or 5.603

Apply the same principle as given above

The whole number and the tenth place digits are the same. As 4 is greater than 0, we know that 5.64 is greater than 5.603.

So, 5.64 is greater.

#### Question 7

Dinesh went from place A to place B and from there to place C. A is 7.5 km from B and B is 12.7 km from C. Ayyub went from place A to place D and there to place C. D is 9.3 km from A and C is 11.8 km from D. Who travelled more and how much?

Solution:

Distance travelled by Dinesh = A to B + B to C = 7.5 km + 12.7 km = 20.2 km

Distance travelled by Ayyub = A to D + D to C = 9.3 km + 11.8 km = 21.1 km

Difference between their travelled distances = 21.1 km – 20.2 km = 0.9 km

Therefore, Ayyub travelled 0.9 km distance more than Dinesh.

#### Question 8

How much less is 28 km than 42.6 km?

Solution:

$42.6 \text{ km} - 28 \text{ km} = 14.6 \text{ km}$

$2 \times 86 \div 100 = 172/100 = 1.72$

# PERCENTAGE

## [CHAPTER – 10]

Question 1:

Find:

(i) 32% of 425

(ii)  $16\frac{2}{3}\%$  of 16

(iii) 6.5% of 400

ANSWER:

We have:

$$(i) 32\% \text{ of } 425 = \left(\frac{32}{100} \times 425\right) = \frac{32 \times 17}{4} = (8 \times 17) = 136$$

$$(ii) 16\frac{2}{3}\% \text{ of } 16 = 50/3\% \text{ of } 16 = (50/(3 \times 100) \times 16) = (1/6 \times 16) = 8/3 = 2\frac{2}{3}$$

$$(iii) 6.5\% \text{ of } 400 = (6.5/100 \times 400) = (65/(10 \times 100) \times 400) = (65 \times 4) = 260/10 = 26$$

Question 2:

Find the number whose 13% is 65.

ANSWER:

Let  $x$  be the required number.

Then, 13% of  $x = 65$

$$\Rightarrow (13/100 \times x) = 65$$

$$\Rightarrow x = (65 \times 100/13) = 500$$

Hence, the required number is 500.

Question 3:

Find the number whose  $6\frac{1}{4}\%$  is 2.

ANSWER:

Let  $x$  be the required number.

Then,  $6\frac{1}{4}\%$  of  $x = 2$

$$\Rightarrow (6\frac{1}{4}\% \times x) = 2$$

$$\Rightarrow (25/400 \times x) = 2$$

$$\Rightarrow x = (2 \times 400/25) = 32$$

Hence, the required number is 32.

Question 4:

What amount is 10% more than Rs 90?

ANSWER:

$$10\% \text{ of Rs } 90 = \text{Rs } (10/100 \times 90) = \text{Rs } 9$$

$$\therefore \text{Amount that is 10\% more than Rs } 90 = \text{Rs } (90 + 9) = \text{Rs } 99$$

Hence, the required amount is Rs 99.

**Question 5:**

What amount is 20% less than Rs 60?

**ANSWER:**

20% of Rs 60 = Rs  $(60 \times 20/100)$  = Rs 12

∴ Amount that is 20% less than Rs 60 = Rs  $(60 - 12)$  = Rs 48

Hence, the required amount is Rs 48.

## **SPEED, DISTANCE AND TIME**

### **[CHAPTER – 11]**

**Question 1:**

Driving  $5/4^{\text{th}}$  of his usual speed, David reached the destination 12 minutes earlier. What is the usual time he takes to travel?

**Solution:**

Let X km/hr be the usual speed and let t hours be the usual time taken.

Speed on this occasion =  $5/4$  X km/hr. The time taken on this occasion =  $(t - 12/60)$  hrs.

Since the distance is the same in both the cases,  $xt = 5/4 \times X (t - 12/60)$

Solution for t,  $t = 1$  hour - the usual time taken.

**Question 2:**

In a cross-country race, a motorist averages a speed of 140 mph during the first 4 hours and then increases his average by 20 mph during the last 3 hours. What was his average speed during the entire race?

**Solution:**

Distance travelled in first 4 hours =  $140 \times 4 = 560$  miles.

Distance travelled in next 3 hours =  $160 \times 3 = 480$  miles.

Therefore, the total distance travelled = 1040 miles.

The total time taken = 7 hours. Therefore, the average speed =  $1040/7 = 148 \frac{4}{7}$  mph.

**Question 3:** During the onward journey from Bombay to Pune, Deccan Queen travels at an average speed of 80 kmph, while on the return journey, the train is able to average a speed of 100 kmph. What is the average speed of the train on its entire journey?

**Solution:** Average speed =  $2ab/(a+b) = (2 \times 80 \times 100)/180 = 800/9 = 88 \frac{8}{9}$  km/hr

**Question 4:** A train traveling at 100 km/hr crosses a bridge of half a km length completely in 30 seconds. What is the length of the train?

**Solution:** Speed = 100 km/hr =  $100 \times \frac{5}{18} = \frac{250}{9}$  m/sec. Time taken to cross = 30 seconds.

Therefore, distance travelled =  $\frac{250}{9} \times 30 = \frac{2500}{3}$  m. Distance = Length of the train + length of the bridge

$\frac{2500}{3} = \text{Length of the train} + 500$  Length of the train =  $\frac{1000}{3}$  m

**Question 5:** A train crosses a signpost in 6 seconds and a car traveling in the same direction at 50 kmph in 72 seconds. What is the length of train and the speed at which it is traveling?

**Solution:** Let X km/hr be the speed of the train. =  $x \times \frac{5}{18}$  m/sec

Time taken to cross a signpost = 6 seconds.

Therefore distance travelled =  $x \times \frac{5}{18} \times 6 = \frac{5X}{3}$  meter = length of the train

**Question 6:** An LSS bus and an ordinary bus leave Pune for Chinchwad - a distance of 32 km simultaneously. The ratio between the average speed of the LSS bus and that of the ordinary bus is 3:2. The LSS bus reaches Chinchwad and immediately leaves back for Pune and meets the ordinary bus at Pimpri. What is the distance between Chinchwad and Pimpri?

**Sol:** Speed of LSS : Speed of ordinary :: 3 : 2.

Since, Distance Speed, Distance travelled by LSS : Distance travelled by ordinary :: 3 : 2

Let distance between Chinchwad and Pimpri be x km.

Then distance travelled by LSS = 32 + x, while the distance travelled by ordinary bus = 32 - x. Therefore,  $32 + x : 32 - x :: 3 : 2$ . Solving for x, we get x = 6.4 km = distance between Pimpri and Chinchwad.

**Question 7:** Traveling at 6 km/hr, I reach my office 20 minutes late. Traveling at 8 km/hr I reach my office 30 minutes early. What is my usual speed and time taken to reach my office?

**Sol:** Let my usual speed be  $S$  km/hr and my usual time be  $t$  hours.

Therefore,

Solving for  $t$ , we get  $t = 3$  hours.

Since the usual time taken = 3 hours, usual distance travelled =  $3S$  kms,  
Equating distance travelled usually, with distance travelled at any of the other two speeds, we get  $6 \times (3 + 20/60) = 3S$ . Therefore,  $S = 6 \frac{2}{3}$  km/hr.

**Question8:** Raju hikes up a hill at 4 mph and comes down at 6 mph. If the total time taken for the total journey is 3.5 hours, what was the distance between the hilltop and the foothills?

**Sol:** Average speed =  $\frac{2ab}{(a+b)} = \frac{(2 \times 6 \times 4)}{10} = 4.8$  mph. Time taken = 3.5 hours both ways. So, the two way distance =  $4.8 \times 3.5$  miles = 16.8 miles. Hence, the distance one-way = 8.4 miles.

## TRIANGLES

### [CHAPTER – 16]

**Question 1:**

Name the types of following triangles:

- (a) Triangle with lengths of sides 7 cm, 8 cm and 9 cm.
- (b)  $\triangle ABC$  with  $AB = 8.7$  cm,  $AC = 7$  cm and  $BC = 6$  cm.
- (c)  $\triangle PQR$  such that  $PQ = QR = PR = 5$  cm.
- (d)  $\triangle DEF$  with  $m\angle D = 90^\circ$
- (e)  $\triangle XYZ$  with  $m\angle Y = 90^\circ$  and  $XY = YZ$ .
- (f)  $\triangle LMN$  with  $m\angle L = 30^\circ$ ,  $m\angle M = 70^\circ$  and  $m\angle N = 80^\circ$

**ANSWER:**

- (a) Scalene triangle
- (b) Scalene triangle
- (c) Equilateral triangle
- (d) Right-angled triangle
- (e) Right-angled isosceles triangle
- (f) Acute-angled triangle

**Question 2:**

**Match the following:**

**Measures of Triangle**

- (i) 3 sides of equal length
- (ii) 2 sides of equal length
- (iii) All sides are of different length
- (iv) 3 acute angles
- (v) 1 right angle
- (vi) 1 obtuse angle
- (vii) 1 right angle with two sides of equal length

**Type of Triangle**

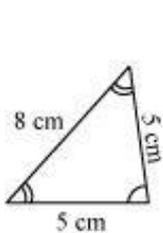
- (a) Scalene
- (b) Isosceles right angled
- (c) Obtuse angled
- (d) Right angled
- (e) Equilateral
- (f) Acute angled
- (g) Isosceles

**ANSWER:**

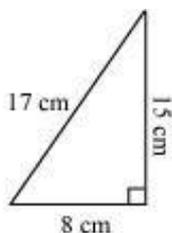
- (i) Equilateral -----(e)
- (ii) Isosceles -----(g)
- (iii) Scalene -----(a)
- (iv) Acute-angled -----(f)
- (v) Right-angled -----(d)
- (vi) Obtuse-angled -----(c)
- (vii) Isosceles right-angled -----(b)

**Question 3:**

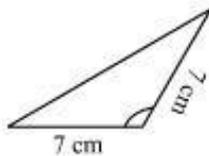
**Name each of the following triangles in two different ways: (you may judge the nature of the angle by observation)**



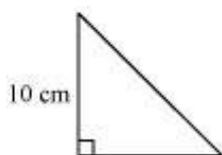
(a)



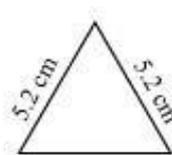
(b)



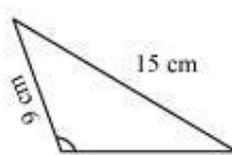
(c)



(d)



(e)



(f)

**ANSWER:**

- (a) Acute-angled and isosceles**
- (b) Right-angled and scalene**
- (c) Obtuse-angled and isosceles**
- (d) Right-angled and isosceles**
- (e) Acute-angled and equilateral**
- (f) Obtuse-angled and scalene**

**Question 4:**

**Say True or False:**

- (a) Each angle of a rectangle is a right angle.**
- (b) The opposite sides of a rectangle are equal in length.**
- (c) The diagonals of a square are perpendicular to one another.**
- (d) All the sides of a rhombus are of equal length.**
- (e) All the sides of a parallelogram are of equal length.**
- (f) The opposite sides of a trapezium are parallel.**

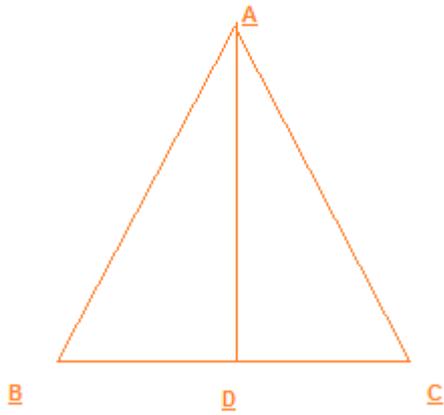
**ANSWER:**

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

**Question 5:**

**Verify by drawing a diagram if the median and altitude of an isosceles triangle can be same.**

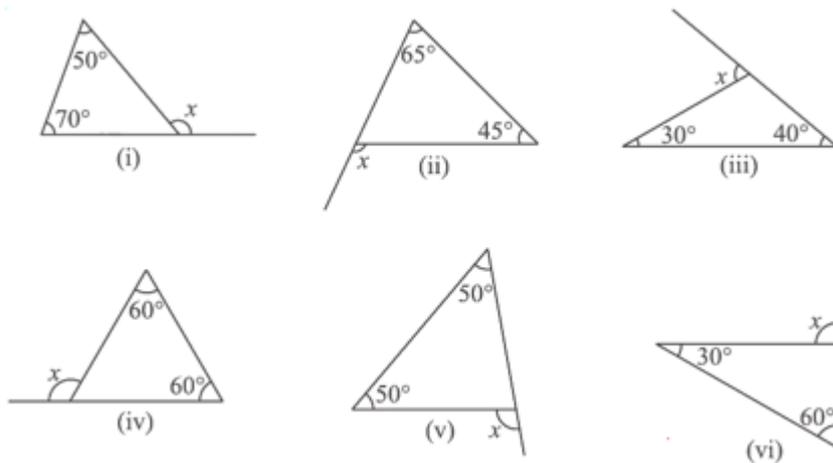
**Solution**



AD is the altitude in the Isosceles triangle and we can see that  $BD=DC$ , So it is also the median of the triangle.

### Question 6

Find the value of the unknown exterior angle in the below figures



### Solution

We know that an exterior angle of a triangle is equal to the sum of its interior opposite angles.

(i)  $x=50+70=120$

(ii)  $x=45+65=110$

(iii)  $x=30+40=70$

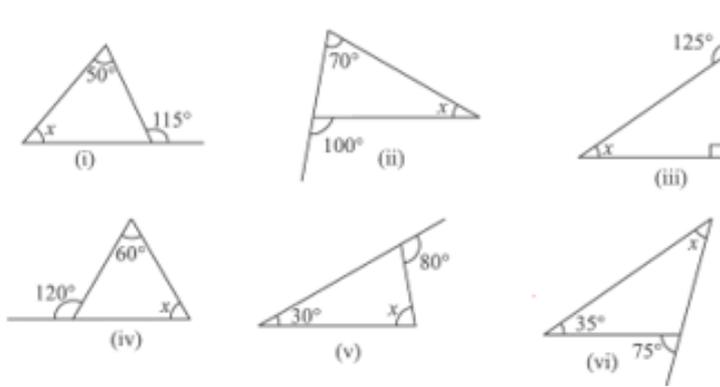
(iv)  $x=60+60=120$

(v)  $x=50+50=100$

(vi)  $x=30+60=90$

### Question 7

Find the value of the unknown interior angle  $x$  in the following figures:



### Solution

(i)  $115 = x + 50$   
 $115 = x + 50$   
 $x = 115 - 50 = 65$

(ii)  $100 + x = 70$   
 $100 + x = 70$   
 $x = 100 - 70 = 30$

(iii)  $x + 90 = 125$   
 $x + 90 = 125$   
 $x = 125 - 90 = 35$

(iv)  $x + 60 = 120$   
 $x + 60 = 120$   
 $x = 120 - 60 = 60$

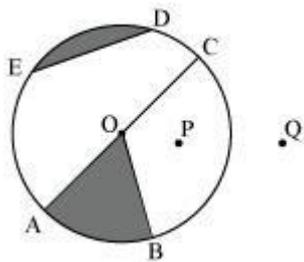
(v)  $x + 30 = 80$   
 $x + 30 = 80$   
 $x = 80 - 30 = 50$

(vi)  $x + 35 = 75$   
 $x + 35 = 75$   
 $x = 75 - 35 = 40$

## CIRCLES [CHAPTER – 18]

### Question 1:

From the figure, identify:



- |                          |                                |
|--------------------------|--------------------------------|
| (a) The centre of circle | (e) Two points in the interior |
| (b) Three radii          | (f) a point in the exterior    |
| (c) a diameter           | (g) a sector                   |
| (d) a chord              | (h) a segment                  |

ANSWER:

- (a) O

(b)  $\overline{OA}, \overline{OB}, \overline{OC}$

(c)  $\overline{AC}$

(d)  $\overline{ED}$

(e) O, P

(f) Q

(g) AOB (shaded region)

(h) DE (shaded region)

Question 2:

(a) Is every diameter of a circle also a chord?

(b) Is every chord of circle also a diameter?

ANSWER:

(a) Yes. The diameter is the longest possible chord of the circle.

(b) No

Question 3:

Draw any circle and mark

(a) Its centre

(e) a segment

(b) a radius

(f) a point in its interior

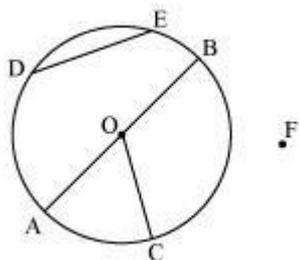
(c) a diameter

(g) a point in its exterior

(d) a sector

(h) an arc

ANSWER:



(a) O

(b)  $\overline{OC}$

(c)  $\overline{AB}$

(d) COA

(e) DE

(f) O

(g) F

(h)  $\widehat{AC}$

Question 4:

Say true or false:

(a) Two diameters of a circle will necessarily intersect.

(b) The centre of a circle is always in its interior.

ANSWER:

(a) True. They will always intersect each other at the centre of the circle.

(b) True

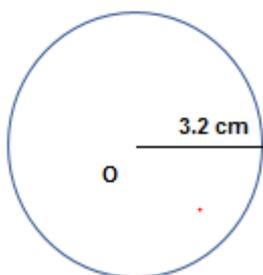
## GEOMETRICAL CONSTRUCTION

### [CHAPTER – 22]

Question 1:

Draw a circle of radius 3.2 cm

Answer:



**Step 1** Open the compasses for the required radius of 3.2 cm.

**Step 2** Mark a point with a sharp pencil where we want the centre of the circle to be. Name it as O.

be. Name it as O.

**Step 3** Place the pointer of the compasses on O.

**Step 4** Turn the compasses slowly to draw the circle.

Question 2:

With the same centre O, draw two circles of radii 4 cm and 2.5 cm.

Answer:

**Step 1** Open the compasses for the required radius of 2.5 cm.

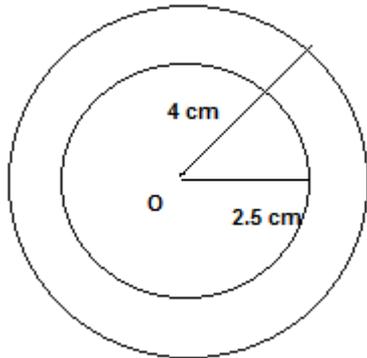
**Step 2** Mark a point with a sharp pencil where we want the centre of the circle to be. Name it as O.

**Step 3** Place the pointer of the compasses on O.

**Step 4** Turn the compasses slowly to draw the circle.

**Step 5.** Now Open the compasses for the required radius of 4 cm.

**Step 6.** Place the pointer of the compasses on O and Turn the compasses slowly to draw the circle

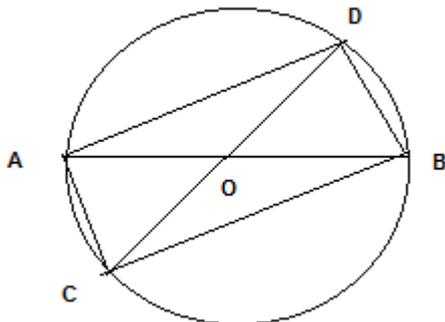


**Question 3:**

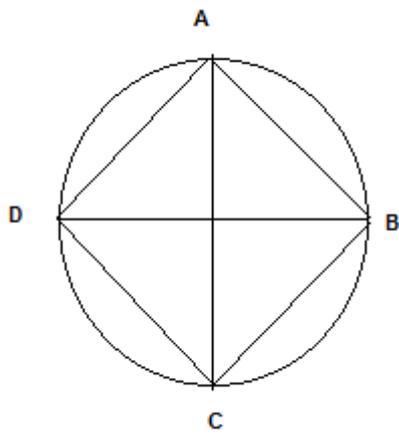
Draw a circle and any two of its diameters. If you join the ends of these diameters, what is the figure obtained? What figure is obtained if the diameters are perpendicular to each other? How do you check your answer?

**Answer:**

(i) By joining the ends of two diameters, we get a rectangle. By measuring, we find  $AD = BC$ ,  $AC = BD$  i.e., pairs of opposite sides are equal and  $\angle A = \angle B = \angle C = \angle D = 90^\circ$  i.e. each angle is of  $90^\circ$ . Hence, it is a rectangle.



(ii) If the diameters are perpendicular to each other, then by joining the ends of two diameters, we get a square. By measuring, we find that  $AB = BC = CD = DA$ , i.e., all four sides are equal. Also,  $\angle A = \angle B = \angle C = \angle D = 90^\circ$ , i.e. each angle is of  $90^\circ$ . Hence, it is a square.



**Question 4:**

Draw any circle and mark points A, B and C such that

- (a) A is on the circle.
- (b) B is in the interior of the circle.
- (c) C is in the exterior of the circle.

**Answer:**

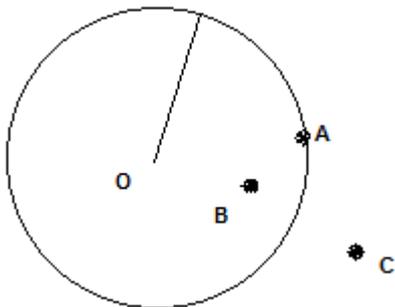
- (1) Point O is marked by using the pencil and then circle's centre is drawn
- (2) Compasses pointer is placed at O after that circle is drawn slowly using the compasses

Now points A, B and C are marked as below.

A is on the circle.

B is in the interior of the circle.

C is in the exterior of the circle.



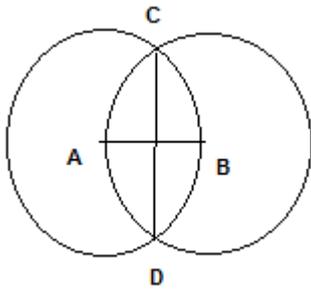
**Question 5:**

Let A, B be the centre of two circles of equal radii; draw them so that each one of them passes through the centre of the other. Let them intersect at C and D. Examine whether AB and CD are at right angles

**Answer:**

Draw two circles of equal radii taking A and B as their centre such that one of them passes through the centre of the other. They intersect at C and D. Join

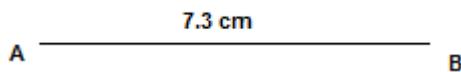
AB and CD. Yes, AB and CD intersect at right angle as  $\angle COB$  is 90.



**Question 6:**

Draw a line segment of length 7.3 cm using a ruler.

**Answer:**



(i) At the point A make place the zero mark of the ruler

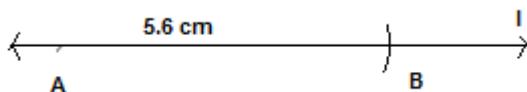
(ii) And pick appoint B at the exact distance of 7.3 cm from the point A

(iii) Now join AB

**Question 7:**

Construct a line segment of length 5.6 cm using ruler and compasses.

**Answer:**



(i) Draw a line l. Mark a point A on a line l.

(ii) Place the compasses pointer on the zero mark of the ruler. Open it to place the pencil point up-to the 5.6 cm mark.

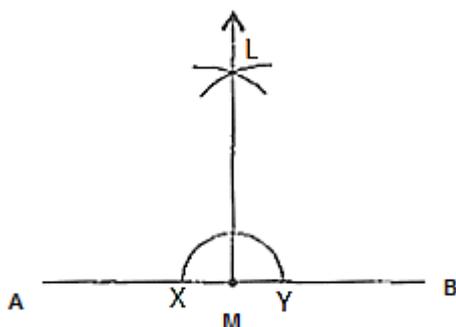
(iii) Now place the pointer of compasses on A and swing an arc to cut l at B.

**Question 8:**

Draw any line segment AB. Mark any point M on it. Through M, draw a perpendicular to AB.

(use ruler and compasses)

**Answer**



(i) Draw the line segment AB

(ii) Make a point M on it

(iii) With M as midpoint and with some radius, an intersecting arc is drawn the

line at 2 points X and Y.

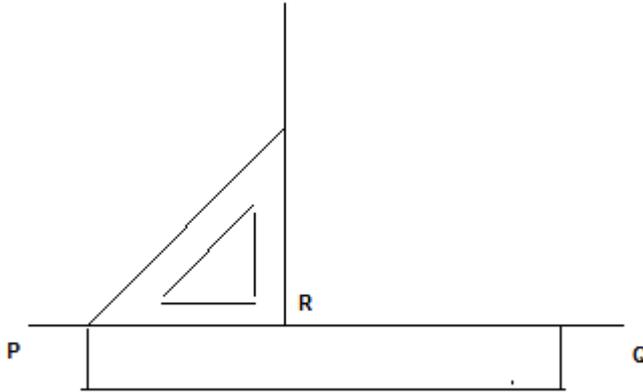
(iv) With X and Y as centers as well as radius more than OX, draw 2 arcs, they cut together at L.

(v) Join LM Then LM is perpendicular to PQ through O point.

**Question 9:**

Draw any line segment PQ. Take any point R not on it. Through R, draw a perpendicular to PQ. (use ruler and set-square)

**Answer:**



(i) A set-square is placed on PQ such that one arm of its right angle aligns along PQ

(ii) A ruler is placed along the edge opposite to the right angle of the set-square.

(iii) Hold the ruler fixed. Set square slide the along the ruler till the point R touches set square's other arm

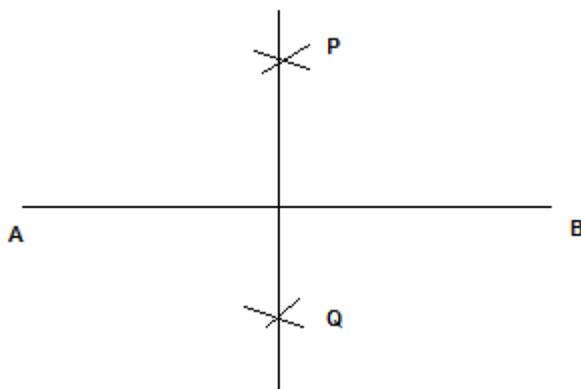
(iv) Hold the set-square firmly in this position. Draw RT along the edge of the set-square.

**Question 10:**

Draw AB of length 7.3 cm and find its axis of symmetry.

**Answer:**

Axis of symmetry of line segment AB will be the perpendicular bisector of AB. So, we need to draw the perpendicular bisector of AB.



(i) Draw a line segment is drawn  $AB = 7.3$  cm

(ii) With A and B as centers and radius more than half of AB, construct 2 arcs which intersect each other at P and Q.

(iii) Join PQ. Then PQ is the symmetry axis of the segment line AB.

# PERIMETER AND AREA

## [CHAPTER – 23]

### Question 1

The lid of a rectangular box of sides 40 cm by 10 cm is sealed all round with tape. What is the length of the tape required?

### Answer

As the lid of the box is sealed around with a tape, we need to find the perimeter of the rectangular box.

Length of the rectangular box = 40 cm

Width of the box = 10 cm

We know that Perimeter of a rectangle is given by

= 2 (length + width)

So, length of tape required = perimeter of the rectangular box =  $2(40 + 10) = 100\text{cm}$ .

### Question 2

A table-top measures 2 m 25 cm by 1 m 50 cm. What is the perimeter of the table-top?

### Answer

The important thing in this question is the Unit conversion. We need to either convert m into cm or cm into m. It is good to convert into lowest unit to make it easier

Length of the table-top = 2 m 25 cm = 2 m + 0.25 m = 2.25 m

Width of the table-top = 1 m 50 cm = 1 m + 0.50 m = 1.50 m

We know that Perimeter of a rectangle is given by

= 2 (length + width)

Perimeter =  $2(\text{length} + \text{width}) = 2(2.25 + 1.50) = 2(3.75) = 7.50\text{m}$

### Question 3

What is the length of the wooden strip required to frame a photograph of length and breadth 32 cm and 21 cm respectively?

### Answer

A frame is put around the photograph and hence to find the length of the wooden strip to frame we find the perimeter of the photograph.

Length of the photograph = 32 cm

Width of the photograph = 21 cm

We know that Perimeter of a rectangle is given by

= 2 (length + width)

Perimeter =  $2(\text{length} + \text{width}) = 2(32 + 21) = 2(53) = 106\text{cm}$

### Question 4

A rectangular piece of land measures 0.7 km by 0.5 km. Each side is to be fenced with 4 rows of wires. What is the length of the wire needed?

**Answer**

**Length of the rectangular piece of land = 0.7 km**

**Width of the land = 0.5 km**

**The rectangular piece of land is to be fenced all around with wire. Hence, perimeter of the rectangular land = length of the wire.**

**We know that Perimeter of a rectangle is given by**

**= 2 (length + width)**

**Perimeter = 2(length + width) = 2(0.7+0.5)=2(1.2)= 2.4 km**

**Each side is to be fenced with 4 rows of wires. So total length of the wire needed is 4 times the perimeter.**

**Total length of wire needed = 4(2.4) = 9.6 km**

**Question 5**

**Find the perimeter of each of the following shapes:**

**(a) A triangle of sides 3 cm, 4 cm and 5 cm.**

**(b) An equilateral triangle of side 9 cm.**

**(c) An isosceles triangle with equal sides 8 cm each and third side 6 cm.**

**Answer**

**a) Perimeter = (3+4+5)=12cm**

**b) An equilateral triangle is a triangle whose sides are equal.**

**Given, side of an equilateral triangle = 9 cm**

**Perimeter = 9 cm + 9 cm + 9 cm OR  $3 \times 9 = 27$  cm**

**c) An isosceles triangle is a triangle with two equal sides.**

**Given, equal sides = 8 cm and third side = 6 cm**

**Perimeter = 8 cm + 8 cm + 6 cm OR  $(2 \times 8) + 6$  cm = 22 cm**

**Question 6**

**Find the perimeter of a triangle with sides measuring 10 cm, 14 cm and 15 cm.**

**Answer**

**Perimeter of a triangle = 10cm+14cm+15cm=39cm**

**Question 7**

**Find the side of the square whose perimeter is 20 m.**

**Answer**

**Perimeter of a square is given by = 4 × side of a square**

**Given Perimeter = 20 m**

**So, 20 m = 4 × side**

**side of the square =  $20 / 4 = 5$  m**

**Question 8**

**A piece of string is 30 cm long. What will be the length of each side if the string is used to form:**

**(a) a square?**

**(b) an equilateral triangle?**

**Answer**

**The string length is the perimeter of the shape in the three options**

<b>a)</b>	<b>Square has all the side equal Perimeter= 4(side of square)</b>	<b>Perimeter=30 cm Side =30/4=7.5 cm</b>
<b>b)</b>	<b>equilateral triangle has three equal sides Perimeter =3(side)</b>	<b>Perimeter=30 cm Side =30/3=10 cm</b>

### Question 9

Find the areas of the rectangles whose sides are:

(a) 3 cm and 4 cm

(b) 12 m and 21 m

(c) 2 km and 3 km

(d) 2 m and 70 cm

**Answer**

Area of the rectangles is given by =  $L \times B$

a)	3cm, 4cm	12 cm <sup>2</sup>
b)	12cm, 21cm	252 cm <sup>2</sup>
c)	2km, 3km	6 km <sup>2</sup>
d)	2m, 70cm (.7 m)	1.4 m <sup>2</sup>

### Question 10

Find the areas of the squares whose sides are:

(a) 10 cm

(b) 14 cm

(c) 5 m

**Answer**

Area of the square is given by =  $(\text{side})^2$

a)	10 cm	100cm <sup>2</sup>
b)	14 cm	196 cm <sup>2</sup>
c)	5 cm	25 m <sup>2</sup>

### Question 11

What is the cost of tiling a rectangular plot of land 500 m long and 200 m wide at the rate of Rs 8 per hundred sq. m?

**Answer**

To tile a rectangular plot, we need to find the area of the plot.

Given length of the plot = 500 m

Width of the plot = 200 m

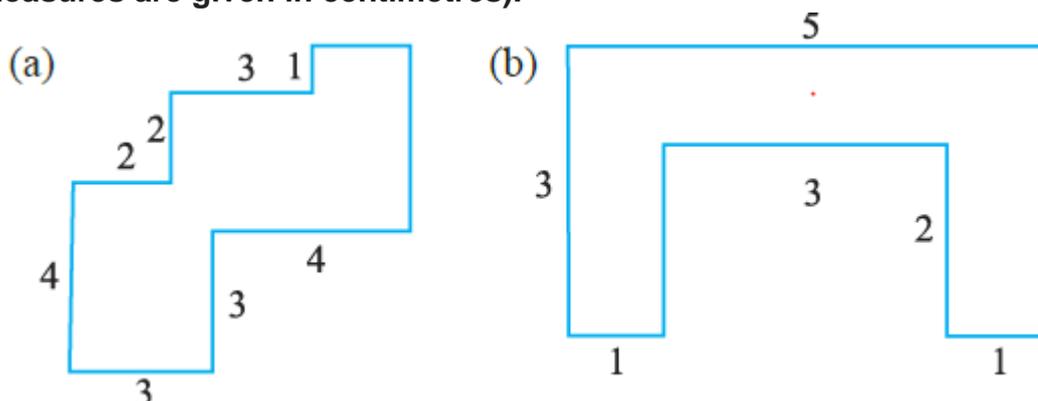
So, area of the plot =  $500 \times 200 = 1,00,000$  sq. m

The cost of tiling 100 sq. m = Rs 8.

So, the cost of tiling 1,00,000 sq. m is  $(8 \times 1,00,000)/100 = \text{Rs. } 8,000$

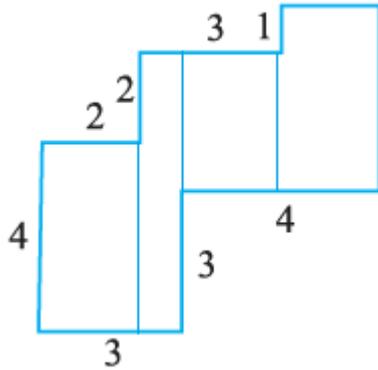
### Question 12

By splitting the following figures into rectangles, find their areas (The measures are given in centimetres).



## Answer

(a) The given figure can be divided into four rectangles



Area of first rectangle =  $4 \times 2 = 8\text{cm}^2$

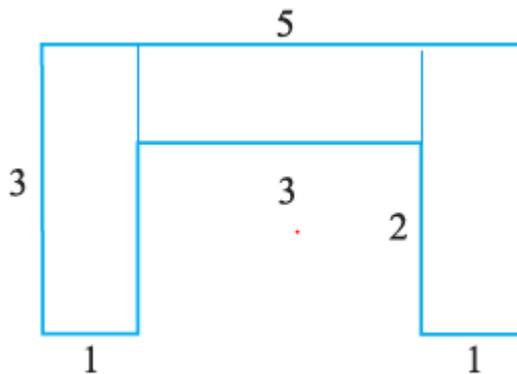
Area of second rectangles =  $6 \times 1 = 6\text{cm}^2$

Area of Third rectangles =  $3 \times 2 = 6\text{cm}^2$

Area of four rectangles =  $4 \times 2 = 8\text{cm}^2$

Total area =  $28\text{cm}^2$

(b) The given figure can be divided into three rectangles



Area of first rectangle =  $3 \times 1 = 3\text{cm}^2$

Area of second rectangles =  $3 \times 1 = 3\text{cm}^2$

Area of Third rectangles =  $3 \times 1 = 3\text{cm}^2$

Total area =  $9\text{cm}^2$

## DATA HANDLING

### [CHAPTER – 24]

#### Question 1

In a Mathematics test, the following marks were obtained by 40 students.

Arrange these marks in a table using tally marks.

8 1 3 7 6 5 5 4 4 2

4 9 5 3 7 1 6 5 2 7

7 3 8 4 2 8 9 5 8 6

7 4 5 6 9 6 4 4 6 6

(a) Find how many students obtained marks equal to or more than 7.

(b) How many students obtained marks below 4?

**Answer**

we can construct the table as follows.

Mark	Tally mark	Number of Students
1		2
2		3
3		3
4		7
5		6
6		7
7		5
8		4
9		3

(a) The students who obtained their marks equal to or more than 7 are the students who obtained their marks as either of 7, 8, and 9. Hence, number of these students =  $5 + 4 + 3 = 12$

(b) The students who obtained their marks below 4 are the students who obtained their marks as either of 1, 2, and 3. Hence, number of these students =  $2 + 3 + 3 = 8$

**Question 2**

Total number of students of a school in different years is shown in the following table

Years	Number of students
1996	400
1998	535
2000	472
2002	600
2004	623

A. Prepare a pictograph of students using one symbol to represent 100 students and

answer the following questions:

(a) How many symbols represent total number of students in the year 2002?

(b) How many symbols represent total number of students for the year 1998?

B. Prepare another pictograph of students using any other symbol each representing 50

students. Which pictograph do you find more informative?

**Answer**

A)

Years	Number of students
1996	
1998	
2000	
2002	
2004	

- (a) 6 symbols represent the total number of students in the year 2002.
- (b) 5 complete and 1 incomplete symbols represent the total number of students in the year 1998.

**B)**

Years	Number of students
1996	♥♥♥♥♥♥♥♥
1998	♥♥♥♥♥♥♥♥♥♥♥♥
2000	♥♥♥♥♥♥♥♥♥♥♥
2002	♥♥♥♥♥♥♥♥♥♥♥♥♥♥
2004	♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥

Second one is more informative.