SET - A

Eng. Medium 9th CBSE Batch :	**MAHESH TUTORIALS** **SUBJECT : Maths** **Group - 1** **Chapter # 1, 2, 3, 4, 5, 6, 7, 11, 12, 15** **Model Answer Paper**	**Test -** Date: Time: 3 Hrs Marks : 100

CHAPTER : 1

Q : 1 Solve the following sums : [1 Mark] 01

1. $4\frac{1}{8} = \frac{33}{8}$

$= \frac{33 \times 125}{8 \times 125}$ ½

$= \frac{4125}{1000}$

$=$ **4.125, terminating decimal** ½

Q : 2 Solve the following sums : [2 Marks Each] 06

2. Since we require 6 rational numbers between 3 and 4, So we write ½

$\frac{3}{1} = \frac{3}{1} \times \frac{7}{7} = \frac{21}{7}$ and $\frac{4}{1} = \frac{4}{1} \times \frac{7}{7} = \frac{28}{7}$

Also 21 < 22 < 23 < 24 < 25 < 26 < 27 < 28 ½

$\frac{21}{7} < \frac{22}{7} < \frac{23}{7} < \frac{24}{7} < \frac{25}{7} < \frac{26}{7} < \frac{27}{7} < \frac{28}{7}$ ½

Hence six rational numbers between 3 and 4 are $\mathbf{\frac{22}{7}, \frac{23}{7}, \frac{24}{7}, \frac{25}{7}, \frac{26}{7}}$ **and** $\mathbf{\frac{27}{7}}$ ½

3. $\left(\sqrt{5}\right)^2 = 2^2 + 1^2$ ½

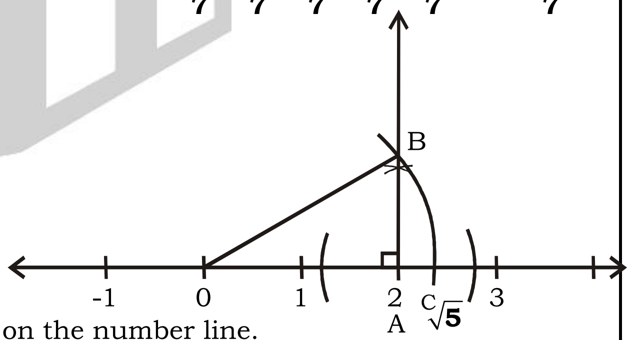
We construct right angled ΔOAB,

right angled at A such that ½

OA = 2 and AB = 1 unit.

∴ By Pythagoras Theorem,

OB = $\sqrt{OA^2 + AB^2} = \sqrt{2^2 + 1^2} = \sqrt{5}$ ½



Now, cut off a length OC = OB = $\sqrt{5}$ on the number line.

∴ Point C represents the irrational number $\sqrt{5}$. ½

4. Let $x = 0.4\overline{7} = 0.477....$

Multiplying both sides by 10, we get

$10x = 4.777....$ ------------- (1) ½

Multiplying both sides by 100, we get

$100x = 47.777....$ ------------- (2)

Subtracting (1) from (2), we get

$100x - 10x = (47.777...) - (4.777....)$

$90x = 43$

$\therefore x = \frac{43}{90}$

$\therefore \mathbf{0.4\overline{7}} = \mathbf{\frac{43}{90}}$ ½

Shortcut method : Let $x = 0.4\overline{7}$
Multiplying both sides by 10, we get

$$10x = 4.\overline{7}$$

$$= 4 + \frac{7}{9}$$ ½

$$10x = \frac{36+7}{9}$$

$$x = \frac{43}{90}$$

$\therefore$ $\mathbf{0.4\overline{7}} = \mathbf{\frac{43}{90}}$ ½

Q : 3 Solve the following sums : [3 Mark] **03**

5. $\frac{\sqrt{7}-1}{\sqrt{7}+1} - \frac{\sqrt{7}+1}{\sqrt{7}-1} = \frac{\left(\sqrt{7}-1\right)^2 - \left(\sqrt{7}+1\right)^2}{\left(\sqrt{7}+1\right)\left(\sqrt{7}-1\right)}$ ½

$$= \frac{\left(\sqrt{7}\right)^2 - 2\left(\sqrt{7}\right)(1) + (1)^2 - \left[\left(\sqrt{7}\right)^2 + 2\left(\sqrt{7}\right)(1) + (1)^2\right]}{\left(\sqrt{7}\right)^2 - (1)^2}$$ ½

$$= \frac{7 - 2\sqrt{7} + 1 - 7 - 2\sqrt{7} - 1}{7-1}$$ ½

$$= \frac{-4\sqrt{7}}{6}$$

$$= \frac{-2}{3}\sqrt{7}$$ ½

It is given that $\frac{\sqrt{7}-1}{\sqrt{7}+1} - \frac{\sqrt{7}+1}{\sqrt{7}-1} = a + b\sqrt{7}$

½

$\therefore$ $\frac{-2}{3}\sqrt{7} = a + b\sqrt{7}$

$\therefore$ $a = 0$ and $b = \mathbf{\frac{-2}{3}}$ ½

CHAPTER : 2

Q : 1 Solve the following sums : [1 Marks Each] **02**

1. The highest power term is $5x^3$ and the exponent is 3. So, the degree is 3. 1

2. Let $p(x) = 5x - 4x^2 + 3$

At $x = 2$, $p(2) = 5(2) - 4(2)^2 + 3$ ½

$= 10 - 16 + 3$

$= -3$ ½

Q : 2 Solve the following sums : [2 Marks Each] **08**

3. $p(x) = x^3 - ax^2 + 6x - a$

Divisor $= x - a$ ½

$\therefore$ By Remainder theorem,

$p(a) = (a)^3 - a(a)^2 + 6(a) - a$ ½

$= a^3 - a^3 + 6a - a$ ½

$= 5a$ ½

4. Let $p(x) = x^3 - 3x^2 - 9x - 5$

The constant term is – 5.

$\therefore$ The possible factors are ± 1, ± 5 ½

Now, $p(-1) = (-1)^3 - 3(-1)^2 - 9(-1) - 5$

$= -1 - 3 + 9 - 5$

$= 0$

$\therefore$ $(x + 1)$ is a factor of $p(x)$.

To obtain the second factor, divide $p(x)$ by $x + 1$ ½

$$\begin{array}{r|l} & x^2 - 4x - 5 \\ x+1 & x^3 - 3x^2 - 9x - 5 \\ & x^3 + x^2 \\ & - \quad - \\ \hline & -4x^2 - 9x \\ & -4x^2 - 4x \\ & + \quad + \\ \hline & -5x - 5 \\ & -5x - 5 \\ & + \quad + \\ \hline & 0 \end{array}$$

½

$\therefore$ Second factor $= x^2 - 4x - 5$

$= x^2 + x - 5x - 5$

$= x(x + 1) - 5(x + 1)$

$= (x + 1)(x - 5)$

$\therefore$ $p(x) = (x + 1)(x + 1)(x - 5)$, ½

$x^3 - 9x^2 - 9x - 5 = (x + 1)(x + 1)(x - 5)$

5. $(-2x + 5y - 3z)^2 = [(-2x) + 5y + (-3z)]^2$ ½

$= (-2x)^2 + (5y)^2 + (-3z)^2 + 2(-2x)(5y) + 2(5y)(-3z) + 2(-3z)(-2x)$ ½

$= 4x^2 + 25y^2 + 9z^2 - 20xy - 30yz + 12zx$ 1

6. $(28)^3 + (-15)^3 + (-13)^3$

Let $x = 28$, $y = -15$, $z = -13$ ½

$\therefore x + y + z = 28 - 15 - 13 = 0$ ½

$\therefore x^3 + y^3 + z^3 = 3xyz$

$(28)^3 + (-15)^3 + (-13)^3 = 3(28)(-15)(-13)$ ½

$= 16380$ ½

CHAPTER : 3

Q : 1 Solve the following sums : [1 Marks Each] **02**

1. II quadrant or IV quadrant 1

2. I quadrant — (1, 1), (4, 3) ½
II quadrant — (– 2, 3), (– 1, 1) ½

Q : 2 Solve the following sums : [2 Marks Each] **04**

3. (i) False, because if ordinate of a point is zero, the point lies on the X-axis. 1
(ii) False, If the point lies on Y-axis at a distance of 2 units from X-axis then its co-ordinates will be (0, – 2) or (0, 2). 1

4. Since a point lies on the X-axis at a distance of 7 units from the Y-axis. ½
So, its abscissa = 7 or – 7 and ordinate = 0 ½
Hence, the co-ordinates of point is (7, 0) or (– 7, 0). ½
Similarly, if the point lies on Y-axis at a distance of 7 units from X-axis in negative direction then its co-ordinate is (0, 7). ½

Q : 3 Solve the following sums : [4 Mark] **04**

5. Clearly, from the figure :
(i) The coordinates of B are (–5, 2). ½
(ii) The coordinates of C are (5, –5). ½
(iii) The coordinates (–3, –5) are identified by the point E. ½
(iv) The coordinates (–2, –4) are identified by the point G. ½
(v) The abscissa of the point D is 6. ½
(vi) The ordinate of the point H is – 3. ½
(vii) The coordinates of the point L are (0, 5). ½
(viii) The coordinates of the point M are (–3, 0). ½

CHAPTER : 4

Q : 1 Solve the following sums : [1 Mark] **01**

1. $x = 3y$ can be written as $x - 3y + 0 = 0$. ½
On comparing it with $ax + by + c = 0$, we have
$a = 1$, $b = -3$ and $c = 0$. ½

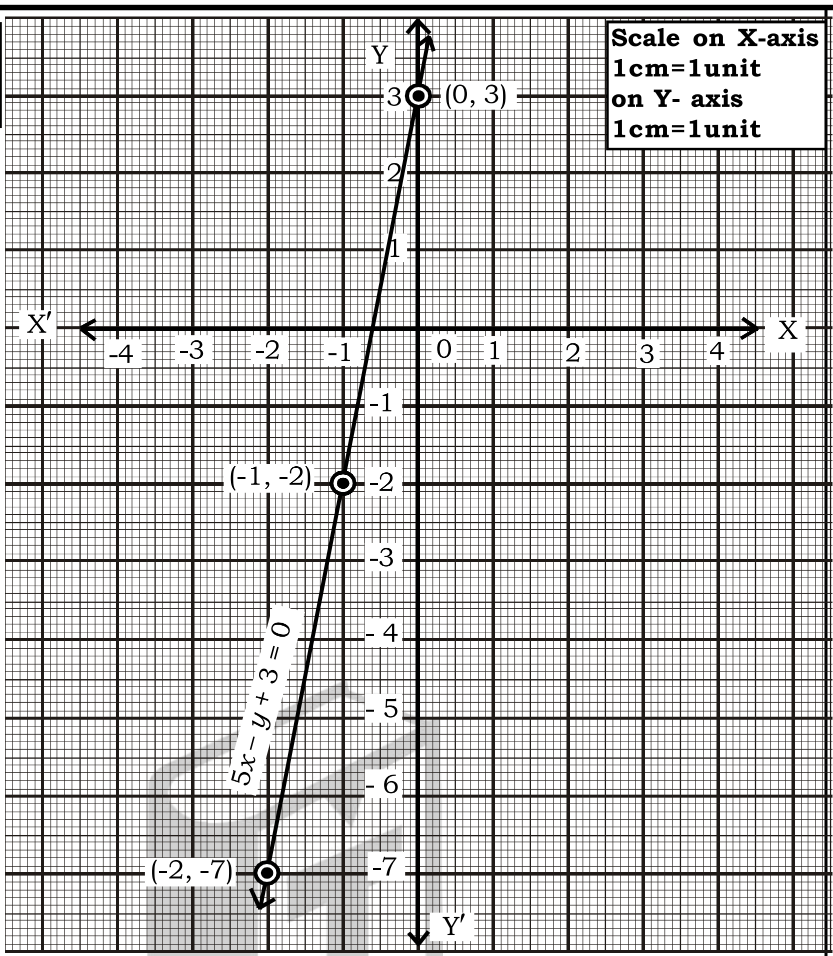
Q : 2 Solve the following sums : [2 Mark] **02**

2. The given equation can be written as $y = 7 - 2x$. ½
For $x = 0$, $y = 7 - 2 \times 0 = 7 - 0 = 7$
For $x = 1$, $y = 7 - 2 \times 1 = 7 - 2 = 5$ ½
For $x = 2$, $y = 7 - 2 \times 2 = 7 - 4 = 3$
For $x = 3$, $y = 7 - 2 \times 3 = 7 - 6 = 1$ ½
$\therefore$ The four solutions of the given equation are (0, 7), (1, 5), (2, 3) and (3, 1). ½

Q : 3 Solve the following sums : [3 Mark] **03**

3. Taxi fare for first km = Rs. 8
Taxi fare for the subsequent km = Rs. 5 ½
Total fare = Rs. y
Total distance = x km
The linear equation for the above information is given by :
$y = 8 \times 1 + 5(x - 1)$
$\therefore \quad y = 8 + 5x - 5$ ½
$\therefore \quad y = 5x + 3$
$\Rightarrow \quad 5x - y + 3 = 0$
When $x = 0$, $y = 5 \times 0 + 3 = 0 + 3 = 3$
When $x = -1$, $y = 5 \times (-1) + 3 = -5 + 3 = -2$
When $x = -2$, $y = 5 \times (-2) + 3 = -10 + 3 = -7$ ½
Thus, we have the following table :

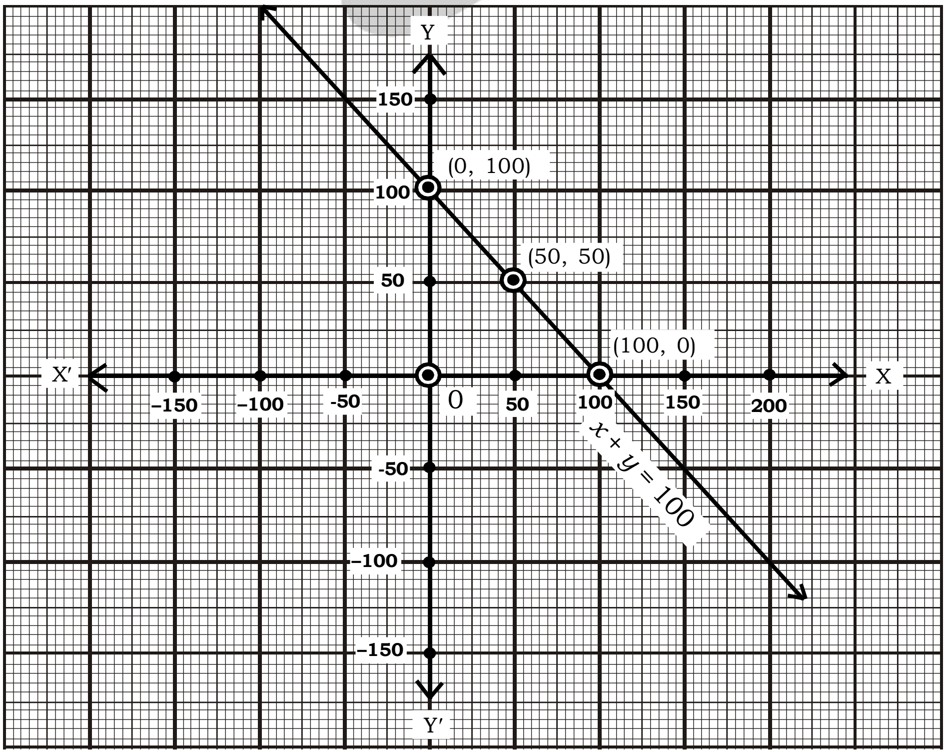
x	0	− 1	− 2
y	3	− 2	− 7



1 ½

Plotting the points (0, 3), (− 1, − 2) and (−2, −7) on the graph paper and drawing a line joining them, we obtain the required graph.

Q : 45. **Solve the following sums : [4 Mark]** **04**



2

Let Yamini and Fatima contributed Rs. x and Rs. y towards the P.M.'s Relief Fund totally Rs. 100. ½

∴ The linear equation using the above data is $x + y = 100$. i.e., $y = 100 - x$.

To draw its graph : ½

When $x = 0$, we have $y = 100 - 0 = 100$

When $x = 100$, we have $y = 100 - 100 = 0$

When $x = 50$, we have $y = 100 - 50 = 50$

The table for these values is as under : ½

x	0	100	50
y	100	0	50

Plotting the points (0, 100), (100, 0) and (50, 50) on the graph paper and drawing a line joining them, we obtain the graph of the line $x + y = 100$ as shown. ½

CHAPTER : 5

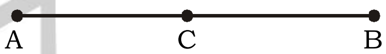
Q : 1 Solve the following sums : [1 Mark] **01**

1. Things Which are equal to the same thing are equal to one another. 1

Q : 2 Solve the following sums : [2 Marks Each] **06**

2. We have a point C lying between two points A and B such that AC = BC. ½

Adding AC on both sides, we have



$$AC + AC = AC + BC$$ ½

$$\therefore \quad 2AC = AB$$ ½

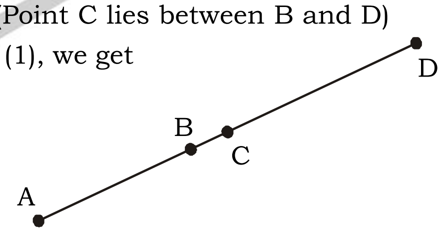
$$\therefore \quad AC = \frac{1}{2}AB. \qquad [\because AC + CB \text{ coincides with } AB]$$ ½

3. AC = BD .... (1) (Given)

Also AC = AB + BC .... (2) (Point B lies between A and C) ½

and, BD = BC + CD .... (3) (Point C lies between B and D) ½

Substituting for AC and BD from (2) and (3) in (1), we get



$$AB + BC = BC + CD$$ ½

$$\therefore \quad AB + BC - BC = BC + CD - BC$$

$$\therefore \quad AB = CD.$$ ½

4. x = z ...(i) [Given]

y = y ...(ii) ½

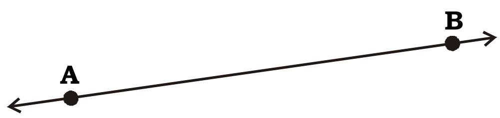
If equals are added to equals, the wholes are equal. ½

x + y = z + y ...(iii) [From (i) and (ii)]

But x + y =10 [Given] ½

10 = z + y [Things which are equal to the same thing are equal to one another] ½

Q : 2 Solve the following sums : [3 Mark] **03**



5. (i) Only One 1

(ii) Only One 1

(iii) None ½

Because, the Euclid's Postulate 2 states that:

Given two distinct points, there is a unique line that passes through them. ½

CHAPTER : 6

Q : 1 Solve the following sums : [1 Marks] **01**

1. $\angle BCD + \angle ACD = 180$ (Linear Pair)

$(2x + 4) + (x - 1) = 180$ ½

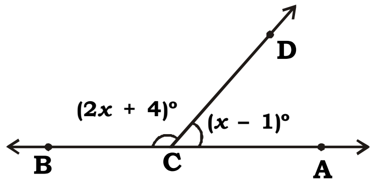
$2x + 4 + x - 1 = 180$

$3x + 3 = 180$

$3x = 180 - 3$

$x = \frac{177}{3}$

$x = 59$ ½



Q : 2 Solve the following sums : [2 Mark] 02

2. Since the sum all angles round a point is equal to 360°

$\therefore$ $(\angle BOC + \angle COA) + (\angle BOD + \angle AOD) = 360°$ ½

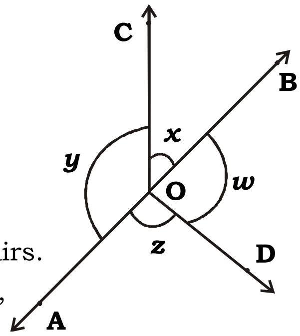
$\therefore$ $(x + y) + (w + z) = 360$

But $x + y = w + z$ [Given] ½

$\therefore$ $x + y = w + z = \frac{360}{2} = 180$ ½

Thus, ∠BOC and ∠COA, ∠BOD and ∠AOD form linear pairs. ½

Consequently OA and OB are two opposite rays. Therefore, AOB is a straight line.



Q : 3 Solve the following sums : [3 Mark] 03

3. Since CD || EF and transversal PQ intersects them at S and T respectively. ½

$\therefore$ $\angle CST = \angle STF$ [Alternate angles]

$\therefore$ $180 - y = z$ [$\because$ $\angle y + \angle CST = 180$ being linear pair]

$\therefore$ $y + z = 180$ ½

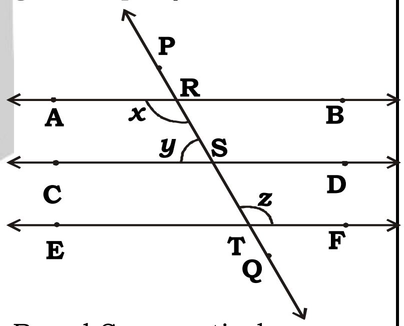
Given $y : z = 3 : 7$.

So, the sum of ratios $= 3 + 7 = 10$

$\therefore$ $y = \frac{3}{10} \times 180 = 3 \times 18 = 54$ ½

and, $z = \frac{7}{10} \times 180$

$= 7 \times 18 = 126$ ½



Since AB || CD and transversal PQ intersects them at R and S respectively.

$\therefore$ $\angle ARS + \angle RSC = 180°$ [Interior angles are supplementary] ½

$\therefore$ $x + y = 180$

$\therefore$ $x = 180 - y = 180 - 54 = 126$ ½

Hence, $x = 126$

Q : 4 Solve the following sums : [4 Mark] 04

4. Consider ΔXYZ,

$\angle YXZ + \angle XYZ + \angle XZY = 180°$ [Angle sum property of a triangle] ½

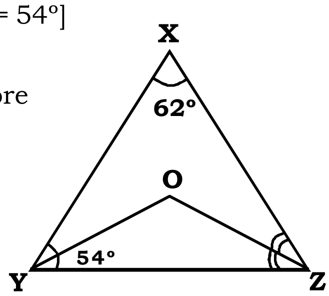
$\therefore$ $62° + 54° + \angle XZY = 180°$ [$\because$ $\angle YXZ = 62°$, $\angle XYZ = 54°$]

$\therefore$ $\angle XZY = 180° - 62° - 54° = 64°$

Since YO and ZO are bisectors of ∠XYZ and ∠XZY. Therefore ½

$\angle OYZ = \frac{1}{2} \times \angle XYZ = \frac{1}{2} \times 54° = 27°$ ½

and $\angle OZY = \frac{1}{2} \times \angle XZY = \frac{1}{2} \times 64° = 32°$ ½



In ΔOYZ, we have ½

$\angle YOZ + \angle OYZ + \angle OZY = 180°$ [Angle sum property] ½

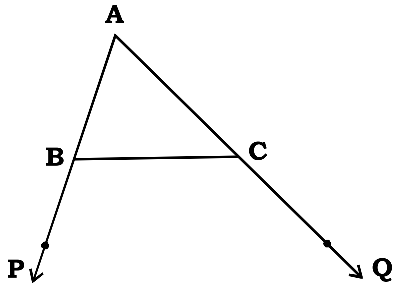
$\therefore$ $\angle YOZ + 27° + 32° = 180°$

∴ $\angle YOZ = 180° - 27° - 32° = 121°$ ½

Hence, $\angle OZY = 32°$ and $\angle YOZ = 121°$ ½

CHAPTER : 7

Q : 1 Solve the following sums : [1 Mark] **01**



1. Since $\angle PBC < \angle QCB$ ½

$-\angle PBC > -\angle QCB$

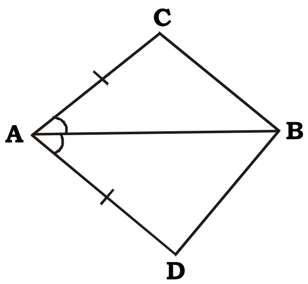
$180° - \angle PBC > 180° - \angle QCB$

$\angle ABC > \angle ACB$

$AC > AB$ ½

(∵ side opposite to greater angle is larger)

Q : 2 Solve the following sums : [2 Mark] **02**



2. Now, in Δs ABC and ABD, we have

$AC = AD$ (given) ½

$\angle CAB = \angle DAB$ (∵ AB bisects ∠A) ½

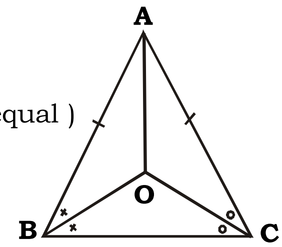
and $AB = AB$ (common)

∴ By SAS congruence criterion, we have ½

$\Delta ABC \cong \Delta ABD$

∴ $BC = BD$ (CPCT) ½

Q : 3 Solve the following sums : [3 Mark] **03**



3. (i) In ΔABC, we have AB = AC

$\angle B = \angle C$ ½

(∵ Angles opposite to equal sides are equal)

$\frac{1}{2}\angle B = \frac{1}{2}\angle C$

$\angle OBC = \angle OCB$ .... (i) ½

(∵ OB and OC bisect ∠B and ∠C respectively ∴ $\angle OBC = \frac{1}{2}\angle B$ and $\angle OCB = \frac{1}{2}\angle C$)

$OB = OC$ (sides opp to equal ∠s are equal) ..(ii)

(ii) Now, in Δs ABO and ACO, we have ½

$AB = AC$ (given)

$AO = AO$ (common side) ½

$OB = OC$ [from (ii)]

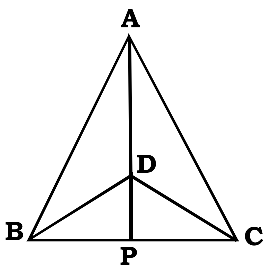
By SSS criterion of congruence, we have ½

$\Delta ABO \cong \Delta ACO$

∴ $\angle BAO = \angle CAO$ (CPCT)

∴ AO bisects ∠BAC ½

Q : 4 Solve the following sums : [4 Mark] **04**



4. (i) In ΔABD and ΔACD, we have

$AB = AC$ (given)

$BD = DC$ (given) ½

and $AD = AD$ (common side)

∴ By SSS criterion of congruence, we have

$\Delta ABD \cong \Delta ACD$, $\angle BAD = \angle CAD$ (CPCT)

(ii) In ΔABP and ΔACP, we have

∴ $\angle BAP = \angle CAP$ [∵∠BAP = ∠BAD and ∠CAP = ∠CAD] .. (i)

$AB = AC$ [given]

$AP = AP$ (common) ½

∴ By SAS criterion of congruence, we have

$\Delta ABP \cong \Delta ACP$, BP = CP ..(ii) (CPCT) ½

∴ $\angle APB = \angle APC$ (from (iii))

(iii) Since $\Delta ABD \cong \Delta ACD$.

$\angle BAD = \angle CAP$ (CPCT)

AD bisects $\angle A$

AP bisects $\angle A$ ... (iv)

In ΔBDP and ΔCDP, we have

BD = CD (given)

BP = CP (from (ii))

and, DP = DP (common side) ½

∴ By SSS criterion of congruence, we have

$\Delta BDP \cong \Delta CDP$

∴ $\angle BDP = \angle CDP$ (CPCT)

i.e. DP bisects $\angle D$

∴ AP bisects $\angle D$ ... (ii)

combining (1) and (2), we get

AP bisects $\angle A$ as well as $\angle D$.

(iv) Since AP stands on BC

$\angle APB + \angle APC = 180^\circ$ (linear pair) ½

$\angle APB = \angle APC$ (from (iii))

$$\angle APB = \angle APC = \frac{180^\circ}{2} = 90^\circ$$

BP = PC (from (ii))

∴ AP is perpendicular bisector of BC. ½

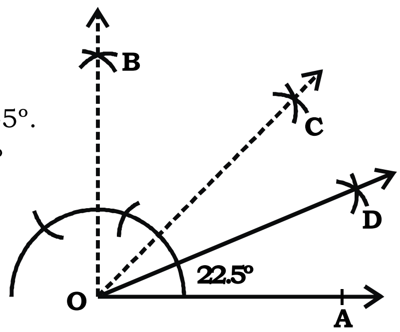
CHAPTER : 11

Q : 1 Solve the following sums : [2 Mark] **02**

1. Steps of Construction :

1. Draw an $\angle AOB = 90^\circ$. ½
2. Draw the bisector OC of $\angle AOB$, then $\angle AOC = 45^\circ$. ½
3. Bisect $\angle AOC$, such that $\angle AOD = \angle COD = 22.5^\circ$

   Thus, $\angle AOD = 22.5^\circ$. 1



Q : 2 Solve the following sums : [4 Mark] **08**

2. Given : Base BC = 8 cm, one base angle, $\angle B = 45^\circ$ and difference of two sides, AB – AC = 3.5cm. ½

Required : To construct ΔABC.

Steps of Construction :

1. Draw a ray BX and cut off a line segment BC = 8 cm from it.
2. Cut $\angle YBC = 45^\circ$.
3. Cut off a line segment BD = 3.5 cm (∵ AB – AC = 3.5cm) from BY. ½
4. Join CD.
5. Draw perpendicular bisector PQ of CD intersecting BY at a point A.
6. Join AC.

   Then, ABC is the required triangle. ½

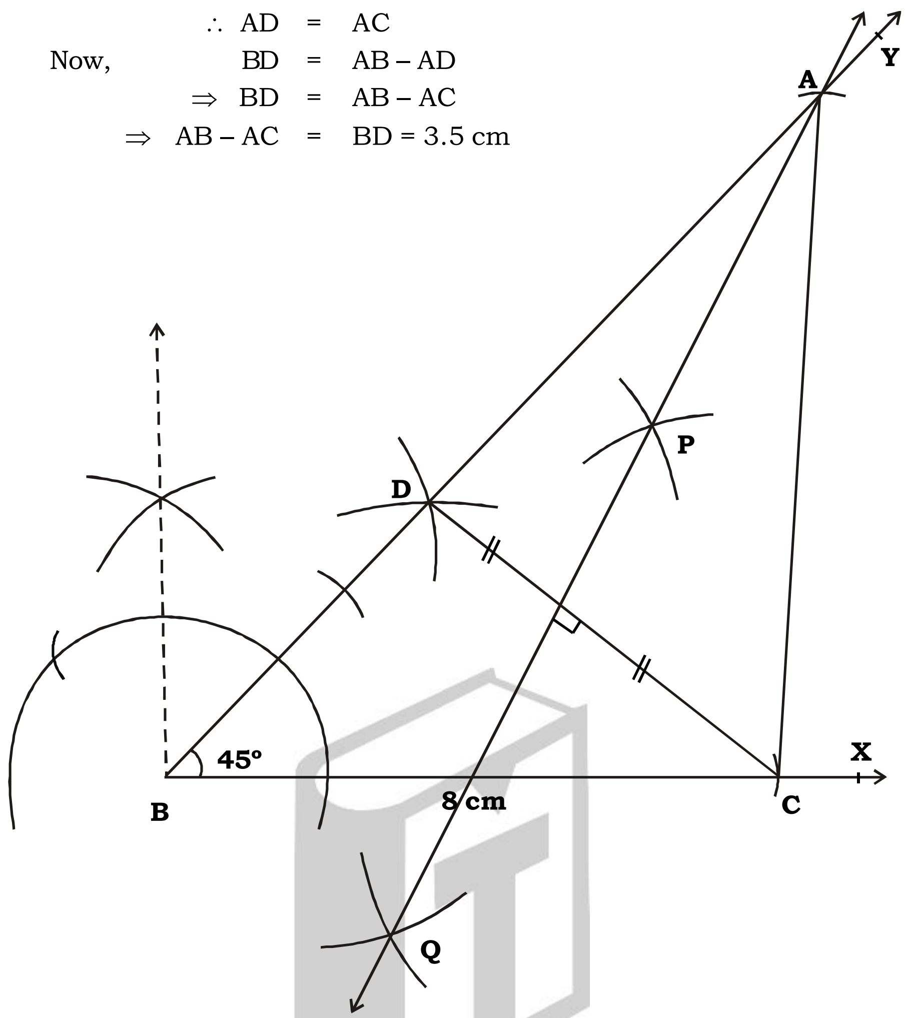
Justification : A lies on perpendicular bisector of CD.

$\therefore$ AD = AC

Now, BD = AB – AD

$\Rightarrow$ BD = AB – AC

$\Rightarrow$ AB – AC = BD = 3.5 cm



2 ½

3. **Given** : Base angles; ∠Y = 30° and ∠Z = 90°, Sum of three sides, XY + YZ + ZX = 11 cm. ½

Required : To construct ΔXYZ

Steps of Construction :

1. Draw a line segment PQ = 11 cm. (∵ XY + YZ + ZX = 11 cm.)
2. Draw KPQ = 30°, (∠Y = 30°) and ∠ LQP = 90° (∵ ∠Z = 90°). ½
3. Bisect ∠KPS and ∠LQP. Let these intersect at point X.
4. Draw perpendicular bisector MN of PX and RS of XQ.
5. Let MN intersect PQ at Y and RS intersect PQ at Z.
6. Join XY and XZ. ½

   Then, XYZ is the required triangle.

Justification : We observe that Y lies on perpendicular bisector MN of PX.

PY = XY and similarly, QZ = XZ This gives

XY+ YZ + ZX = PY + YZ + QZ = PQ = 11 cm

again ∠YXP = ∠XPY (as in ΔXPY, XY= PY)

$\therefore$ ∠XYZ = ∠YXP + ∠XPY

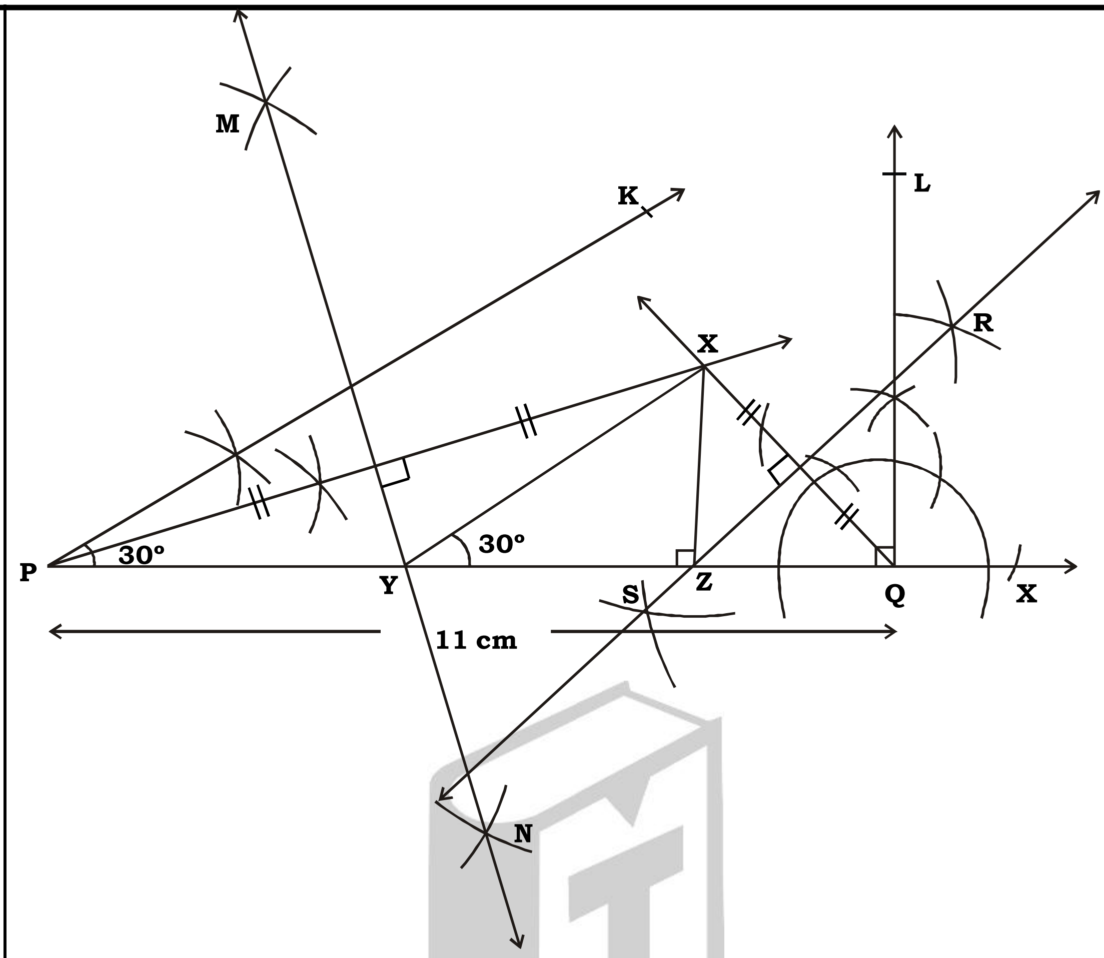
= 2 ∠XPY

= ∠KPQ

$\Rightarrow$ ∠XYZ = 30°

Similarly, ∠XZY = ∠LQP

∠XZY = 90°



2½

CHAPTER : 12

Q : 1 MCQ : [1 Mark] **01**

1. (c) $\frac{x^2}{\sqrt{3}}$ 1

Q : 2 Solve the following sums : [2 Marks] **02**

2. First find the area of side wall measuring 15m, 11m and 6m.

Let a = 15m, b = 11m, c = 6m

and $s = \frac{1}{2}(a+b+c) = \frac{1}{2}(15+11+6)\text{m}$ ½

$= \left(\frac{1}{2} \times 32\right) = 16\text{m}$

Now, $s - a = 16 - 15 = 1\text{ m}$

$s - b = 16 - 11 = 5\text{ m}$

and $s - c = 16 - 6 = 10\text{m}$ ½

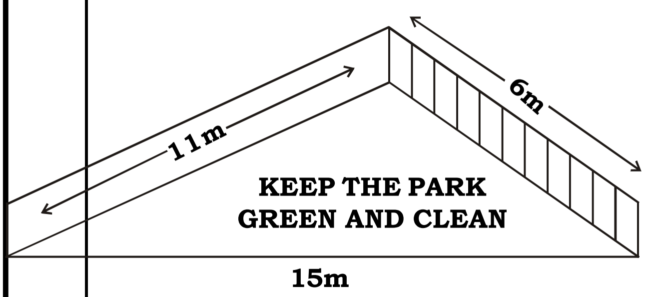
$\therefore$ Area of side wall $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{16 \times 1 \times 5 \times 10}$

$= \sqrt{\underline{4 \times 4} \times \underline{5 \times 5} \times 2}$

$= 4 \times 5\sqrt{2}$

$= 20\sqrt{2}\ \text{m}^2$ ½



∴ Area painted in blue colour = Area of side wall

$= 20\sqrt{2}\ m^2$ ½

Q : 3 Solve the following sums : [3 Mark] **03**

3. First we find the area of triangular side measuring 122m, 22m, and 120m.

Let $a = 122m$, $b = 22m$ and $c = 120m$. ½

∴ $s = \frac{1}{2}(a + b + c) = \frac{1}{2}(122 + 22 + 120)$

$= \left(\frac{1}{2} \times 264\right) = 132m$ ½

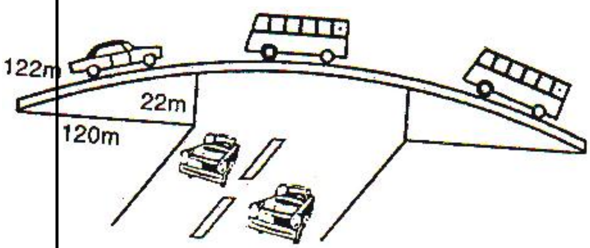
Now, $s - a = 132 - 122 = 10m$

$s - b = 132 - 22 = 110m$

and $s - c = 132 - 120 = 12m$ ½

∴ Area of triangular wall $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{132 \times 10 \times 110 \times 12}$



$= \sqrt{11 \times 12 \times 10 \times 10 \times 11 \times 12}$ ½

$= \sqrt{\underline{10 \times 10} \times \underline{11 \times 11} \times \underline{12 \times 12}}$

$= (10 \times 11 \times 12)$

$= 1320\ m^2$ ½

Rent charges = Rs 5000 per m^2 per year

∴ Rent charged from a company for 3 months $= Rs\left(5000 \times 1320 \times \frac{3}{12}\right)$

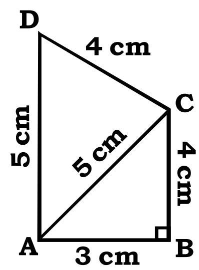
= Rs 16,50,000. ½

Q : 4 Solve the following sums : [4 Mark] **04**

4. Since $AC^2 = AB^2 + BC^2$

$(5^2 = 3^2 + 4^2$ i.e., $25 = 9 + 16)$ ½

$\angle ABC = 90^\circ$



Area of rt. $\angle$d $\Delta ABC = \frac{1}{2} \times AB \times BC$

$= \left(\frac{1}{2} \times 3 \times 4\right)\ cm^2$ ½

$= 6cm^2$.

For Δ ACD :

Let $a = 5cm$, $b = 4cm$ and $c = 5cm$. Then,

$s = \frac{1}{2}(a + b + c) = \frac{1}{2}(5 + 4 + 5)cm$ ½

$= \frac{1}{2} \times 14\ cm = 7cm$

Now, $s - a = 7 - 5 = 2cm$

$s - b = 7 - 4 = 3cm$

and $s - c = 7 - 5 = 2cm$

∴ Area of $\Delta ACD = \sqrt{s(s-a)(s-b)(s-c)}$ ½

$= \sqrt{7 \times 2 \times 3 \times 2}$

$= 2\sqrt{21}$ ½

$= 2 \times 4.6$ (approx.)

$= 9.2$ cm² approx.

Area of quadrilateral ABCD = Area of ΔABC + Area of ΔACD

= 6 + 9.2

= 15.2 cm² approx. ½

CHAPTER : 15

Q : 1 Solve the following sums : [2 Marks Each] **04**

1. Total number of students in mathematics is 90.

(i) Clearly, from the given table, the number of student who obtained less than 20% marks in the mathematics test = 7. ½

$\therefore$ P (a student obtaining less than 20% marks) = $\mathbf{\frac{7}{90}}$ ½

(ii) Clearly, from the given table, number of students who obtained marks 60 or above

= (students in 60 – 70) + (students above 70)

= 15 + 8 = 23 ½

$\therefore$ P (a student obtaining marks 60 and above) = $\mathbf{\frac{23}{90}}$ ½

2. The total number of students = 200

(i) P (a student likes statistics) = $\frac{\text{No. of students who like statistics}}{\text{Total number of students}}$ ½

$= \frac{135}{200} = \mathbf{\frac{27}{40}}$ ½

(ii) P (a student does not like statistics)

$= \frac{\text{No. of students who does not like statistics}}{\text{Total number of students}}$ ½

$= \frac{65}{200} = \mathbf{\frac{13}{40}}$ ½

Q : 2 Solve the following sums : [3 Marks Each] **06**

3. Let E_0, E_1 and E_2 be the event of getting no girl, 1 girl and 2 girls.

(i) $\therefore P(E_2)$ = Probability of a family having 2 girls ½

$= \frac{\text{Number of families having 2 girls}}{\text{Total number of families}}$

$= \frac{475}{1500}$ ½

$= \mathbf{\frac{19}{60}}$

(ii) $\therefore P(E_1)$ = Probability of a family having 1 girl

$= \frac{\text{Number of families having 1 girl}}{\text{Total number of families}}$ ½

$= \frac{814}{1500} = \mathbf{\frac{407}{750}}$ ½

(iii) $\therefore P(E_0)$ = Probability of a family having no girl

$= \frac{\text{Number of families having no girl}}{\text{Total number of families}}$ ½

$= \mathbf{\frac{211}{1500}}$

$\therefore$ Sum of probabilities $= P(E_0) + P(E_1) + P(E_2)$

$= \frac{211}{1500} + \frac{407}{750} + \frac{19}{60}$

$= \frac{211 + 814 + 475}{1500}$

$= \frac{1500}{1500} = 1$ ½

4. The total number of families = 2400

(i) Number of families earning Rs 10000 – 13000 per month and owning exactly 2 vehicles = 29. ½

$\therefore$ P (Families earning Rs 10000 – 13000 per month and owning exactly 2 vehicles)

$= \mathbf{\frac{29}{2400}}$ ½

(ii) Number of families earning Rs 16000 or more per month and owning exactly 1 vehicle = 579.

$\therefore$ P (Families earning Rs 16000 or more per month and owning exactly 1 vehicle) ½

$= \mathbf{\frac{579}{2400}}$

(iii) Number of families earning less than Rs 7000 per month and does not own any vehicle = 10. ½

$\therefore$ P (Families earning less than Rs 7000 per month and does not own any vehicle)

$\frac{10}{2400} = \mathbf{\frac{1}{240}}$ ½

(iv) Number of families earning Rs 13000 – 16000 per month and owning more than 2 vehicles = 25.

$\therefore$ P (Families earning Rs 13000 – 16000 per month and owning more than two ½

vehicles) $= \frac{25}{2400} = \mathbf{\frac{1}{96}}$

(v) Number of families owning not more than 1 vehicle

= Families having no vehicle + Families having 1 vehicle ½

= (10 + 0 + 1 + 2 + 1) + (160 + 305 + 535 + 469 + 579)

= 14 + 2148 = 2162

P (Families owning not more than 1 vehicle) $= \frac{2162}{2400} = \mathbf{\frac{1031}{1200}}$ ½

★★★★ ***Best of Luck*** ★★★★