ಕರ್ನಾಟಕ ಸರ್ಕಾರ

ಬೆಂಗಳೂರು ಗ್ರಾಮಾಂತರ ಜಿಲ್ಲಾ ಪಂಚಾಯತ್

ಸಾರ್ವಜನಿಕ ಶಿಕ್ಷಣ ಇಲಾಖೆ

ಉಪನಿರ್ದೇಶಕರ ಕಛೇರಿ (ಆಡಳಿತ). ಬೆಂಗಳೂರು ಗ್ರಾಮಾಂತರ ಜಿಲ್ಲೆ

ಸ್ಫೂರ್ತಿ

ಎಸ್ ಎಸ್ ಎಲ್ ಸಿ 2020–21

ವಿದ್ಯಾರ್ಥಿಗಳ ಉತ್ತೀರ್ಣತೆಗೊಂದು ಕೈಗನ್ನಡಿ

ಗಣಿತ

ಆಂಗ್ಲ ಮಾಧ್ಯಮ

ಸಲಹೆ ಮತ್ತು ಮಾರ್ಗದರ್ಶನ

ಶ್ರೀ ರವಿಕುಮಾರ್ . ಎಂ.ಆರ್ ಭಾ.ಆ.ಸೇ

ಮುಖ್ಯ ಕಾರ್ಯವಿರ್ವಹಣಾಧಿಕಾರಿಗಳು ,

ಬೆಂಗಳೂರು ಗ್ರಾಮಾಂತರ ಜಿಲ್ಲಾ ಪಂಚಾಯತ್

ಶ್ರೀ ಗಂಗಮಾರೇಗೌಡ . ಎಂ.ಹೆಚ್

ಉಪನಿರ್ದೇಶಕರು(ಆಡಳಿತ), ಸಾ. ಶಿ. ಇ

ಬೆಂಗಳೂರು ಗ್ರಾಮಾಂತರ ಜಿಲ್ಲೆ.

ಶ್ರೀ ಹನುಮಂತಪ್ಪ

ಶಿಕ್ಷಣಾಧಿಕಾರಿಗಳು ಸಾ. ಶಿ. ಇ

ಬೆಂಗಳೂರು ಗ್ರಾಮಾಂತರ ಜಿಲ್ಲೆ.

ಕ್ರ.ಸಂ	ಕಲಿಕಾಂಶಗಳು	ಅಂಕಗಳು	ಪುಠ ಸಂಖ್ಯೆ
1	Graphs (7 Marks)	7	
	1. *Solving pair of linear equation by graphical method.* 2. *Ogive Curve*	4 3	4 5
2	Constructions (9 marks)		6–8
	1. Construction of Tangents to a Circle. 2. Division of a line segment. 3. Construction of a similar triangle	2/3 2 3/4	6 7 8
3	Theorems (8 marks)	8	9–13
	Theorems (Triangles) 1) Basic proportionality theorem or Thales theorem. 2) AAA criterion theorem 3) Areas of Similar Triangles theorem 4) Pythagoras Theorem <u>Theorem (circles)</u> 1. Prove that, "The lengths of tangents drawn from an external point to a circle are equal 2. Prove that, "The tangent at any point of a circle is Perpendicular to the radius through the point of contact".	5 3	9 10 11 12 13 13
4	Important Questions (21 marks)		
	1. To calculate , Mean / Mode /	3	14–15

	Median.		
	2. Quadratic Equations – Formula Method, Nature of roots	4	16–18
	3. Pair of Linear Equations in two variables – Elimination Method	4	19–20
	4. Some Examples on A.P	4	21
	Coordinate geometry • Examples on distance formula • Examples on section formula • Examples on area of triangles.	6	22–30
	ಒಟ್ಟು	45	

<u>ಸೂಚನೆ</u>:ಇಲ್ಲಿ ನೀಡಲಾದ ಪ್ರಶ್ನೆಗಳು ಮತ್ತು ಅವುಗಳ ಉತ್ತರಗಳು ಮಾದರಿ ಪ್ರಶ್ನೊತ್ತರಗಳಾಗಿದ್ದು ವಿದ್ಯಾರ್ಥಿಗಳು ಇದೇ ರೀತಿಯ ಇತರೆ ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಲು ಕ್ರಮವಹಿಸುವುದು.

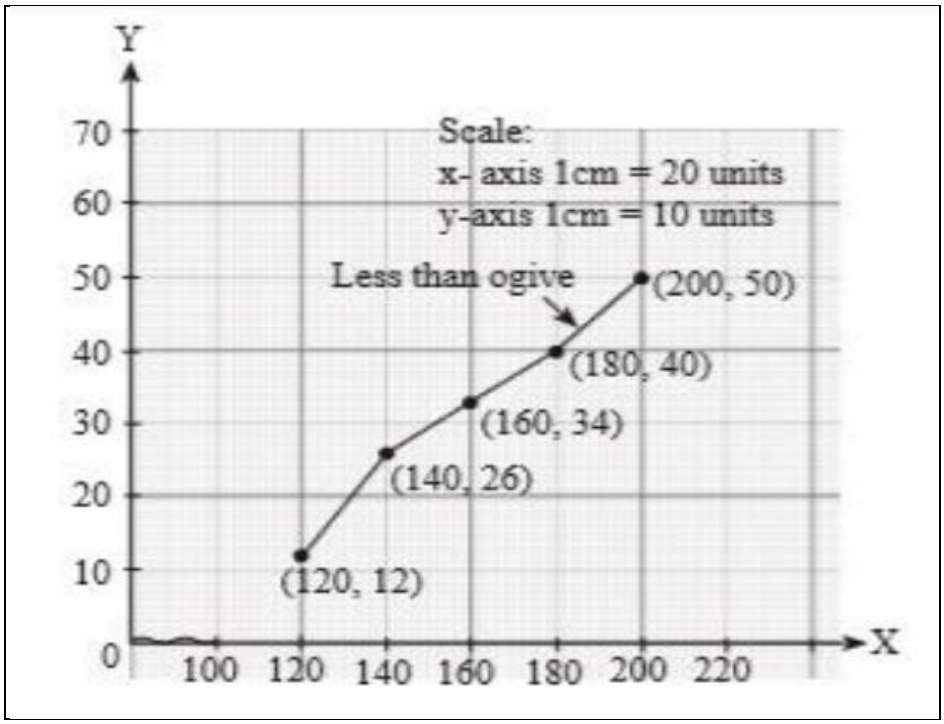
Graph (7 Marks)

Ogive Curve (3 Marks)

1. **Convert the distribution to a less than type cumulative frequency distribution and draw its Ogive.**

Daily Income	Number of workers
100-120	12
120-140	14
140-160	8
160-180	6
180-200	10

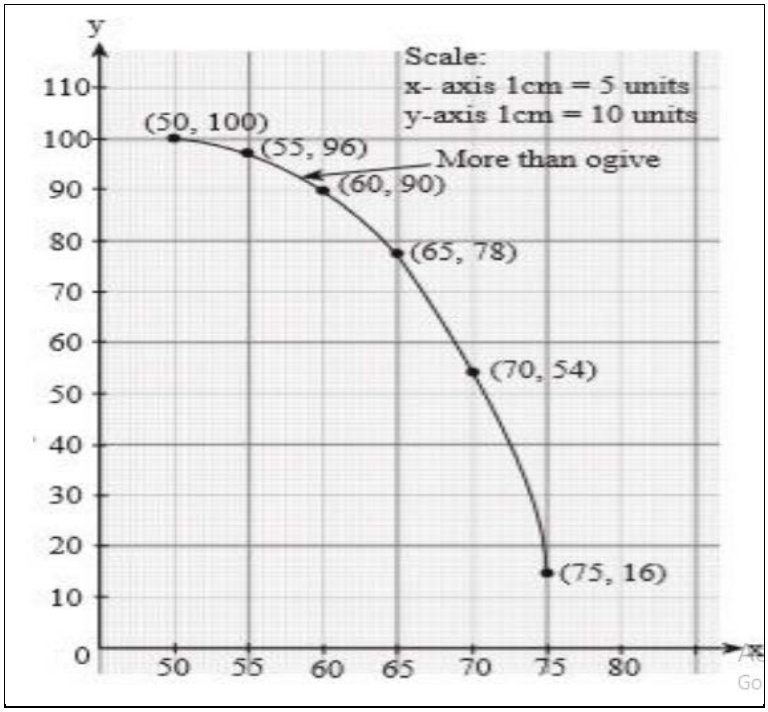
Daily Income	No. of Workers	Cumulative frequency (cf)
Less than 120	12	12
Less than 140	14	26
Less than 160	8	34
Less than 180	6	40
Less than 200	10	50



2. Convert the distribution to a more than type distribution and draw its Ogive:

Production in Yield (in Kg/ha)	Number of farms
50-55	2
55-60	8
60-65	12
65-70	24
70-75	38
75-80	16

Production in Yield (Kg/ha)	No. of farms	Cumulative frequency (cf)
More than 50	2	100
More than 55	8	98
More than 60	12	90
More than 65	24	78
More than 70	38	54
More than 75	16	16



Solving a pair of linear equations by Graphical Method…. 4 marks)

3. Solve the equations graphically

X + Y = 5, 2X- Y = 4.

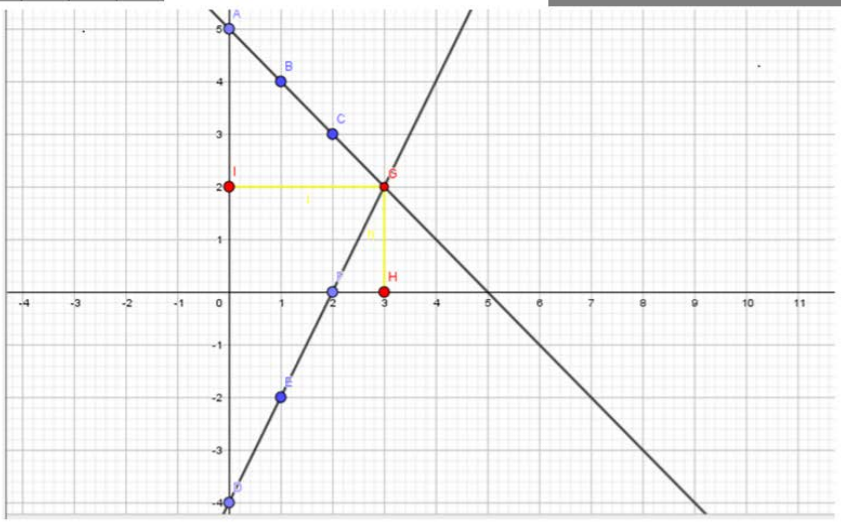
Y =5 -X	Y = 2X-4

X	0	1	2
Y	5	4	3

Y

X	0	1	2
Y	-4	-2	0

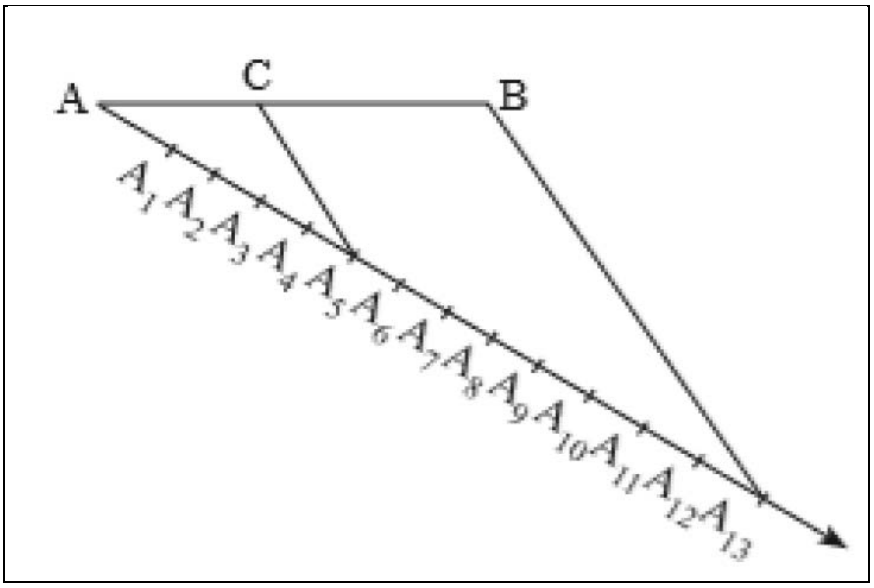
Scale : X-axis 1cm=1unit
Y-axis 1cm=1unit



Constructions (9 marks)

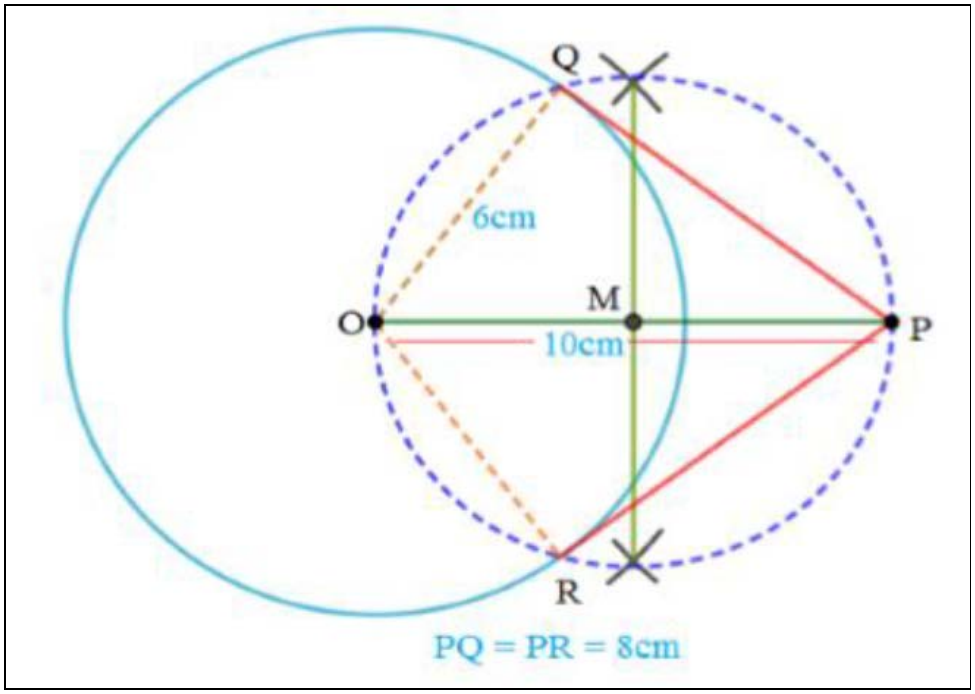
Division of a line segment

4. Draw a line segment of length 7.6 cm and divide it in the ratio 5 : 8

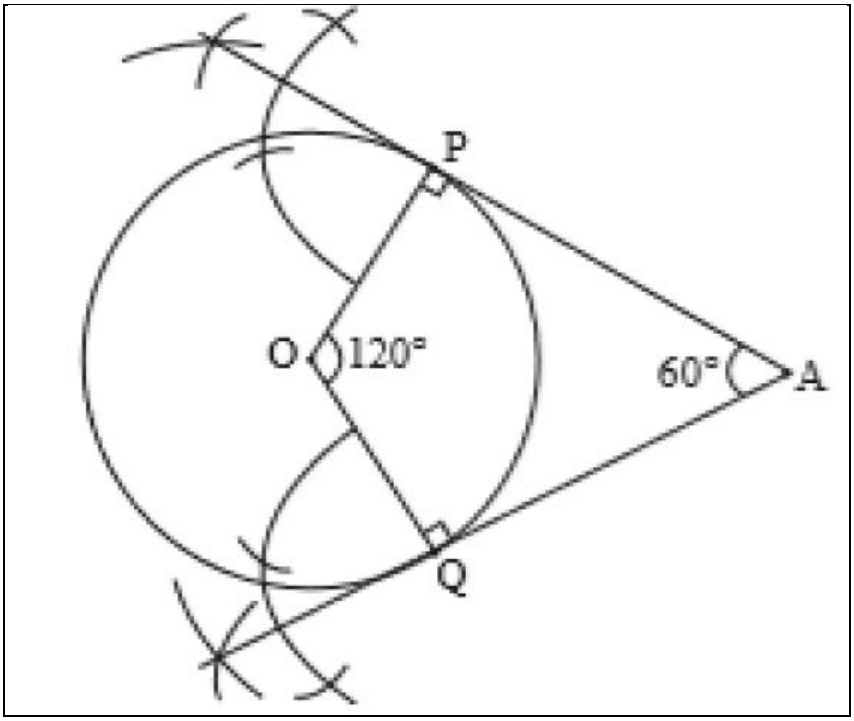


Construction of Tangents to a Circle.

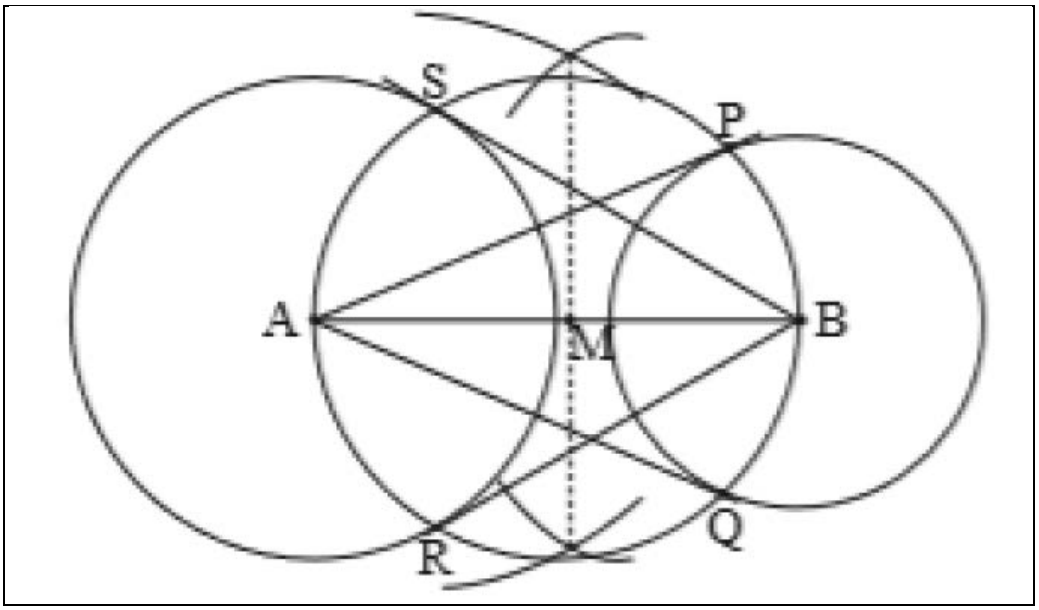
5. Draw a circle of radius 6 cm. From a point 10 cm away from its centre. Construct the pair of tangents to the circle.



6. **Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°**

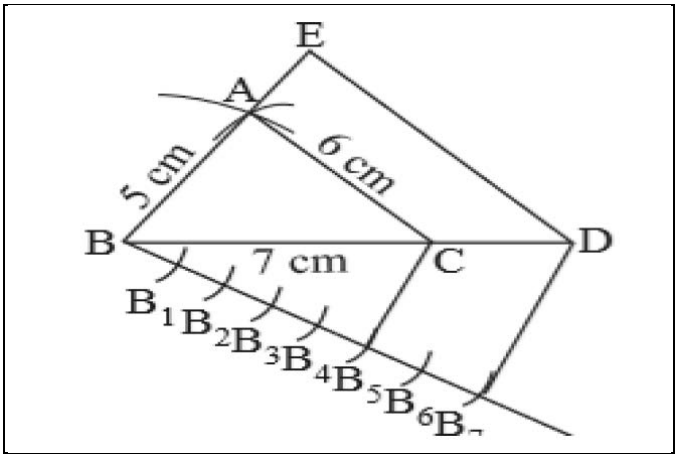


7. **Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.**

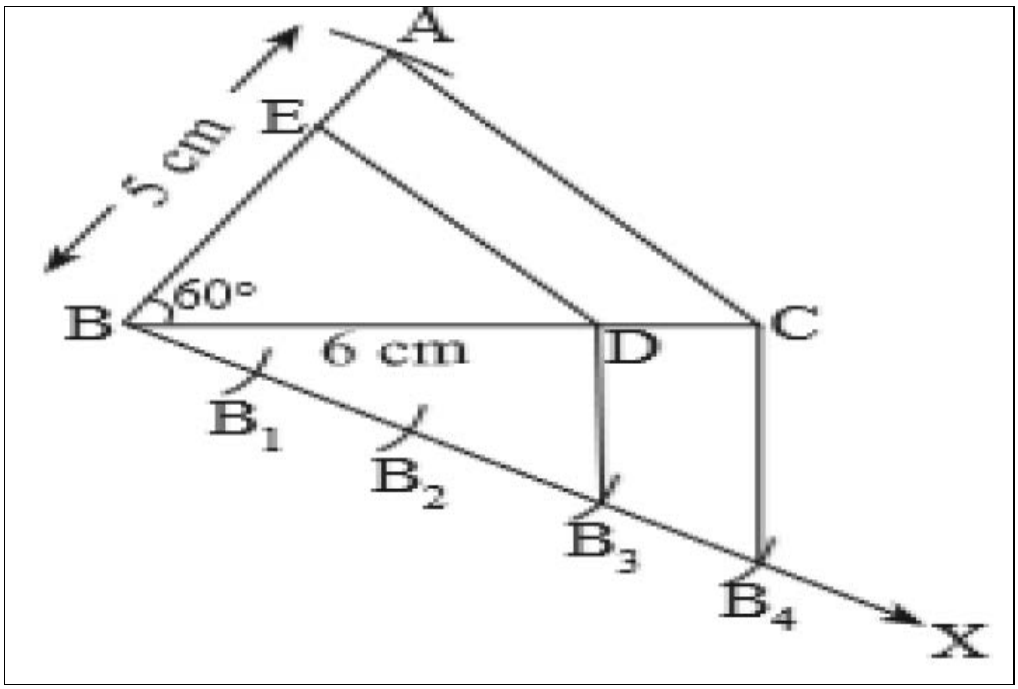


Construction of a similar triangle

8. **Construct a triangle with sides 5 cm, 6 cm and 7 cm and then another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the first triangle**



9. **Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and ∠ABC = 60°. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the △ABC**

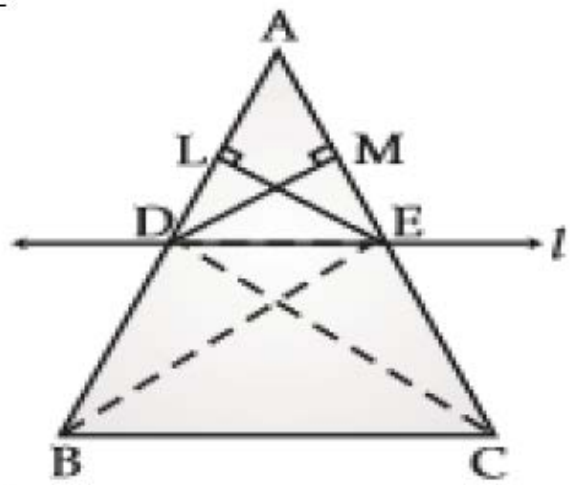


THEOREMS (8 MARKS)

Theorems (Triangles)

10. Basic proportionality theorem or Thales theorem.

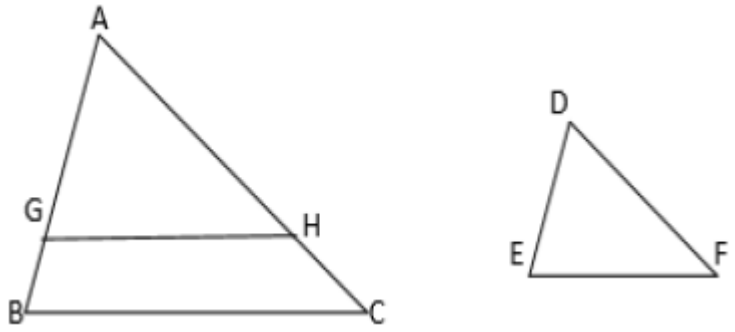
If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.



Data :	**In ABC, DE//BC**	
To Prove :	$\frac{AD}{BD} = \frac{AE}{CE}$	
Construction :	**Join DC and EB**. Draw **EL ⊥ AB, DM ⊥ AC.**	
Proof : $\frac{ar\ (ADE)}{ar\ (BDE)}$ =	$\frac{1/2xADxLE}{1/2xBDxLE} = \frac{AD}{BD}$ ---→ (1)	area of△= 1/2xbxh
$\frac{ar\ (ADE)}{ar\ (CDE)}$ =	$\frac{1/2xAExDM}{1/2xCExDM} = \frac{AE}{CE}$ --→ (2)	area of△= 1/2xbxh
	ar(BDE)=ar(CDE) ----→ (3)	By theorem
	From (1),(2) and(3)	
	$\frac{AD}{BD} = \frac{AE}{CE}$	

11. <u>AAA criterion theorem</u>

If in two triangles, corresponding angles are equal then their corresponding sides are in the same ratio and hence the two triangles are similar.



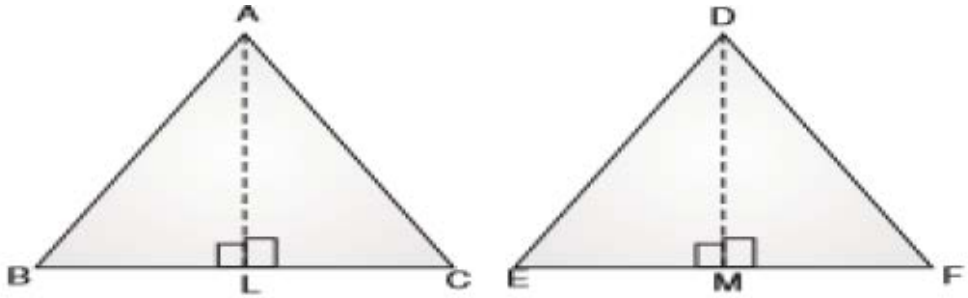
Data :	In $\triangle ABC$ and $\triangle DEF$ $\angle A = \angle D$, $\angle B = \angle E$, $\angle C = \angle F$
To Prove :	$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$
Construction :	Cut AG = DE and AH = DF and join GH

Proof : In $\triangle AGH$ and $\triangle DEF$

$\angle A = \angle D$	Data
$AG = DE$	Construction
$AH = DF$	Construction
$\therefore \triangle AGH \cong \triangle DEF$	SAS Congruence
$\therefore GH = EF$	
$\angle G = \angle E$	
$\angle G = \angle E = \angle B$	
$\therefore GH \parallel EF$	
$\therefore \frac{AB}{AG} = \frac{BC}{GH} = \frac{AC}{AH}$	By Thales theorem
$\therefore \frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$	

12. Areas of Similar Triangles theorem

The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.



Data :	$\triangle ABC \sim \triangle DEF$, $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$
To Prove :	$\frac{ar\,(ABC)}{ar\,(DEF)} = \frac{BC^2}{EF^2}$
Construction :	Draw AL ⊥ BC and DM ⊥ EF

Proof :

$$\frac{ar\,(ABC)}{ar\,(DEF)} = \frac{\frac{1}{2} x\ BC\ x\ AL}{\frac{1}{2} x\ EF\ x\ DM} = \frac{BC\ X\ AL}{EF\ X\ DM} \rightarrow (1)$$

In Δ ABL and △ DEM

$\angle B = \angle E \rightarrow$ Data

$\angle L = \angle M = 90° \rightarrow$ Construction

$\therefore \triangle ABL \sim \triangle DEM \rightarrow$ AA Similarity criterion

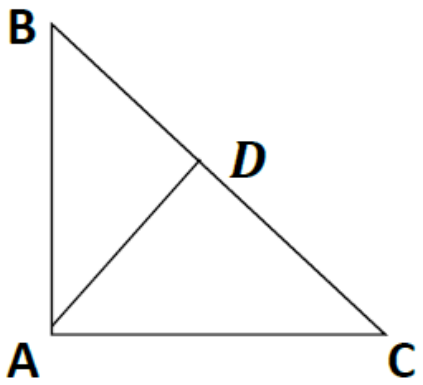
$$\therefore \frac{AB}{DE} = \frac{AL}{DM} = \frac{BC}{EF}$$

$$\frac{BC}{EF} = \frac{AL}{DM} \rightarrow (2)$$

$$\frac{ar\,(ABC)}{ar\,(DEF)} = \frac{BC^2}{EF^2} \quad \text{Substitute (2) in (1)}$$

13. Pythagoras Theorem

In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides



Data :	In $\triangle$ ABC, $\angle A = 90°$
To Prove :	$AB^2 + AC^2 = BC^2$
Construction :	Draw AD $\perp$ BC

Proof : In $\triangle$ DAB and $\triangle$ BAC

$\angle D = \angle A = 90°$ Data and Construction

$\angle B = \angle B$ (Common)

$\therefore \triangle DAB \sim \triangle BAC$ (AA Similarity criterion)

$\Rightarrow \frac{DB}{BA} = \frac{AB}{BC}$

$AB^2 = DB.\ BC \rightarrow (1)$

In $\triangle$ DAC and $\triangle$ CAB

$\angle D = \angle A = 90°$ Data and Construction

$\angle C = \angle C$ (Common)

$\therefore \triangle DAC \sim \triangle CAB$ (AA Similarity criterion)

$\therefore \Rightarrow \frac{DC}{CA} = \frac{AC}{CB}$

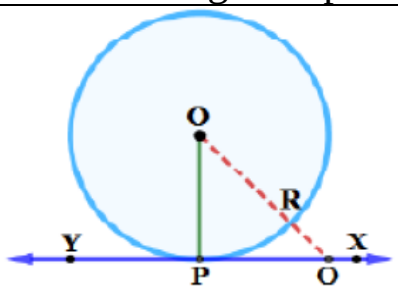
$AC^2 = DC.\ CB \rightarrow (2)$

(1) + (2)

$AB^2 + AC^2 = BC^2$

Theorem (circles)

14. Prove that, “The tangent at any point of a circle is Perpendicular to the radius through the point of contact”.



Data : Circle with center O, XY is the tangent, OP is radius

To Prove : OP ⊥ XY

Construction : Take a point Q on XY other than P and Join OQ

Proof :

OP = OR (Radii of the same Circle)

OQ = OR + RQ

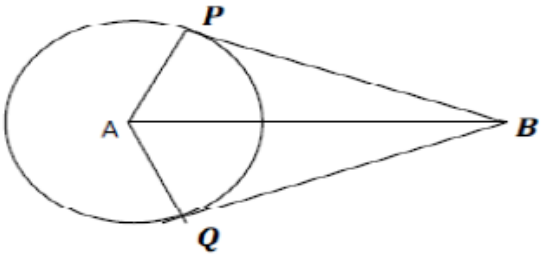
OQ > OR

OQ > OP (OP = OR)

OP is the shortest of all the distances of the point O to the points of XY

∴ OP ⊥ XY

15. Prove that, “The lengths of tangents drawn from an external point to a circle are equal



Data : Circle with center ‘A’, BP and BQ are tangents

To Prove : BP = BQ

Proof :

In △ APB and △ AQB

∠ P = ∠ Q = 90°

AB = AB (Common)

AP = AQ (Radii of the same circle)

∴ △ APB ≅ △ AQB (RHS)

∴ BP = BQ

Important Questions (16 marks)

To calculate , Mean / Mode / Median.

16. Find the mean for the given frequency distribution

C- I	5-15	15-25	25-35	35-45	45-55
F	2	3	6	5	4

Answer: Direct method

C- I	Frequency (fi)	Mid Point (xi)	fixi
5-15	2	10	20
15-25	3	20	60
25-35	6	30	180
35-45	5	40	200
45-55	4	50	200
	∑fi = 20		∑fixi = 660

Mean , $\bar{X} = \frac{\sum fixi}{\sum fi}$

$\bar{X} = \frac{660}{20}$

Mean = $\bar{X}$ = 33

17. Calculate the mode for the following frequency distribution table .

C- I	10-20	20-30	30-40	40-50	50-60
frequency	5	6	10	4	3

L =30

f_0= 6

f_1=10

f_3=4

h=10

Mode = L + $[\frac{f_1-f_0}{2f_1-f_0-f_2}]$ X h

Mode = 30+$[\frac{10-6}{2x10-6-4}]$ x 10

Mode = 30 +$[\frac{4}{20-10}]$ X 10

Mode = 30 + $\frac{40}{10}$ = 30 + 4

Mode = 34

18.Calculate the median for the given frequency distribution table

Class Interval	30-40	40-50	50-60	60-70	70-80
frequency	5	9	12	8	6

CI	f	c_f
30 – 40	5	5
40 – 50	9	14
50 - 60	12	26
60 – 70	8	34
70 - 80	6	40
	N = 50	

$$\frac{N}{2} = \frac{40}{2} = 20$$

$$L = 50, \quad C_f = 14$$

$$f = 12$$

$$h = 10$$

$$\text{Median} = L + \left[\frac{\frac{N}{2} - cf}{f}\right] X\ h$$

$$\text{Median} = 50 + \left[\frac{20 - 14}{12}\right] X\ 10$$

$$\text{Median} = 50 + \left[\frac{6}{12}\right] 10$$

$$\text{Median} = 50 + 5$$

$$\text{Median} = 55$$

II Quadratic Equations – Formula Method, Nature of roots

19. Find the roots of the quadratic equation **$3x^2 - 5x + 2 = 0$** by applying quadratic formula.

Solution : **$ax^2 + bx + c = 0$**

a = 3, b = -5, c = 2.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a},$$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4X3X2}}{2X3}$$

$$x = \frac{5 \pm \sqrt{25 - 24}}{6}$$

$$x = \frac{5 \pm \sqrt{1}}{6}$$

$$x = \frac{5 \pm 1}{6}$$

$$x = \frac{5+1}{6}$$

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

$$x = 1$$

$$x = \frac{5-1}{6}$$

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

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

20. <u>Solve the quadratic equation $x^2 - 5x - 10 = 0$by Factorization method</u>.

Soln : $x^2 - 5x - 10 = 0$

$x^2 - 5x + 2x - 10 = 0$

$x(x - 5) + 2(x - 5) = 0$

$(x - 5)(x + 2) = 0$

$(x - 5) = 0$ or $(x + 2) = 0$

$X = 5$ or $x = -2$

21. <u>Solve the quadratic equation $3x^2 - x - 10 = 0$ by Factorization method.</u>

Soln : $3x^2 - x - 10 = 0$

$3x^2 - 6x + 5x - 10 = 0$

$\underline{3x^2 - 6x} + \underline{5x - 10} = 0$

$3x(x - 2) + 5(x - 2) = 0$

$(x - 2)(3x + 5) = 0$

$x - 2 = 0$ or $3x + 5 = 0$

$x = +2$ or $3x = -5$ $x = \frac{-5}{3}$

22. <u>Find the value of the discriminant of $2x^2 - 5x + 3 = 0$</u>

Solution : $ax^2 + bx + c = 0$

$a=2$, $b=-5$, $c=3$

Discriminant , $\Delta = b^2 - 4ac$

$= (-5)^2 - 4(2)(3)$

$= 25 - 24 = 1$

23. Determine the nature of the roots : $2x^2 - 4x + 3 = 0$

Solution : $2x^2 - 4x + 3 = 0$

$ax^2 + bx + c = 0$

here a = 2, b = -4, c = 3

Discriminant = $\triangle = b^2 - 4ac$

$= (-4)^2 - 4 \times 2 \times 3$

$= 16 - 24$

$= -8 < 0$

So, the given equation has no real roots.

24. Determine the nature of the roots : $x^2 - 6x + 9 = 0$

Solution: $x^2 - 6x + 9 = 0$

$ax^2 + bx + c = 0$

a=1, b=-6, c=9

Discriminant , $\Delta = b^2 - 4ac$

$= (-6)^2 - 4(1)(9)$

$= 36 - 36$

$= 0$

Roots are real and equal.

25. Find the value of 'K' for the quadratic equation $4x^2 - kx + 1 = 0$, if it has equal roots.

Solution : $4x^2 - kx + 1 = 0$

$ax^2 + bx + c = 0$

a = 4, b = -k , c = 1

Roots are real and equal

$\therefore \quad b^2 - 4ac = 0$

$(-k)^2 - 4(4)(1) = 0$

$k^2 - 16 = 0$

$k^2 = 16$

$k = \pm\sqrt{16}$

$k = \pm 4$

<u>Pair of Linear Equations in two variables – Elimination Method</u>

26. . **<u>Solve the pair of linear equations : x-y = 5, 2x – 3y = 5</u>**

Solution : Elimination method

$x - y = 5 \rightarrow (1)$ and $2x - 3y = 5 \rightarrow (2)$

multiply equation (1) by 3

$3x + 3y = 15 \rightarrow (3)$

Sum of (2) + (3)

$$3x + 3y = 15$$
$$\underline{2x - 3y = 5}$$
$$5x = 20$$

$x = \frac{20}{5}$, $x = 4$

Substitute x = 4 in equation (1)

$4 + y = 5$

$y = 5 - 4$

$y = 1$

$\therefore x = 4$ and $y = 1$

27. <u>Solve the pair of linear equations : x + y = 6, x – y = 2</u>

Solution :

$x + y = 6 \rightarrow (1)$

$x - y = 2 \rightarrow (2)$

$2x = 8$

$x = \frac{8}{2}$,

$x = 4$

Substitute x = 4 in equation (1)

$$4 + y = 6$$

$$y = 6 - 4$$

$$y = 2$$

$$x = 4 \text{ and } y = 2$$

28. <u>For what value of 'K" , the pair of linear equation Kx – 4y = 3 , 6x – 12y = 9 has infinitely many solutions:</u>

Solution: Kx – 4y = 3 and 6x – 12y = 9

$$Kx - 4y - 3 = 0 \text{ and } 6x - 12y - 9 = 0$$

Here, $a_1 = K$,

$b_1 = -4$,

$c_1 = -3$

$a_2 = 6$,

$b_2 = -12$,

$c_2 = -9$

Condition for infinitely many solutions

$$\frac{a1}{a2} = \frac{b1}{b2} = \frac{c1}{c2}$$

$$\frac{a1}{a2} = \frac{k}{6},$$

$$\frac{b1}{b2} = \frac{-4}{-12} = \frac{1}{3}$$

$$\therefore \frac{a1}{a2} = \frac{b1}{b2}$$

$$\Rightarrow \frac{k}{6} = \frac{1}{3}$$

$$\Rightarrow 3k = 6$$

$$\therefore k = \frac{6}{3} = 2$$

Arithmetic progression

- nth term of A.P is $a_n = a + (n - 1)d$
- Sum of first n terms of A.P is $S = \frac{n}{2}[2a + (n - 1)d]$ or $S = \frac{n}{2}[a + l]$

29. Find the 13th term of an A.P **3, 8, 13,** . . . . . .

Solution:

$a = 3$, $d = a_2 - a_1 = 8 - 3 = 5$ $n = 13$ $a_{13} = ?$

$$a_n = a + (n-1)d$$

$$a_{13} = 3 + (13-1)5$$

$$a_{13} = 3 + (12)5$$

$$a_{13} = 3 + 60$$

$$\therefore a_{13} = 63$$

30. Find the sum of first 20 terms of the series 2+6+10+.....

ಖಂಟಣಣುಂಟಿ: $a = 2$ $d = a_2 - a_1 = 6 - 2 = 4$ $n = 20$ $S_{20} = ?$

$$S_n = \frac{n}{2}[2a+(n-1)d]$$

$$S_{20} = \frac{20}{2}[2 \times 2 + (20-1)4]$$

$$S_{20} = \frac{20}{2}[4 + (19)4]$$

$$S_{20} = \frac{20}{2}[4 + 76]$$

$$S_{20} = 10\,[80]$$

$$\therefore S_{20} = 800$$

Coordinate geometry

- Examples on distance formula
- Examples on section formula
- Examples on area of triangles

31. Find the distance between the origion and a point (8,-6).

Solution:

(8 , –6) = **(x , y)**

d = $\sqrt{x^2 + y^2}$

d = $\sqrt{8^2 + (-6)^2}$

d = $\sqrt{100}$

d = 10 Units

32. **Find the distance between** (–5 , 7) & **(-1, 3)**

Soliution: d = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

PQ = $\sqrt{(-1-(-5))^2 + (3-7))^2}$

= $\sqrt{(-1+5)^2 + (-4)^2}$

= $\sqrt{16+16}$

PQ = $\sqrt{32}$ Units.

33. **Find the point on Y-axis which is equidistant from A (6, 5) & B (-4, 3)**

Solution: The point on Y-axis be (0,y).

According to given PA = PB

$(6-0)^2 + (5-y)^2 = (-4-0)^2 + (3-y)^2$

$36 + 25 + y^2 - 10y = 16 + 9 + y^2 - 6y$

$Y^2 - y^2 - 10y + 6y = 25 - 61$

$-4y = -36, \quad y = \frac{-36}{-4} \quad y = 9$

Point on Y-axis is (0 , 9)

34. <u>The distance between P (2, -3) & Q (10, y) is 10units.Find Y.</u>

Solution: $(x_1,y_1)=(2,-3)$, $(x_2 ,y_2)=(10,y)$, $d=10$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$10 = \sqrt{(10 - 2)^2 + (y - (-3))^2}$$

$$10 = \sqrt{64 + (y + 3)^2}$$

$$(10)^2 = 64 + (y+3)^2$$

$$100 - 64 = (y+3)^2$$

$$(y+3)^2 = 36,$$

$$Y + 3 = \pm 6,$$

$y = 6 - 3$ $\quad$ $y = -6 - 3$

$y = 3$, or $y = -9$

35. **<u>Find the mid point of line segment joining the points (4, 1) & (2, 7)</u>**

Solution: $(x_1 , y_1) = (4 , 1)$, $(x_2 , y_2) = (2 , 7)$, $m : m = 1 : 1$

$$P(x , y) = \left[\frac{x_1+x_2}{2} , \frac{y_1+y_2}{2}\right]$$

$$= \left[\frac{4+2}{2}, \frac{1+7}{2}\right]$$

$$= (3 , 4)$$

36. <u>Find the coordinates of a point which divides the line segment joining the points (4, -3) & (8, 5) internally in the ratio 3:1.</u>

Solution: $(x_1,y_1) = (4,-3)$, $(x_2,y_2) = (8,5)$, $m : m = 3 : 1$

$$X = \left[\frac{m_1x_2+m_2x_1}{m_1+m_2}\right]$$

$$X = \left[\frac{3(8)+1(4)}{3+1}\right] = \left[\frac{24+4}{4}\right] = \frac{28}{4}$$

$$X = 7$$

$$y = \left[\frac{m_1y_2+m_2y_1}{m_1+m_2}\right]$$

$$y = \left[\frac{3(5)+1(-3)}{3+1}\right]$$

$$= \left[\frac{15-3}{4}\right] = \frac{12}{4}$$

$$y = 3$$

The point is (7,3)

37. <u>In what ratio does the point (2,5) divides the line segment joining the pointsA(-6,2) and B(3,-5).</u>

Solution: $(x , y) = (2 , 5)$,

$(x_1 , y_1) = (-6 , 2)$, $(x_2 , y_2) = (3 , -5)$, $m_1 : m_2 = ?$

$$\frac{m_1}{m_2} = \frac{x_1-x}{x-x_2}$$

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

$$= \frac{-8}{-1} = \frac{8}{1}$$

$m_1 : m_2 = 8 : 1$

38. <u>In what ratio does Y-axis divides the line segment joining the points (5,-6) and B(-1,-4). Also find the coordinates of the point of intersection.</u>

Solution: Let the ratio be K:1 and the point on Y-axis be(0,y).

$$(0,\ y) = \left[\frac{m_1x_2+m_2x_1}{m_1+m_2}, \frac{m_1y_2+m_2y_1}{m_1+m_2}\right]$$

$$(0,\ y) = \left[\frac{-k+5}{k+1}, \frac{-4k-6}{k+1}\right]$$

$$\frac{-k+5}{k+1} = 0$$

$$-k + 5 = 0$$

k = 5

The ratio is 5:1

Substitute k value we get

Consider , $(0,\ y) = \left[\frac{-k+5}{k+1}, \frac{-4k-6}{k+1}\right]$

$$= \left[\frac{-k+5}{k+1}, \frac{-4k-6}{k+1}\right]$$

$$= \left[0, \frac{-4X5 - 6}{5+1}\right]$$

$$= \left[0, \frac{-13}{3}\right]$$

39. <u>Find the coordinates of points which trisects the line segment joining the points A (2, -2) & B (-7, 4)</u>

Solution:

Let the points on AB be P and Q

P divides AB in the ratio 1:2.

The coordinates of P = $\left[\frac{m_1x_2+m_2x_1}{m_1+m_2}, \frac{m_1y_2+m_2y_1}{m_1+m_2}\right]$

$$= \left[\frac{1(-7)+2(2)}{1+2}, \frac{1(4)+2(-2)}{1+2}\right]$$

$$= \left[\frac{-7+4}{3}, \frac{4-4}{3}\right]$$

$$= \left(\frac{-3}{3}, \frac{0}{3}\right)$$

The coordinates of P = (-1, 0)

∴ Q divides AB in the ratio 2:1.

The coordinates of Q = $\left[\frac{m_1x_2+m_2x_1}{m_1+m_2}, \frac{m_1y_2+m_2y_1}{m_1+m_2}\right]$

$$= \left[\frac{2(-7)+1(2)}{2+1}, \frac{2(4)+1(-2)}{2+1}\right]$$

$$= \left[\frac{-14+2}{3}, \frac{8-2}{3}\right]$$

The coordinates of Q = (-4, 2)

40. **Find the area of a triangle with vertices of Q (1, -1), (-4, 6) & (-3, -5)**

Solution: $(X_1, Y_1) = (1, -1)$, $(X_2, Y_2) = (-4, 6)$ $(X_3, Y_3) = (-3, -5)$

$$\text{Area of triangle} = \frac{1}{2}\{x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\}$$

$$= \frac{1}{2}[1(6 + 5) + (-4)(-5 + 1) + (-3)(-1-6)]$$

$$= \frac{1}{2}(11 + 16 + 21)$$

$$= \frac{1}{2} X48 = 24 \text{ sq. units.}$$

41. **Find the value of k when the points A (2 ,6), B (4, k) & C (6, -2) are collinear.**

Solution: Given the points are collinear , area of triangle=0

$(X_1, Y_1) = (2, 6)$, $(X_2, Y_2) = (4, k)$ $(X_3, Y_3) = (6, -2)$

$$\therefore \text{Area of triangle} = 0$$

$$\{x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\} = 0$$

$$\therefore [2(k + 2) + 4(-2 - 6) + 6(6 - k)] = 0$$

$$[2(k + 2) + 4(-8) + 6(6 - k)] = 0$$

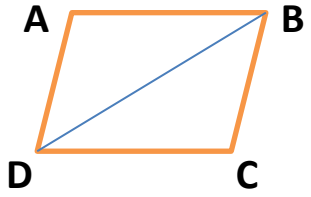
$$2k + 4 - 32 + 36 - 6k = 0$$

$$-4k + 8 = 0$$

$$\therefore K = 2$$

42. Find the area of a quadrilateral whose vertices taken in order are A (-5, 7), B (-4, -5) C (-1, -6) & D (4, 5)

Solution :



Area of triangle ΔABD

$A(X_1, Y_1) = (-5, 7)$, $B(X_2, Y_2) = (-4, -5)$ & $D(X_3, Y_3) = (4, 5)$

Area of triangle ΔABD $= \frac{1}{2}\{x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\}$

$= \frac{1}{2}[-5(-5 - 5) + (-4)(5 - 7) + 4(7 + 5)]$

$= \frac{1}{2}[50 + 8 + 48]$

$= \frac{1}{2} X106$

$= 53$ sq. units

Area of triangle ΔBCD

Area of triangle ΔBCD $= \frac{1}{2}\{x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\}$

$= \frac{1}{2}[-4(-6 - 5) - 1(5 + 5) + 4(-5 + 6)]$

$= \frac{1}{2}[44 - 10 + 4]$

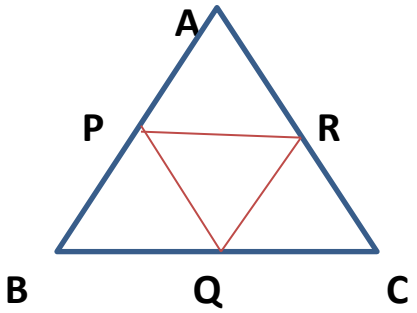
$= \frac{1}{2} X 38$

$= 19$ sq. units

∴ Area of a quadrilateral ABCD $= 53 + 19 = 72$ sq. units

43. **Find the area of a triangle formed by joining the midpoints of sides of a triangle whose vertices are A (0, 1), B(2, 1) & C(0, 3)**

ಉತ್ತರ :



Let P is the mid point of AB , Q is the mid point of BC ,R is the mid point of AC .

The coordinates of P = $\left[\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right]$

$$= \left[\frac{0+2}{2}, \frac{1+1}{2}\right] = \left[\frac{2}{2}, \frac{2}{2}\right]$$

The coordinates of P = (1 , 1)

The coordinates of Q = $\left[\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right]$

$$= \left[\frac{2+0}{2}, \frac{1+3}{2}\right] = \left[\frac{2}{2}, \frac{4}{2}\right]$$

The coordinates of Q = (1 , 2)

The coordinates of R= $\left[\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right]$

$$= \left[\frac{0+0}{2}, \frac{1+3}{2}\right] = \left[\frac{0}{2}, \frac{4}{2}\right]$$

The coordinates of R = (0 , 2)

P (1 , 1), Q(1, 2) & R(0 , 2)

(X_1 , Y_1), (X_2 ,Y_2) & (X_3 , Y_3)

$$\Delta PQR = \frac{1}{2}\{x_1 (y_2 - y_3)+ x_2 (y_3 - y_1)+ x_3 (y_1 - y_2)\}$$

$$= \frac{1}{2} [1(2 - 2) + 1 (2 – 1) + 0 (1 - 2)]$$

$$= \frac{1}{2} [1X 0 + 1X1 + 0X(-1)]$$

$$= \frac{1}{2} [0 + 1 + 0] = \frac{1}{2} X1$$

$$\Delta PQR = \frac{1}{2} \text{ sq. units .}$$