GOVERNMENT URDU HIGH SCHOOL YELLAGONDAPALYA

SUBJECT: MATHEMATICS 2019 – 20

SUMMATIVE ASSESMENT - 1 ***Time : 3 Hrs***

Class :10th ***Marks:80***

I. Answer the following [mcq]

1 x 8 = 8

1. the nth term an of the AP with first term a and common difference d is given by

[a] $S_n = a + (n-1)$ *[b]* $S_n = \frac{n(n+1)}{2}$ *[c]* $Sn = \frac{n}{2}[2a + (n-1)d]$ *[d]* $a_n = a + (n-1)d$.

2. The pair of co-ordinates satisfying 2x + y = 6 is

[a] 1,1 [b] 2,2 [c] 3 ,3 [d] 4,4

3. The following is an example of Pythagorean triplet

[a] 3, 5, 7 [b] 12, 14, 16 [c] 3,6, 9 [d] 1.5, 2, 2.5

4. All circles are______ (congruent, similar)

[a] similar_ [b] congruent [c] Equal [d] Concentric

5. Formula to find the area of Quadrant

[a] $\frac{\pi r^2}{2}$ **[b]** πr^2 **[c]** $\frac{\pi r^2}{3}$ **[d]** $\frac{\pi r^2}{4}$

6. If $\Delta ABC \sim \Delta DEF$ then

[a] $\frac{AB}{DE} = \frac{BC}{EF} = \frac{BC}{DF}$ **[b]** $\frac{AB}{DE} = \frac{BC}{EG} = \frac{AC}{DF}$ **[c]** $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AB}{DF}$ **[d]** $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

7. Which is the Mid-point formula

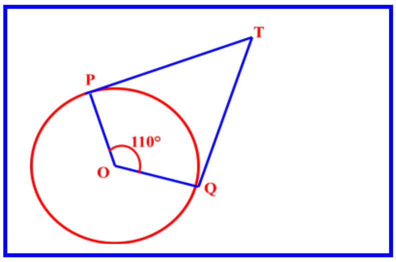
[a] $p(x,y) = \frac{x_2+x_1}{2}, \frac{y_2+y_1}{2}$ **[b]** $p(x,y) = \frac{x_2+x_1}{4}, \frac{y_2+y_1}{4}$, **[c]** $p(x,y) = \frac{x_2+x_1}{3}, \frac{y_2+y_1}{3}$ **[d]** $p(x,y) = \frac{x_2+x_1}{2}$

8. A number which can be expressed in the form of $\frac{p}{q}$ is called

1 x 8 = 8

[a] rational number [b] irrational number [c] lemma [d] algorithm.

II Answer the following:



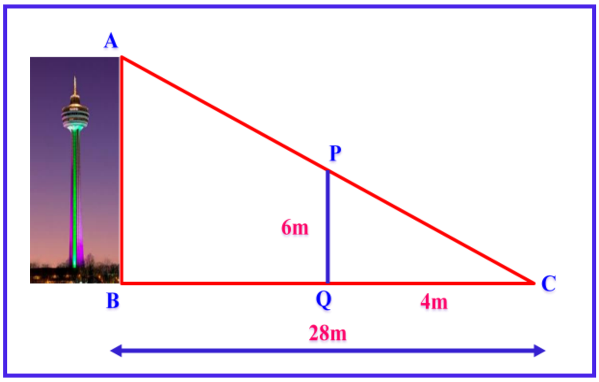
9. In the following AP the missing terms in the box is 2, ☐ 26 is

10. State the converse of B.P.T. Thales:

11. State Euclid's division lemma

12. If TP and TQ are the two tangents to a circle with centre O is

So that ∠ POQ = 110° then ∠ PTQ is equal to



13.Write the section formula?-

14. Write the area of a sector of a circle

15. Which term of the AP : 3, 8, 13, 18,……..is 78

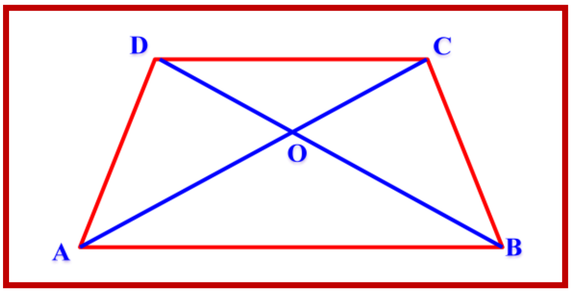
16. The 17th term of an AP exceeds its 10+th term by 7 .

Find the common difference.

2 x 8 = 16

II. Answer the following questions:

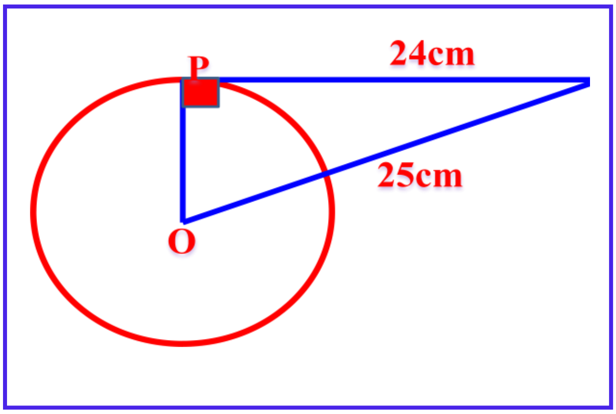
17. A vertical pole of length 6m casts a shadow 4m long on the ground and at the same time a tower casts a



18. Diagonals of a trapezium ABCD with AB || DC intersect each other at the point O . If AB = 2CD, Find the ratio of the areas of triangles AOB and COD

19. On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$, $\frac{c_1}{c_2}$ find out whether the given pair of linear equation is

3x + 2y = 5 ; 2x – 3y = 7



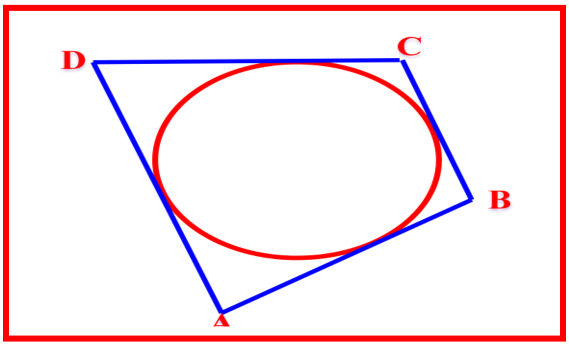
20. Solve by Substitution method :

x + y = 5 ------[1]

2x – 3y = 4 -----[2]

21. From a point Q, the length of the tangent to a circle is 24cm and the distance of Q from the centre is 25cm .

The radius of the circle is .



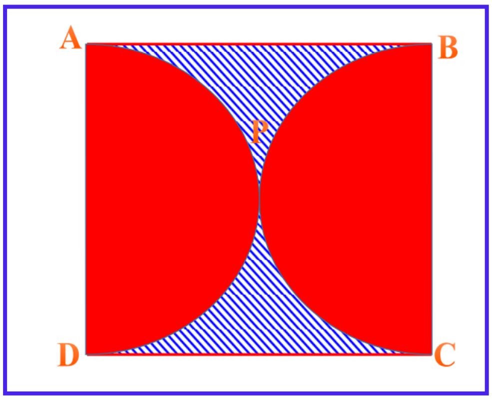
22. A quadrilateral ABCD is drawn to circumscribe a circle [see fig]

Prove that AB + CD = AD + BC

23. Find the area of a sector of a circle with radius 6cm if angle of the sector is 60°

24. Find the area of the shaded region in fig , if ABCD is a square of side 14cm

and APD and BPC are semicircles.



25. Draw a circle of radius 6cm . From a point 10cm Away from its centre , construct the pair of tangents to the circle and measure their lengths

3 x 9 = 27

26. Construct a triangle of sides 4cm, 5cm, and 6cm And then a triangle similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.

27. Find the distance between the pair of points. (2, 3) (4, 1)

28. A (2, 3), B (4, k) and C (6 , –4) Find the value of 'k' for which the points are Collin

29. Prove that $2 + \sqrt{5}$ is irrational

30. An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which They can march.

31. Find the sum of first 40 positive integers divisible by 6 OR

31[a] Find the sum of the first 15 multiples of 8

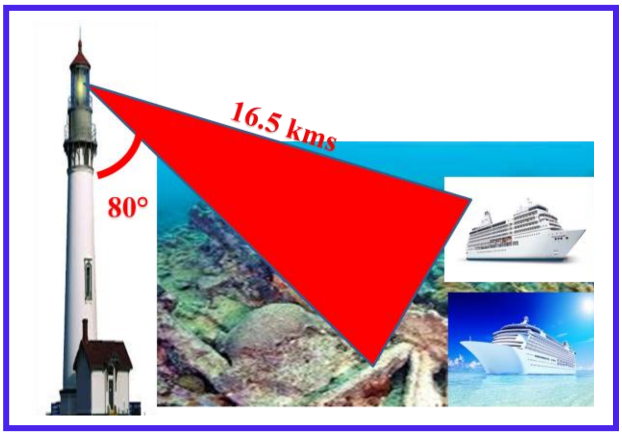
32. Prove Thales theorem Basic proportionality theorem OR

Theorem (AA similarity Criterion) " If two triangles are equiangular , then their corresponding sides are proportional "

33.Solve equation graphically : $2x + 3y = 9$

$4x + 6y = 18$

34. Two warn ships for underwater rocks, a lighthouse spreads a red coloured light over a sector of angle 80° To a distance of 16.5km . Find the area of the sea over which the ships are warned. [use $\pi = 3.14$]



OR

4 x 4 = 16

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

35] Find the area of the quadrilateral whose vertices taken in order, are

(– 4 – 2), (– 3 – 5) (3 – 2) and (2, 3)

OR

35[a]Prove that " In a right angled triangle the square on hypotenuse is equal to the sum of the square on the Other two sides"

36] A sum of Rs. 700 is to be used to give seven cash prizes to students of a school for their overall

Academic performance. If each prize is Rs. 20 less than its preceeeing prize, find the value of each

Of the prizes. OR

36[a] 200 logs are stacked in the following manner : 20 logs in the bottom row , 19 in the next row,

18 in the row next to it and so on [see fig] In how many rows are the 200 logs placed and how many logs

Are in the top row?

37. Five years ago Nuri was thrice as old as sonu.

Ten years later , nuri will be twice as sold as Sonu. How old are nuri and Sonu.

38. Draw a circle of radius 3cm. Take two points P and Q on one of its extended diameter each at a distance

Of 7cm from its centre. Draw tangents to the circle from these points P and Q .

1 x 5 = 5

OR

[1] A boat goes 30 km upstream and 44km downstream in 10 hours. In 13 hours, it can go 40km upstream and 55 km down-stream. Determine the speed of the stream and that of The boat in still water.

KEY PAPER

1. the nth term a_n of the AP with first term a and common difference d is given by

[a] $S_n = a + (n-1)$ [b] $S_n = \frac{n(n+1)}{2}$ [c] $Sn = \frac{n}{2}[2a + (n-1)d]$ [d] $a_n = a + (n-1)d$.

2. The pair of co-ordinates satisfying 2x + y = 6 is

[a] 1,1 [b] 2,2 [c] 3 ,3 [d] 4,4

3. The following is an example of Pythagorean triplet

[a] 3, 5, 7 [b] 12, 14, 16 [c] 3,6, 9 [d] 1.5, 2, 2.5

4. All circles are______ (congruent, similar)

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[a] $\frac{\pi r^2}{2}$ [b] πr^2 [c] $\frac{\pi r^2}{3}$ [d] $\frac{\pi r^2}{4}$

6. If $\Delta ABC \sim \Delta DEF$ then

[a] $\frac{AB}{DE} = \frac{BC}{EF} = \frac{BC}{DF}$ [b] $\frac{AB}{DE} = \frac{BC}{EG} = \frac{AC}{DF}$ [c] $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AB}{DF}$ [d] $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

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8. A number which can be expressed in the form of $\frac{p}{q}$ is called

[a] rational number [b] irrational number [c] lemma [d] algorithm.

II Answer the following:

1 x 6 = 6

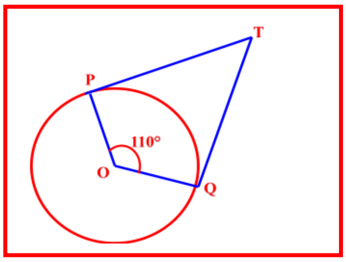
9. In the following AP the missing terms in the box is 2, ☐ 26 is 14

A = 2 , and a3 = 26 ⇒ a3 = a + 2d ⇒ 26 = 2 + 2d ⇒ 2d = 26 – 2 = d = $\frac{24}{2}$ = 12 2 = a + d = 2 + 12 = 14

10. State the converse of B.P.T. Thales:

If A straight line divides two sides of a triangle proportionally,

Then the straight line is parallel to third side.



11. State Euclid's division lemma

Ans: a = (b x q) + r it is called "EUCLID'S DIVISION LEMMA"

12. If TP and TQ are the two tangents to a circle with centre O is

So that ∠ POQ = 110° then ∠ PTQ is equal to

Ans:- ∠ P + ∠ O + ∠ Q + ∠ T = 360 °

90 ° + 110 ° + 90 ° +∠ T = 360 °

∠ T = 360 ° — 290 ° = 70 °

13.Write the section formula?

Ans: $p(x, y) = \left(\frac{m_1x_2+m_2x_1}{m_1+m_2}, \frac{m_1y_2+m_2y_1}{m_1+m_2} \right)$

14. Write the area of a sector of a circle

Ans:- Area of sector $= \frac{\theta}{360°} \times \pi r^2$

2 x 16 = 32

II. Answer the following questions:

15. Which term of the AP : 3, 8, 13, 18,……..is 78

Ans: $a_n = 78$ a = 3   d= $T_2 - T_1 = 8 - 3 = 5$ n = ?

$a_n = a + (n-1)d \Rightarrow 78 = 3 + (n-1)5 \Rightarrow 78 = 3 + 5n - 5 \Rightarrow 78 = 5n - 2 \Rightarrow 5n = 80 \Rightarrow n = 16$

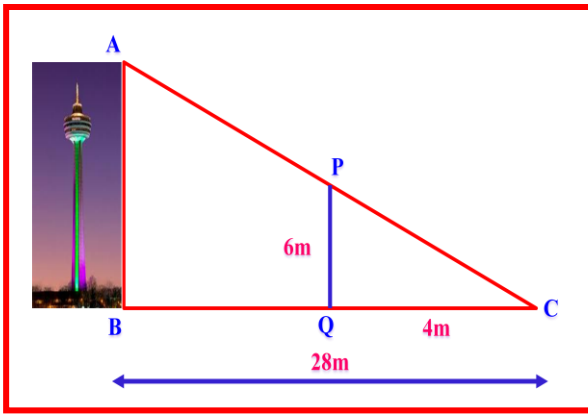
16. The 17^{th} term of an AP exceeds its 10^{th} term by 7 . Find the common difference.

Ans: a_{17} = a10 + 7

a + 16d = a + 9d + 7

a + 16d – a – 9d = 7

$7d = 7 \Rightarrow d = \frac{7}{7} = 1$



17. A vertical pole of length 6m casts a shadow 4m long on the ground

and at the same time a tower casts a

Shadow 28m long . Find the height of the tower.

Ans: Let AB be the height of tower AB=?

PQ be the height of the pole PQ = 6cm

QC be the shadow of pole QC = 4cm BC be the shadow of the tower = ? In Δle ABC and Δle PQC

$\angle$ ABC = $\angle$ ΔPQC ⇒ $\angle$ ABC = $\angle$ ΔPQC = [each 90°] ⇒ $\angle$ ACB = $\angle$ ΔPCQ [common angles]

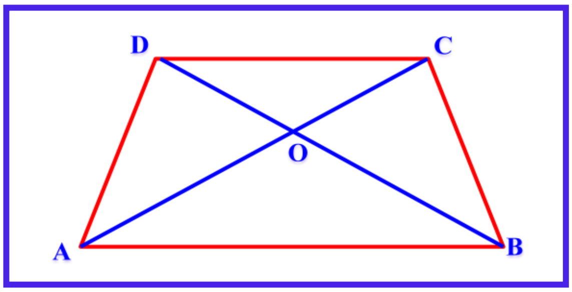
Δle ABC ~ Δle PQC [AA similarity criterion]

$\frac{AB}{PQ} = \frac{BC}{QC} \Rightarrow \frac{AB}{6} = \frac{28}{4} \Rightarrow AB = \frac{28 \times 6}{4} = 42m$

Height of the tower 42 m

18. Diagonals of a trapezium ABCD with AB || DC intersect each other at the point O . If AB = 2CD,

Find the ratio of the areas of triangles AOB and COD



Ans:- Given AB = 2CD

$\angle$ AOB = $\angle$ COD [V.O.A]

$\angle$ OAB = $\angle$ DCO [Alternate angles]

$\angle$ ABO = $\angle$ CDO [Alternate angles]

∴ Δle AOB ~ Δle COD [AA similarity]

$\frac{area\ of\ AOB}{area\ of\ COD} = \frac{AB^2}{CD^2} = \frac{(2CD)^2}{CD^2} = \frac{4CD^2}{CD^2}$

$\frac{area\ of\ AOB}{area\ of\ COD} = \frac{4}{1} \Rightarrow area\ of\ AOB : area\ of\ COD = 4 : 1$

19. On comparing the ratios $\frac{a_1}{a_2}, \frac{b_1}{b_2}, \frac{c_1}{c_2}$ find out whether the given pair of linear equation is consistent.

3x + 2y = 5 ; 2x – 3y = 7

Ans: 3x + 2y – 5= 0   2x – 3y – 7= 0

$a_1 = 3$ $b_1 = 2$ $c_1 = 5$ and $a_2 = 2$ $b_2 = -3$ $c_2 = -7$

$\frac{a_1}{a_2} = \frac{3}{2}$, $\frac{b_1}{b_2} = \frac{2}{-3}$, $\frac{c_1}{c_2} = \frac{-5}{-7} = \frac{5}{7}$ $\therefore \frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

$\therefore$ *the pair of* **Linear equation has unique solution. It is consistent.**

20. Solve by Substitution method :

x + y = 5
2x – 3y = 4

Ans:

x + y = 5 ------[1]
2x – 3y = 4 -----[2]

From equation [1] x = 5 – y ------[3] put equation [3] in equation [2]

$2(5 - y) - 3y = 4 \Rightarrow 10 - 2y - 3y = 4 \Rightarrow -5y = 4 - 10$

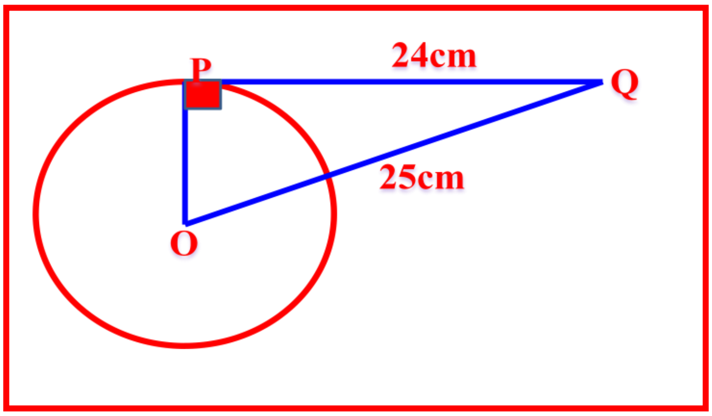
$Y = \frac{-6}{-5} = Y = \frac{6}{5}$ **Now put** $y = \frac{6}{5}$ **in equation [3]**

$x + y = 5 \Rightarrow x + \frac{6}{5} = 5 \Rightarrow x = 5 - \frac{6}{5} \Rightarrow = \frac{25-6}{5} = \frac{19}{5}$

$\therefore x = \frac{19}{5}$ and $y = \frac{6}{5}$

21. From a point Q, the length of the tangent to a circle is 24cm and the distance of Q from the centre is 25cm . The radius of the circle is .

Ans: - In Δle OPQ $\angle P = 90°$



$OQ^2 = OP^2 + PQ^2$ **[Pythagoras theorem]**

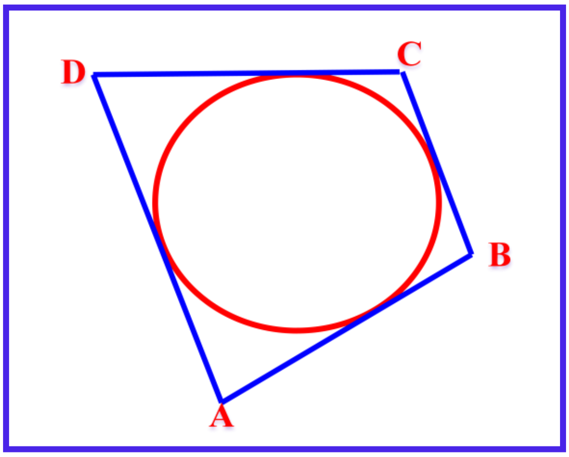
$(25)^2 = OP^2 + (24)^2$

$OP^2 = 625 - 576$

$OP = \sqrt{49} = 7$ cm

22. A quadrilateral ABCD is drawn to circumscribe a circle [see fig]

Prove that AB + CD = AD + BC



Ans: Since the lengths o4f two tangents drawn from An external point of circle are equal.

∴ AP = AS------1 [Tangents drawn from an external point A]

BP = BQ ------2[Tangents drawn from an external point B]

DR = DS------3 [Tangents drawn from an external point D]

CR = CQ ------ 4[Tangents drawn from an external point C]

Adding 1 2 3 & 4

(AP + BP) + (CR + DR) =(BQ + CQ) + (DS + AS)

AB + CD = BC + DA

23. Find the area of a sector of a circle with radius 6cm if angle of the sector is 60°

Ans: Given radius = 6cm and $\theta = 60°$

Area of sector = $= \frac{\theta}{360} \times \pi r^2$.

$= \frac{60}{360} \times \pi (6)^2$

$= \frac{60}{360} \times \pi (6 \times 6)$

$= \frac{60}{360} \times \pi 36$

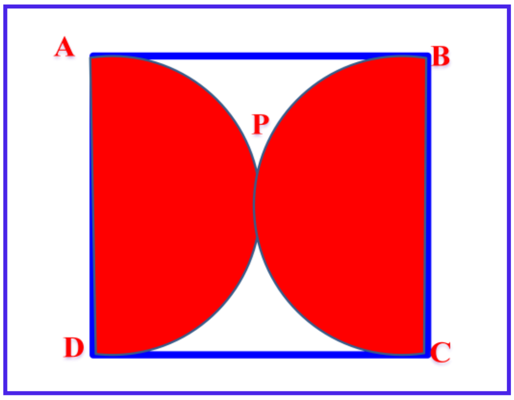
$= 6 \times \frac{22}{7} = \frac{132}{7}$ cm^2 **or** $18\frac{6}{7}$

24. Find the area of the shaded region in fig , if ABCD is a square of side 14cm and

APD and BPC are semicircles.

Ans:- Radius of semicircle = 7cm & side of square = 14cm.

Area of shaded region = Area of square ABCD – Areas of semicircles (APD + BPC)



$= (\text{side})^2 - \left(\frac{1}{2}\pi r^2 + \frac{1}{2}\pi r^2\right)$

$= (14)^2 - \left(\frac{1}{2}\pi(7)^2 + \frac{1}{2}\pi(7)^2\right)$

$= 196 - \frac{22}{7} \times (7)^2$.

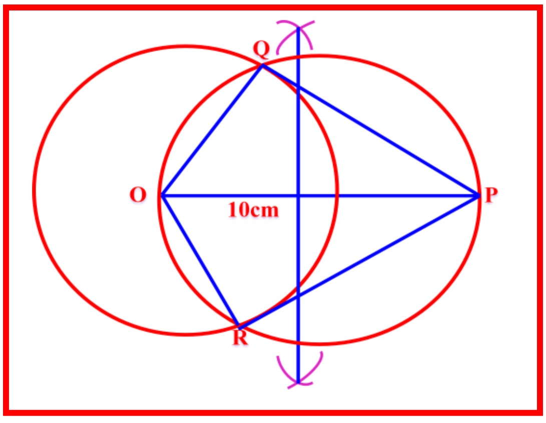
$= 196 - \frac{22}{7} \; 7 \times 7$.

$= 196 - 154 = 42$cm^2

25. Draw a circle of radius 6cm . From a point 10cm

Away from its centre , construct the pair of

tangents to the circle and measure their lengths.



26. Construct a triangle of sides 4cm, 5cm, and 6cm And then a triangle similar to it whose sides are

$\frac{2}{3}$ **of the corresponding sides of the first triangle.**

[32] Construct a triangle of sides 4cm, 5cm and 6cm and then a triangle similar to it whose sides are $\frac{2}{3}$ of the Corresponding sides of the first triangle.

Ans: - Step 1 Draw a line segment AB = 4cm. Taking point A as centre draw an arc of 5cm radius similarly, Taking point B as the centre, draw an arc of 6cm radius. These archs will intersect each other at point C, Now AC = 5cm and BC = 6cm and Δ ABC is the required triangle.

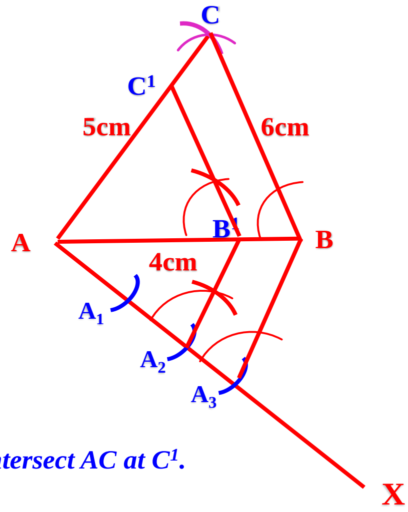
Step 2: Darw a ray AX making an acute angle with line AB on the opposite side of vertex C.

Step 3 : Locate 3 points A_1, A_2, A_3 (as 3 is greater between 2 and 3) on line AX such that $AA_1 = A_1A_2 = A_2A_3$.

Step 4 : join BA_3 and draw a line through A_2 parallel to BA_3 to intersect AB at point B^1.

Step 5 : Draw a line through B^1 parallel to the line BC to intersect AC at C^1.

Δ AB^1C^1 is the required triangle.



27. Find the distance between the pair of points. (2, 3) (4, 1)

Ans: $(x_1, y_1) = 2, 3$ **and** $(x_2, y_2) = 4, 1$

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

$= \sqrt{(4 - 2)^2 + (1 - 3)^2}$

$= \sqrt{(2)^2 + (2)^2}$

$= \sqrt{4 + 4} = \sqrt{8} = 2\sqrt{2}$

28. A (2, 3), B (4, k) and C (6 , –4) Find the value of 'k' for which the points are collinear.

Ans:

Co-ordinate Geometry

[21]Find the value of k, if the points A (2, 3), B(4, k) and C(6, – 4) are collinear.

Ans: A (x_1,y_1) → (2, 3) B (x_2,y_2) → (4, k) C (x_3,y_3) → (6, – 3)

Since these points are collinear therefore area of Δ ABC = 0

$\frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)] = 0$

$\frac{1}{2}[2(k - 3) + 4(-3 - 3) + 6(3 - k)] = 0$

$\frac{1}{2}[2k - 6 + -12 - 12 + 18 - 6k] = 0$

$\frac{1}{2}[-30 + 18 - 4k] = 0$

$\frac{1}{2}[-12 - 4k] = 0$

$\frac{1}{2}2[-6 - 2k] = 0$

$2k = -6$

$k = -3$

29. Prove that $2 + \sqrt{5}$ is irrational

1. Prove that $2 + \sqrt{5}$ is an irrational number.

Ans: If possible let us assume $2 + \sqrt{5}$ is a rational number.

$2 + \sqrt{5} = \frac{p}{q}$. Where $p, q \in z, q \neq 0$

$2 - \frac{p}{q} = -\sqrt{5}$

$\frac{2q - p}{q} = -\sqrt{5}$

$\Rightarrow -\sqrt{5}$ is a rational number

$\because \frac{2q-p}{q}$ = is a rational number

but $-\sqrt{5}$ is a rational number

$\therefore$ our supposition $2 + \sqrt{5}$ is a rational number is wrong.

$\Rightarrow 2 + \sqrt{5}$ is an irrational number.

1.Prove that $5 - \sqrt{3}$ is an irrational number.
2.Prove that $\sqrt{5} + \sqrt{3}$ is an irrational number.
3.Prove that $\sqrt{2} + \sqrt{5}$ is an irrational number.
4.Prove that $\sqrt{2}$ is an irrational number.
5.Prove that $\sqrt{5}$ is an irrational number.
6.Prove that $2\sqrt{5} - 4$is an irrational number.

30. An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in whichThey can march.

Ans: H.C.F of 616 and 32

Step – 1 : Euclid's division lemma a = 616 and b = 32 a = bq + r

616 = 32 x 19 + 8

616 = 616

Step : 2 Euclid's division lemma a = 32 and b = 8 a = bq + r

32 = 8 x 4 + 0

32 = 32 Here remainder is zero So HCF of (616 , 32)

Hence maximum number of columns is 8

32) 616 (19
32

296
288

8

8) 32 (4
32

0

31. Find the sum of first 40 positive integers divisible by 6 OR

31[a] Find the sum of the first 15 multiples of 8

Ans: Let the first 40 positive integers divisible by 6 are 6, 12, 18, 24, -----

[31] Find the sum of the first 40 positive integers divisible by 6

Ans:- Let the first 50 positive integers divisible by 6 are

6, 12 , 18, 24, ------

a= 6 , d = 6 , n = 40 S_{40} = ?

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

$= \frac{40}{2} [2(6) + (40-1)6]$

$= \frac{40}{2} [12 + (39)6]$

= 20 [12 + 234]

= 20 x 246 = 4920

31[a] Find the sum of the first 15 multiples of 8

8, 16 , 24, 32, ------

a= 8 , d = 8 , n = 15 S_{15} = ?

$Sn = \frac{15}{2} [2(8) + (15-1)8]$

$= \frac{15}{2} [2(8) + (15-1)8]$

$= \frac{15}{2} [16 + 112]$

$= \frac{15}{2} [128]$

S_{15}= 15 x 64 = 960

32. Prove Thales theorem Basic proportionality theorem OR

Theorem (AA similarity Criterion) " If two triangles are equiangular , then their corresponding sides are proportional "

Ans: In text book page

33.Solve equation graphically : 2x + 3y = 9

4x + 6y = 18

Ans:-

Solve equation graphically

$2x + 3y = 9$

$4x + 6y = 18$

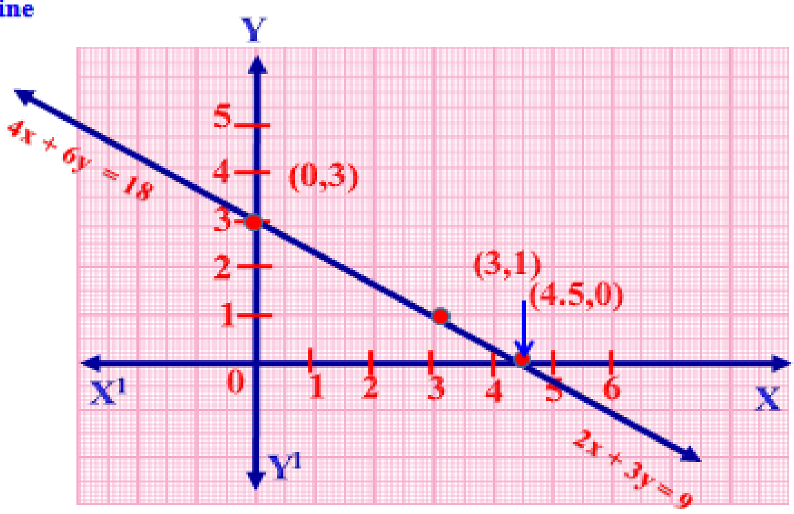
Answer: To obtain the equivalent geometric representation, we find two points on the line representing each equation. That is, we find two solutions of each equation.

These solutions are given below in Table

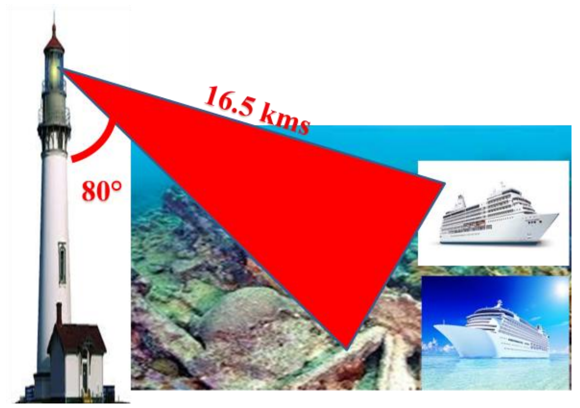
x	0	4.5
$y = \frac{9-2x}{3}$	3	0

x	0	3
$y = \frac{18-4x}{6}$	3	1

We plot these points in a graph paper and draw the lines. We find that both the lines coincide this is so because both the equations are equivalent



34. Two warn ships for underwater rocks, a lighthouse spreads a red coloured light over a sector of angle 80° To a distance of 16.5km . Find the area of the sea over which the ships are warned. [use π = 3.14]



34. To warn ships for underwater rocks, a lighthouse spreads a red coloured light over a sector of angle 80°
To a distance of 16.5km . Find the area of the sea over which the ships are warned.
[use π = 3.14]

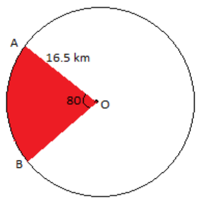
Ans: $\theta = 80°$ $r = 16.5km$

Area of sea warned by ships
Area of a sector angle .

$= \frac{\theta}{360} \times \pi r^2$

$= \frac{\theta}{360} \times 3.14 \times (16.5)^2$

$= 189.97 \text{ km}^2$



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

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

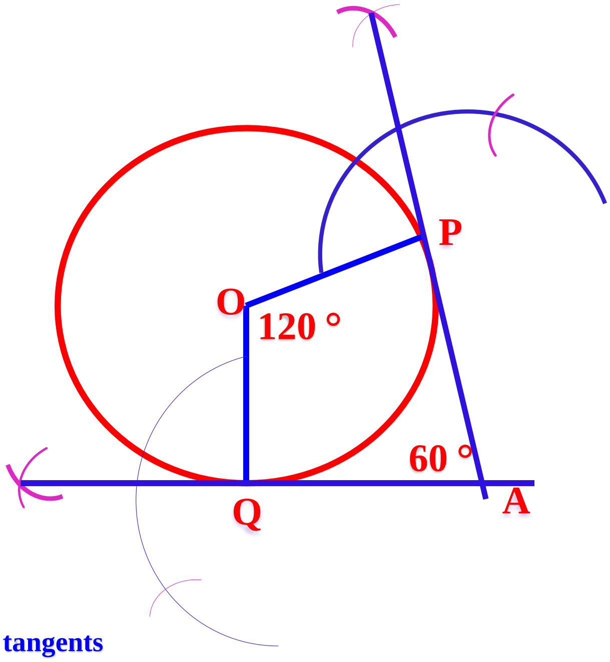
Steps of construction.

[1]Draw a circle of radius 5cms with centre O.

[2] Angle between the radii = 180° – angle between the tangents = 180 ° – 60 ° = 120 °

[3] Draw perpendiculars to OP and OQ

4] join AP and AQ



4∴ AP and AQ are the two required tangents

[35] Find the area of the quadrilateral whose vertices taken in order, are

(– 4 – 2), (– 3 – 5) (3 – 2) and (2, 3)

Ans: Let A (– 4 – 2), B (– 3 – 5) , C (3 – 2) and D (2, 3) are the vertices of quadrilateral

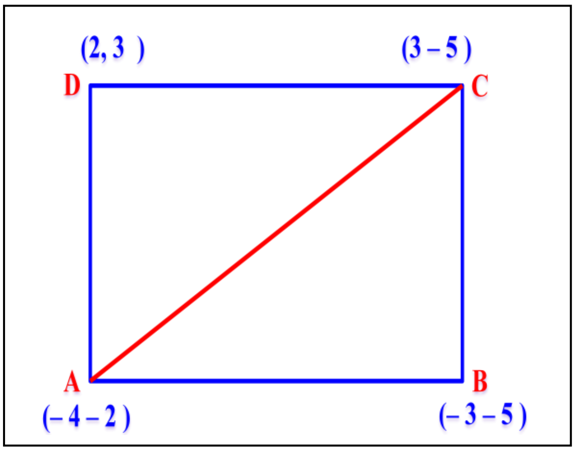
Area of triangle ABC = $= \frac{1}{2} [x_1 (y_2 - y_3) + x_2 (y_3 - y_1) + x_1 (y_1 - y_2)]$

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

$== \frac{1}{2} [(-4 \text{ x } -3) - 3 \text{ x } 0 + 3 \text{ x } 3)]$

$= \frac{1}{2} [12 + 0 + 9]$

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



Area of triangle ADC = $\frac{1}{2} [(-4 (-2 - 3) + 3 (3 + 2) + 2 (-2 + 2))]$

$= \frac{1}{2} [-4 \text{ x } -5 + 3 \text{ x } 5 + 2 \text{ x } 0]$

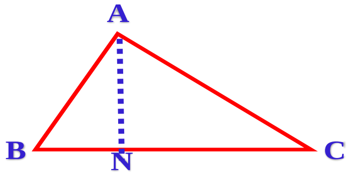
$= \frac{1}{2} [20 + 15]$ **Area of** Δ **ADC** $= \frac{35}{2}$

Area of quadrilateral ABCD = Area of Δ **ABC + area** Δ **ACD**

$= \frac{21}{2} + \frac{35}{2} = \frac{56}{2} = 28$ **[Area of quadrilateral ABCD = 28 sq.units]**

35[a] Prove that " In a right angled triangle the square on hypotenuse is equal to the sum of the square on the Other two siders"

Theorem :2.8:In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the Other two sides.



Proof: We are given a right triangle ABC right angled at B

We need to prove that $AC^2 = AB^2 + BC^2$

Let us draw BD ⊥ AC [see fig]

Now Δ ADB ~ ΔABC (*Theorem* 6.7)

So, $\frac{AD}{AB} = \frac{AB}{AC}$ **(Sides are proportional)**

OR AD. AC = AB^2………..*[1]*

Also Δ ABDC ~ Δ*ABC* [Theorem 6.7]

So, $\frac{CD}{BC} = \frac{BC}{AC}$

OR CD. AC = BC^2………..*[2]*

Adding (1) and (2)

$AD . AC + CD . AC = AB^2 + BC^2$

$AC (AD + CD) = AB^2 + BC^2$

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

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

36] A sum of Rs. 700 is to be used to give seven cash prizes to students of a school for their overall Academic performance. If each prize is Rs. 20 less than its preceeeing prize, find the value of each Of the prizes. OR

38[a] 200 logs are stacked in the following manner : 20 logs in the bottom row , 19 in the next row, 18 in the row next to it and so on [see fig] In how many rows are the 200 logs placed and how many logs Are in the top row?

Ans: Given $a_1, a_2, a_3, a_4, a_5, a_6, a_7$, Sn = 700 n = 7 d = 20 a = ?

$Sn = \frac{n}{2} [2a + (n – 1) d]$

$700 = \frac{7}{2} [2a + (7 – 1) 20]$

$= \frac{700 \times 2}{7} = 2a + 6 \times 20$

200 = 2a + 120

2a = 120 – 200

$a = \frac{80}{2} = 40$

Value of each prize a, a+d , a + 2d , a + 3d , a+ 4d , a +5d , a + 6d

40, 40 + 20 , 40 +2(20) , 40 +3(20) , 40 +4(20) , 40 +5(20) , 40 +6(20) ,

40 , 60 , 80, 100, 120, 140 , `160

Value of 7 prizes are Rs. 160 , 140, 120, 100, 80, 60, 40

36[a]

38[a] 200 logs are stacked in the following manner : 20 logs in the bottom row , 19 in the next row, 18 in the row next to it and so on [see fig] In how many rows are the 200 logs placed and how many logs Are in the top row?

Ans : - 38[a] Ans : 20 , 19 , 18

Sn = 200 a = 20 d = – 1

$Sn = \frac{n}{2} [2a + (n – 1) d]$

$200 = \frac{n}{2} [2(20) + (n – 1) –1]$

400 = n[40 – n +1]

400 = n[41 – n]

$400 = 41n – n^2$

$n^2 – 41n + 400= 0$

Ans : $-n^2 – 25n – 16n + 400= 0$

n(n – 25) – 16(n – 25)

(n – 25) (n – 16)= 0

n – 25 = 0 or n – 16 = 0

n = 25 or n = 16 Hence number of rows are either 25 or 16

number of logs are 20

a16 = a + (n – 1) d

= 20 + (16 – 1) – 1

= 20 + 15 x – 1

= 20 – 15 = 5

∴ number of logs in top row are 5

37. Five years ago Nuri was thrice as old as sonu.

Ten years later , nuri will be twice as sold as Sonu. How old are nuri and Sonu.

Ans:- Let the age of Nuri be 'x' years and Sonu age be 'y' years .

x – 5 = 3 (y – 5)

x – 5 = 3y – 15

x - 3y = 10 -------------------[1]

x + 10 = 2 (y + 10)

x + 10 = 2 y + 20

x – 2y = 20 – 10

x – 2y = 10 ------------------[2]

subtract equation (1) & (2)

x – 3y = 10

x – 2y = 10

–y = - 20

y = 20

put y = 20 in equationb [1]

x – 3 (20) = – 10

x – 60 = – 10

x = – 10 + 60

x = 60

Therefore age of Nuri is 50 years

And sonu age is 20 years.

38. Draw a circle of radius 3cm. Take two points P and Q on one of its extended diameter each at a distance Of 7cm from its centre. Draw tangents to the circle from these points P and Q . syllabus

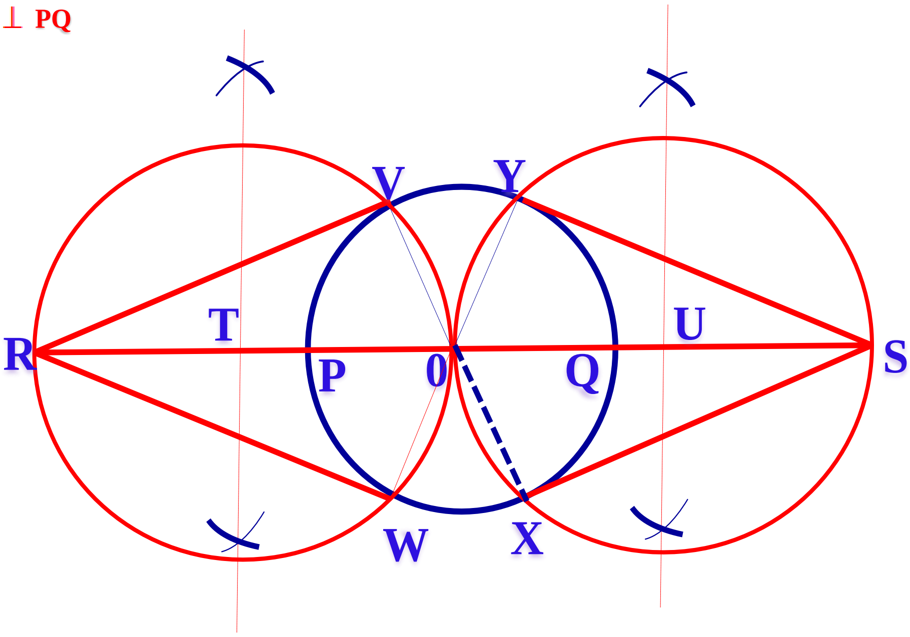
Justification: The construction can be justified by proving that RV, RW, SY, and SX are the tangents to

To the circle (whose centre is O and radius is cm). For this , join OV, OW OX, and OY

∠RVO is an angle in the semi-circle. We know that angle in a semi-circle is a right angle.

∴ ∠ RVO = 90° ⇒ OQ ⊥ PQ

Since OV is the radius of the circle, RV has to be a tangent of the circle. Similarly OW, OX and OY



are the tangents of the circle.

OR 38[a]

[1] A boat goes 30 km upstream and 44km downstream in 10 hours. In 13 hours, it can go 40km upstream and 55 km down-stream. Determine the speed of the stream and that of The boat in still water.

Solution: Let the speed of the boat in still water be x km/h and speed of the stream be y km/h . Then the speed of the boat downstream = (x + y) km/h

And the speed of the boat upstream = (x – y) km/h

Also $\text{time} = \dfrac{\text{distance}}{\text{speed}}$

In the first case, when the boat goes 30km upstream let the time taken, in hour, be t_1.

Then $t_1 = \dfrac{30}{x - y}$ Let t_2 be the time in hours, taken by the boat to go 44km downstream.

Then $t_2 = \dfrac{44}{x + y}$. The total time taken $t_1 + t_2$ is 10 hours. $\therefore \dfrac{30}{x - y} + \dfrac{44}{x + y} = 10$

In the second case, in 13 hours it can go 40 km upstream and 55km down stream

On substituting these values in Equations (1) and (2) we get the pair of linear equations:

$30u + 44v = 10$ or $30u + 55v - 10 = 0$ ------------[4]

$40u + 55v = 13$ or $40u + 55v - 13 = 0$ ------------[5]

Using Cross – multiplication we get

$$\therefore \frac{u}{44(-13)-55(-13)} = \frac{v}{40(-10)-30(-13)} = \frac{1}{30(55)-44(40)}$$

i.e., $\frac{u}{-22} = \frac{v}{-10} = \frac{1}{-110}$

$u = \frac{1}{5}$ $v = \frac{1}{11}$

Now put these values of u and v in Equations 3 we get

$\therefore \frac{1}{x-y} = \frac{1}{5}$ and $\frac{1}{x+y} = \frac{1}{11}$

$x - y = 5$ and $x + y = 11$

Adding these equations we get $2x = 16$ i.e., $x = 8$

Subtracting the equations in (6) we get

$2y = 6$ i.e., $y = 3$

$2y = 6$ i.e., $y = 3$

Hence the speed of the boat in still water is 8km/h and the speed of the Stream is 3 km/h.

PRACTICE PAPER

U can write your school name

I. Answer the following [mcq]

1 x 8 = 8

1. the nth term an of the AP with first term a and common difference d is given by

[a] $S_n = a + (n-1)$ *[b]* $S_n = \frac{n(n+1)}{2}$ *[c]* $Sn = \frac{n}{2}[2a + (n-1)d]$ *[d]* $a_n = a + (n-1)d$.

2. The pair of co-ordinates satisfying 2x + y = 6 is

[a] 1,1 [b] 2,2 [c] 3 ,3 [d] 4,4

3. The following is an example of Pythagorean triplet

[a] 3, 5, 7 [b] 12, 14, 16 [c] 3,6, 9 [d] 1.5, 2, 2.5

4. All circles are______ (congruent, similar)

[a] similar_ [b] congruent [c] Equal [d] Concentric

5. Formula to find the area of Quadrant

[a] $\frac{\pi r^2}{2}$ [b] πr^2 [c] $\frac{\pi r^2}{3}$ [d] $\frac{\pi r^2}{4}$

6. If $\Delta ABC \sim \Delta DEF$ then

[a] $\frac{AB}{DE} = \frac{BC}{EF} = \frac{BC}{DF}$ [b] $\frac{AB}{DE} = \frac{BC}{EG} = \frac{AC}{DF}$ [c] $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AB}{DF}$ <u>[d]</u> $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

7. Which is the Mid-point formula

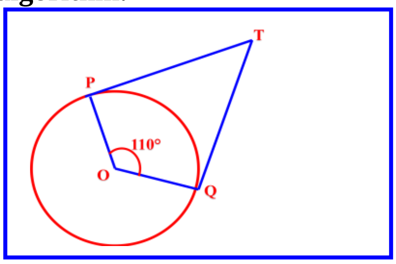
[a] $p(x,y) = \frac{x_2+x_1}{2}, \frac{y_2+y_1}{2}$ [b] $p(x,y) = \frac{x_2+x_1}{4}, \frac{y_2+y_1}{4}$, [c] $p(x,y) = \frac{x_2+x_1}{3}, \frac{y_2+y_1}{3}$ [d] $p(x,y) = \frac{x_2+x_1}{2}$

8. A number which can be expressed in the form of $\frac{p}{q}$ is called

1 x 8 = 8

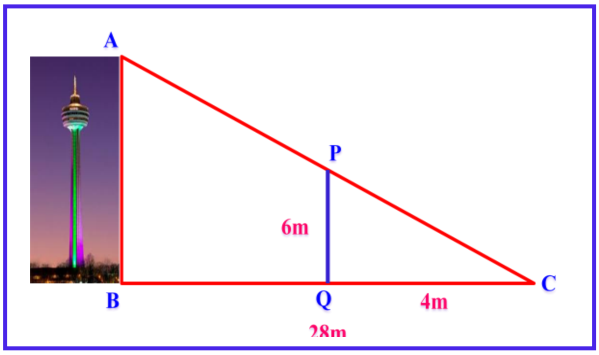
[a] rational number [b] irrational number [c] lemma [d] algorithm.

II Answer the following:



9. In the following AP the missing terms in the box is 2, ☐ 26 is

10. State the converse of B.P.T. Thales:



11. State Euclid's division lemma

12. If TP and TQ are the two tangents to a circle with centre O is

So that ∠ POQ = 110° then ∠ PTQ is equal to

13.Write the section formula?-

14. Write the area of a sector of a circle

15. Which term of the AP : 3, 8, 13, 18,……..is 78

16. The 17th term of an AP exceeds its 10+th term by 7 .

Find the common difference.

2 x 8 = 16

II. Answer the following questions:

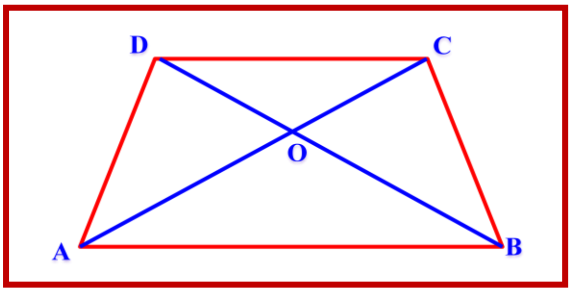
17. A vertical pole of length 6m casts a shadow 4m long on the ground

and at the same time a tower casts a

18. Diagonals of a trapezium ABCD with AB || DC

intersect each other at the point O . If AB = 2CD,

Find the ratio of the areas of triangles AOB and COD



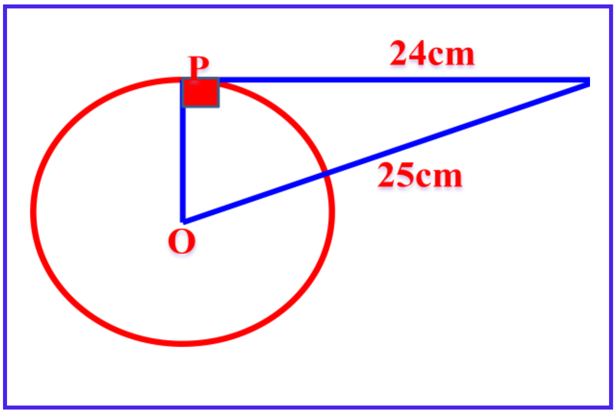
19. On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$, $\frac{c_1}{c_2}$ find out whether the given pair of linear equation is

3x + 2y = 5 ; 2x – 3y = 7

20. Solve by Substitution method :

x + y = 5 ------[1]

2x – 3y = 4 -----[2]



21. From a point Q, the length of the tangent

to a circle is 24cm and the distance

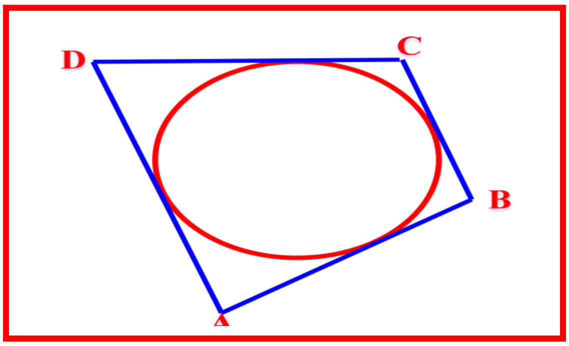
of Q from the centre is 25cm .

The radius of the circle is .

22. A quadrilateral ABCD is drawn to

circumscribe a circle [see fig]

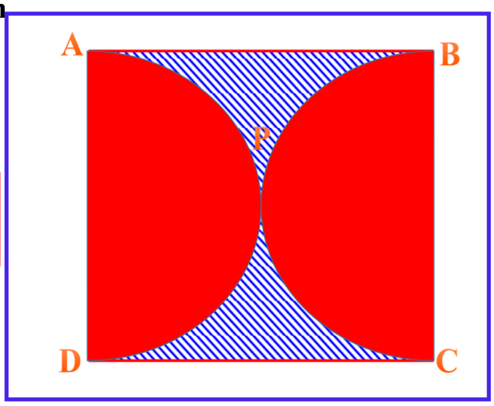
Prove that AB + CD = AD + BC



23. Find the area of a sector of a circle with radius 6cm if angle of the sector is 60°

24. Find the area of the shaded region in fig , if ABCD is a square of side 14cm

and APD and BPC are semicircles.



25. Draw a circle of radius 6cm . From a point 10cm

Away from its centre , construct the pair of

tangents to the circle and measure their lengths

3 x 9 = 27

26. Construct a triangle of sides 4cm, 5cm, and 6cm And then a triangle

similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.

27. Find the distance between the pair of points. (2, 3) (4, 1)

28. A (2, 3), B (4, k) and C (6 , –4) Find the value of 'k' for which the points are Collin

29. Prove that $2 + \sqrt{5}$ is irrational

30. An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which They can march.

31. Find the sum of first 40 positive integers divisible by 6 OR

31[a] Find the sum of the first 15 multiples of 8

32. Prove Thales theorem Basic proportionality theorem OR

Theorem (AA similarity Criterion) " If two triangles are equiangular , then their corresponding sides are proportional "

33.Solve equation graphically : $2x + 3y = 9$

$4x + 6y = 18$

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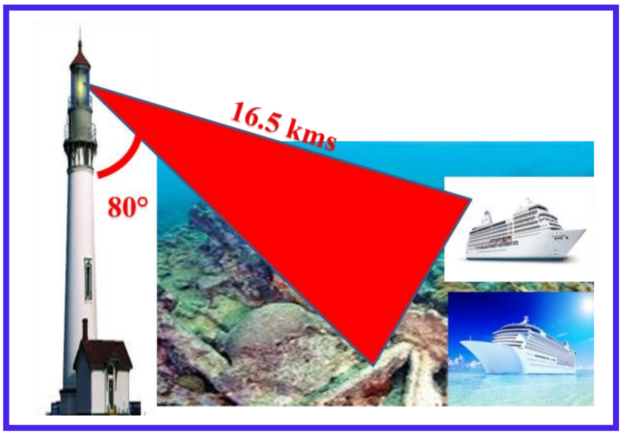

OR

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OR

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