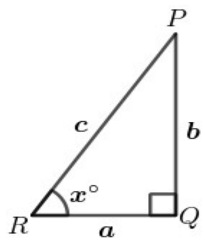
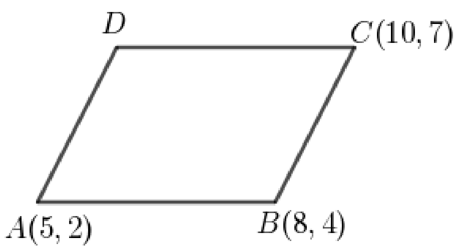
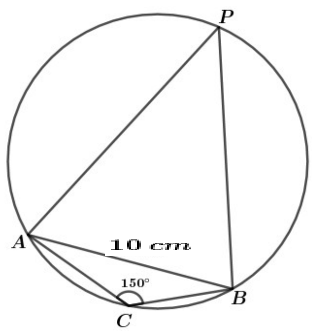
WANDOOR GANITHAM - S S L C MODEL QUESTION PAPER 2021

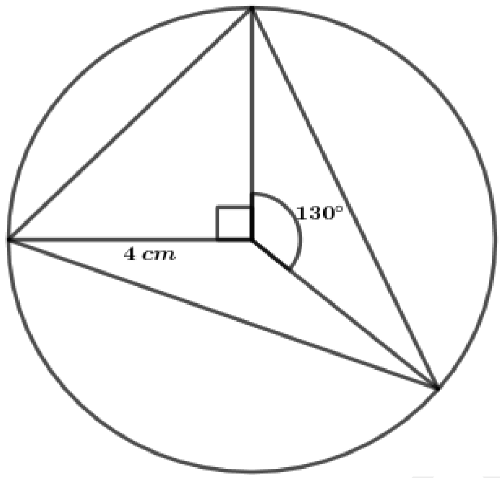
PREE2

DETAILED ANSWER KEY - QUESTION PAPER 2

Qn no.	Key
	For questions from 1 to 5 one score each .
1	**The sum of first five terms of an arithmetic sequence is 30 and sum of first seven terms is 56 . What is the sum of its sixth and seventh terms ?** **(43 , 16 , 26 , 50)**
	Answer . $x_6 + x_7 = S_7 - S_5 = 56 - 30 = 26$
2	**Which among the following is** $\tan x^0$ **?** $\left(\frac{b}{c} \ , \ \frac{a}{c} \ , \ \frac{b}{a} \ , \ \frac{a}{b} \right)$ 
	Answer . $\tan x^0 = \frac{opposite\ side\ of\ x^0}{adjacent\ side\ of\ x^0} = \frac{b}{a}$
3	**(0 ,0) and (6, 8) are the ends of the diameter of a circle . What is its radius ?** **(10 , 6 , 8 , 5)**
	Answer . **Diameter** = $\sqrt{(6-0)^2+(8-0)^2} = \sqrt{6^2+8^2} = \sqrt{36+64} = \sqrt{100} = 10$ **Radius** = $\frac{10}{2} = 5$
4	**In the figure ABCD is a parallelogram . What are the coordinates of D ?** **((5 , 7) , (3 , - 1) , (13 , 9) , (7 , 5))** 

	Answer . $(5+10-8\ ,\ 2+7-4)\ =\ (7,5)$
5	**In a class there are 30 boys and 20 girls . One student is to be selected as leader .** **What is the probability that the class leader will be a boy ?** **(** $\frac{30}{50}$, $\frac{20}{50}$, $\frac{30}{20}$, $\frac{20}{30}$ **)**
	Answer . **Probability that the class leader will be a boy =** $\frac{Numer\ of\ favourable\ results}{Total\ number\ of\ results}\ =\ \frac{30}{50}$
For questions from 6 to 10 carries 2 scores each .	
6	**Seventh term of an arithmetic sequence is 10 and its tenth term is 7 .** **a) What is its common difference ?** **b) What is its 17th term ?**
	Answer . **a)** $common\ difference = \frac{term\ difference}{position\ difference}\ =\ \frac{7-10}{10-7}\ =\ \frac{-3}{3}\ =\ -1$ **b)** $x_{17}\ =\ x_{10} + 7\times d = 7+7\times-1\ =\ 7-7\ =\ 0$
7	$p(x)$ **is a second degree polynomial ,** $p(3)=0, p(-5)=0$ **and the coefficient of** x^2 **is 1 .** **a) Write a factor of** $p(x)$ **?** **b) Write** $p(x)$ **as the product of two first degree polynomials ?**
	Answer . **a)** $x-3$ **or** $x+5$ **b)** $(x-3)(x+5)$

8	**In triangle** ABC **,** $AB=10\,cm, <ACB=150^0$ **.** P **is a point on the alternate arc of arc** ACB **.** **a) What is the measure of** $<APB$ **?** **b)What is the circumdiameter of triangle** ABC **?** 
	<u>Answer .</u> **a)** $<APB = 180-<ACB = 180-150 = 30^0$ **(opposite angles of a cyclic quadrilateral are supplementary)** **b) Circumdiameter of triangle** ABC **=** $\frac{AB}{\sin P} = 10\div\frac{1}{2} = 10\times2 = 20\ cm$
9	**A solid metal cylinder of base radius 9 centimetres and height 20centimetres is melted and recast into cones of same base radius and heght as that of the cylinder .** **a) What is the volume of the cylinder ?** **b) How many cones can be made ?**
	<u>Answer .</u> **a) Volume of the cylinder =** $\pi\times r^2\times h = \pi\times9^2\times20=1620\ \pi\ sq.cm$ **b)** 3
10	**Consider a line passing through the points (4 , 2) and (9 , 5) .** **a) What is the slope of the line ?** **b) If (m , n) is a point on this line ,prove that (m +10 , n + 6) is also a point on this line?**
	<u>Answer .</u> **a) Slope of the line =** $\frac{5-2}{9-4}=\frac{3}{5}$ **b)** $\frac{n+6-n}{m+10-m}=\frac{6}{10}=\frac{3}{5}$ **Since the slopes are same , (m +10 , n + 6) is a point on this line**

	For questions from 11 to 20 carries 3 scores each .
11	**Draw a triangle of circumradius 4 cm and two of the angles 45 ^{0} and 65 ^{0} .**
	
12	**Consider an arithmetic sequence 5 , 9 , 13 , ...** **a) What is its common difference ?** **b)What is its algebraic form ?** **c) Find the position of 121 in this sequence ?**
	<u>Answer .</u> **a) Common difference =** $9-5=4$ **b) Algebraic form =** $dn+f-d=4n+5-4=4n+1$ **c)** $4n+1=121$ $4n=121-1=120$
13	**If** $p(x)=x^2-25$ **a) Find** $p(5)$ **?** **b) Write** $p(x)$ **as the product of first degree polynomials ?** **c) Write** $121x^2-25$ **as the product of first degree polynomials ?**

Answer .

a) $p(5)=5^2-25 = 25-25 = 0$

b) $(x-5)(x+5)$

c) $121x^2-25 = (11x-5)(11x+5)$

14 **One is asked to say a two digit number .**

a) How many two digits numbers are there ?

b) What is the probability that both the digits being same ?

c) What is the probability that the product of the digits being zero ?

Answer .

a) 90

b) Favourable results = 11 , 22 , 33 , 44 , 55 , 66 , 77 , 88 , 99

Probability that both the digits being same = $\frac{Numer\ of\ favourable\ results}{Total\ number\ of\ results} = \frac{9}{90}$

c) Favourable results = 10 , 20 , 30 , 40 , 50 , 60 , 70 , 80 , 90

Probability that the product of the digits being zero =

$$\frac{Numer\ of\ favourable\ results}{Total\ number\ of\ results} = \frac{9}{90}$$

15 **The below are the the rain fall in millimetres in a place last week .**

55 , 62 , 70 , 61, 63 , 56 , 53

a) What is mean rainfall during that week ?

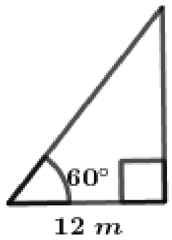
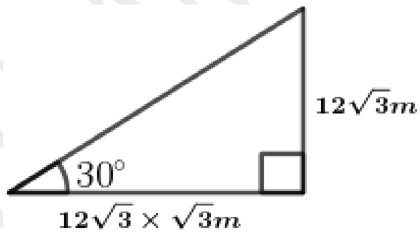
b) What is median rainfall during that week ?

Answer .

a) $Mean = \frac{55+62+70+61+63+56+53}{7} = 60\ mm$

b) 53 , 55 , 56 , 61 , 62 , 63 , 70

Median = $61\ mm$

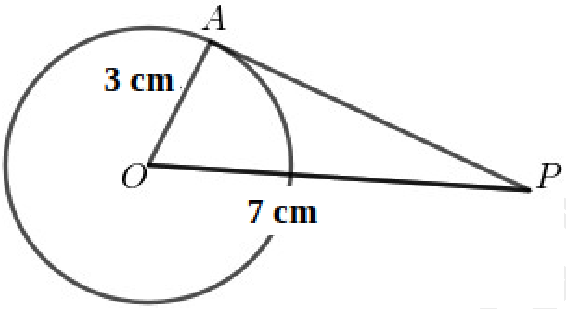
16	**When sun is an elevation of 60^0, the length of the shadow of a tree is 12 meters.** **a) Draw a rough figure based on the given details ?** **b) What is the height of the tree ?** **c) What will be the length of the shadow if sun is an elevation of 30^0 ?**
	<u>Answer .</u> **a)**   **b) Height of the tree =** $12\sqrt{3}\ m$ **c) Length of the shadow =** $12\sqrt{3}\times\sqrt{3}=36\ m$
17	**Two cones have same volume . Their heights are in the ratio 9 : 16** **a) If the height of the first cone is taken as 9h , what is the height of the second cone?** **b) What is the ratio of their radii ?**
	<u>Answer .</u> **a) Height of the second cone = 16 h** **b)** $\frac{1}{3}\times\pi\times r_1^2\times 9h = \frac{1}{3}\times\pi\times r_2^2\times 16h$ $\frac{r_1^2}{r_2^2}=\frac{16}{9}$ ===> $\frac{r_1}{r_2}=\sqrt{\frac{16}{9}}=\frac{4}{3}$ **Ratio of the radii =** $4:3$
18	**A (0 , 0) , B(2 , 0) and C(1 ,** $\sqrt{3}$ **) are the vertices of a triangle .** **a) What is the length of AB ?** **b) What is the length of BC ?** **c) Prove that ABC is an equilateral triangle ?**
	<u>Answer .</u> **a)** $AB=2$

b) $BC=\sqrt{(1-2)^2+(\sqrt{3}-0)^2}=\sqrt{(-1)^2+3}=\sqrt{1+3}=\sqrt{4}=2$

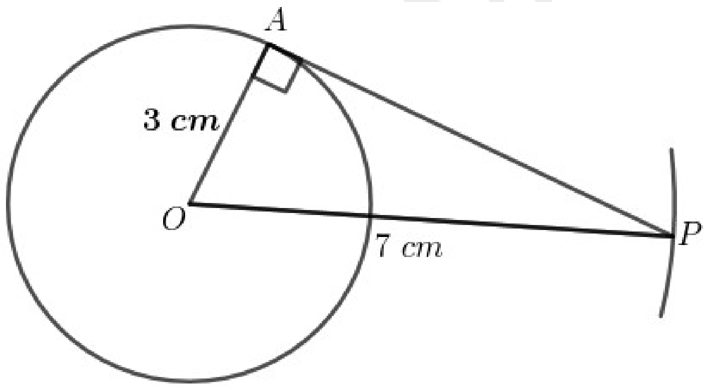
c) $AC=\sqrt{(1-0)^2+(\sqrt{3}-0)^2}=\sqrt{1+3}=\sqrt{4}=2$

$AB = BC=AC$ **==> ABC is an equilateral triangle .**

19



In the figure O is the centre of the circle . PA is a tangent and the radius of the circle is 3 centimetres .Draw this figure in the given measures .

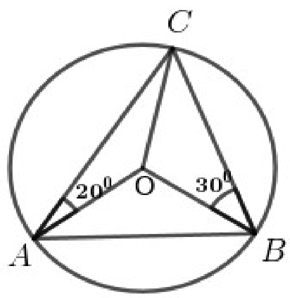


20 **In the figure O is the centre of the circle .< OAC = 20 ^{0}**

< OBC = 30 ^{0}

a) What is the measure of < ACO ?

b) What is the measure of < AOB ?



<u>Answer .</u>

A) $\angle ACO = 20^0$ **(OA = OC , radii of a circle are equal)**

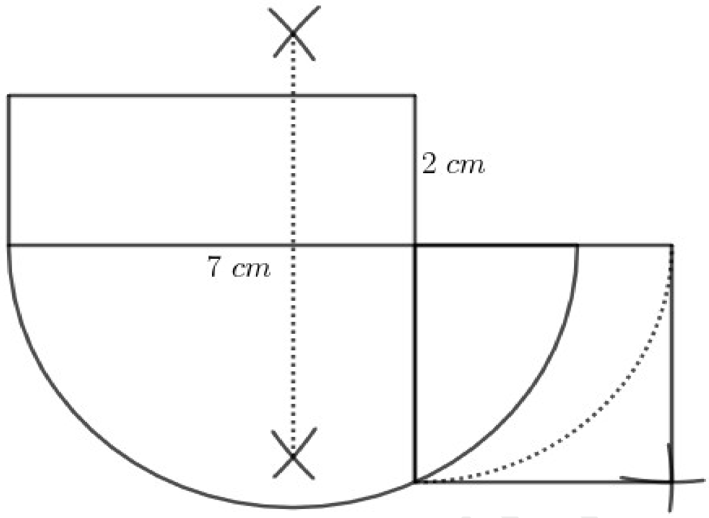
b) $\angle BCO=30^0$ **(OB = OC)**

$\angle ACB = 20+30 = 50^0$ **==>** $\angle AOB=2\times 50^0=100^0$

(The central angle of an arc is double the angle made by it on the alternate arc)

For questions from 21 to 30 carries 4 scores each .

21 **Draw a rectangle of width 7 cm and height 2 cm . Draw a square of the same area .**



22 **The angles of a hexagon are in arithmetic sequence .The smallest angle is 80^0 .**

a) What is the sum of the angles of a hexagon ?

b) What is the sum of the largest and smallest angles ?

c)What is the common difference ?

<u>Answer .</u>

a) Sum of the angles of a hexagon = $4 \times 180 = 720^0$

b) $x_1 + x_6 = \frac{720}{3} = 240^0$

c) Largest angle = $240 - 80 = 160^0$

$$common\,difference = \frac{term\,difference}{position\,difference} = \frac{160-80}{6-1} = \frac{80}{5} = 16^0$$

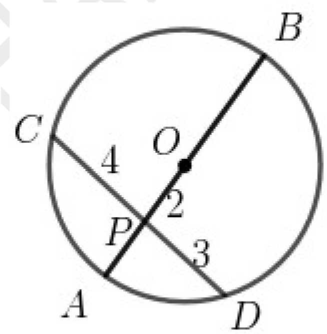
23 **A bag contains 15 white and 25 green beads . Take one bead from this**

a) What is the probability of getting a green bead ?

b) What is the probability of getting a white bead ?

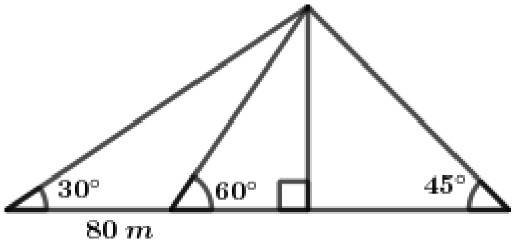
c) How many more green beads are to be put in the box to make the probability of getting a white bead is $\frac{3}{10}$ **?**

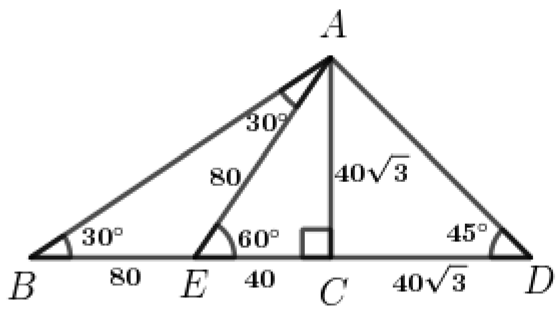
	d) If some balls are taken out from the bag , then the probability of getting a white bead becomes $\frac{1}{q}$ **. What is the probability of getting a green bead ?**
	<u>**Answer .**</u> **a) Probability of getting a green bead=** $\frac{Numer\ of\ favourable\ results}{Total\ number\ of\ results} = \frac{25}{400}$ **b) Probability of getting a white bead =** $\frac{Numer\ of\ favourable\ results}{Total\ number\ of\ results} = \frac{15}{40}$ **c)** $50-40=10$ $\left(\frac{3}{10}=\frac{15}{50}\right)$ **d)** $1-\frac{1}{q}$
24	**Perpendiculars are drawn from a point P to the axes , cut the x axis at (3 , 0) and the y axis at (0, 2) .** **a) What are the coordinates of P ?** **b) Write down the coordinates of two more points on a line passing through the point P parallel to the y – axis ?** **c)Write down the coordinates of another point on a line passing through the point P perpendicular to the y – axis ?**
	<u>**Answer .**</u> **a)** $(3,2)$ **b)** $(3,3)$, $(3,4)$ **or any two points with x -coordinate 3** **c)** $(1,2)$ **or any point with y – coordinate 2 .** **(The line parallel to y – axis is parallel to the x – axis)**
25	**If** $p(x)=x^2-7x+12$ **a) Find** $p(2)$ **?**

	b) Write a factor of $p(x)-p(2)$ **?** **c) Write** $p(x)-p(2)$ **as the product of two first degree polynomials ?**
	<u>Answer .</u> **a)** $p(2) = 2^2 - 7x \times 2 + 12 = 2$ **b)** $(x-2)$ **c)** $p(x)-2 = (x^2-7x+12)-2 = x^2-7x+10$ $x^2-7x+10 = (x-2)(x-5)$
26	**In the figure O is the centre of the circle . Chords AB and CD are intersect at P . PC = 4 cm , PD = 3 cm , PO = 2 cm**  **a) If the radius of the circle is taken as r , what is the length of PB ?** **b) PA x PB = ...** **c) What is the radius of the circle ?**
	<u>Answer .</u> **a)** $PB = r+2$ **b)** $PA \times PB = PC \times PD$ **or** $4 \times 3 = 12$ **c)** $PA \times PB = 12$ ==> $(r+2)(r-2) = 12$ ==> $r^2 - 2^2 = 12$ $r^2 - 4 = 12$ ==> $r^2 = 12+4 = 16$ ==> $r = \sqrt{16} = 4 \ \ cm$
27	**Raju and Geetha stand on either side of a tower . Raju sees the top of the building at an elevation 30^0 and Geetha sees it an elevation of 45^0 . After moving 80 metres towards the tower , Raju sees its top at an elevation 60^0** **a) Draw a rough figure based on the given details ?** **b) What is the height of the tower ?** **c) What is the distance between the tower and Geetha ?**

Answer .

a)





b) In the triangle ABE ,

< ABE = 30^0 , < AEC = 60^0 ==> < BAE = 30^0

(The outer angle at a vertex is the sum of the angles at other vertices)

ABE is an isosceles triangle . (< ABE = 30^0 , < BAE = 30^0)

==> BE = AE = 80 m

In the triangle AEC , $AC = 40\sqrt{3}$ $(\ CE : AC : AE = 1 : \sqrt{3} : 2\ )$

Height of the tower = $40\sqrt{3}\ m$

c) In the triangle ACD ,

$AC = 40\sqrt{3}$ ==> $CD = 40\sqrt{3}$ $(\ CD : AC : AD = 1 : 1 : \sqrt{2}\ )$

Distance between the tower and Geetha = $40\sqrt{3}\ m$

28 Workers in a factory are sorted according to their daily wage in the table below .

Daily wage (Rs)	Number of workers
750	6
1000	8
1250	10
1500	11
1750	9
2000	5
2250	4
2500	3

	a) If the workers are arranged in increasing order of daily wage , what is the daily wage of the worker at the 26th position ? **b) If the workers are arranged in increasing order of daily wage , what is the peculiarity of the median daily wage ?** **c) Find the median daily wage ?**
	Answer

Daily wage	Number of workers
Up to 750	6
Up to 1000	14
Up to 1250	24
Up to 1500	35
Up to 1750	44
Up to 2000	49
Up to 2250	53
Up to 2500	56

a) $Rs\ 1500$

b) Half the sum of the daily wages of 28th and 29th workers .

c) Median = $\frac{1500+1500}{2} = Rs\ 1500$

29	**A sector of arc length** 12π **centimetres is rolled up into a cone of slant height 18centimetres .** **a) What is the radius of the sector ?** **b) What is the base perimeter of the cone ?** **c) What is the base radius of the cone ?** **d) What is the central angle of the sector ?**

Answer .

a) Radius of the sector = Slant height of the cone = $18\ cm$

b) Base perimeter of the cone = Arc length of the sector = $12\pi\ cm$

c) Base radius of the cone = $\frac{12\pi}{2\pi} = 6\,cm$

d) $\frac{x}{360} = \frac{6}{18}$ ==> $x = \frac{6 \times 360}{18} = 120^0$

Central angle of the sector = 120^0

30 **a) Which number is to be added to $x^2 - 20x$ to get a perfect square ?**

b) Find the natural number value of x satisfying the equation $x^2 - 20x = 576$?

Answer .

a) 100 $\qquad x^2 - 20x + 10^2 = (x-10)^2$

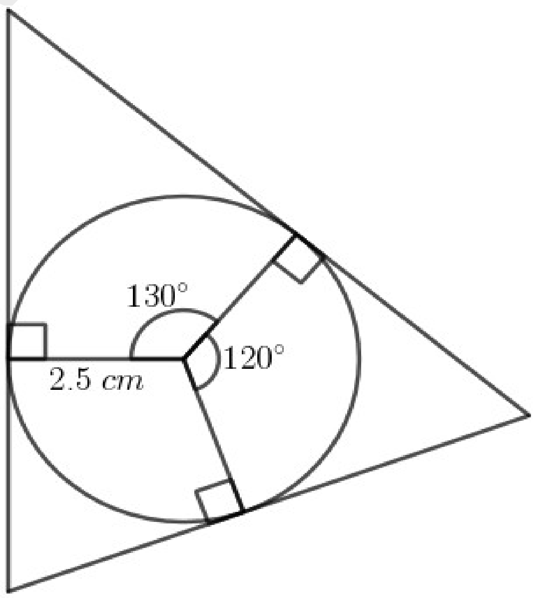
b) $x^2 - 20x \times 2 + 100 = 576 + 100$ ==> $(x-10)^2 = 676$

$x - 10 = \sqrt{676}$ ==> $x - 10 = 26$

$x = 26 + 10 = 36$

For questions from 31 to 45 carries 5 scores each .

31 **Draw a circle of radius 2.5 cm . Draw a triangle of angles 50° , 60° , 70° with all its sides touching this circle .**



32 **Find the following sums .**

a) 1 + 2 + 3 + 4 + 5 + ... +60

b) 1 + 2 + 3 + 4 + 5 + ... + 30

c) 31 + 32 + 33 + 34 + 35 + ... + 60

d) 62 + 64 + 66 + 68 + 70 + ... +120

e) 93 + 96 + 99 + 102 + 105 + ... +180

<u>Answer .</u>

a) 1 + 2 + 3 + 4 + 5 + ... +60 = $\frac{60\times61}{2}=1830$

b) 1 + 2 + 3 + 4 + 5 + ... + 30 = $\frac{30\times31}{2}=465$

c) 31 + 32 + 33 + 34 + 35 + ... + 60 = $1830-465=1365$

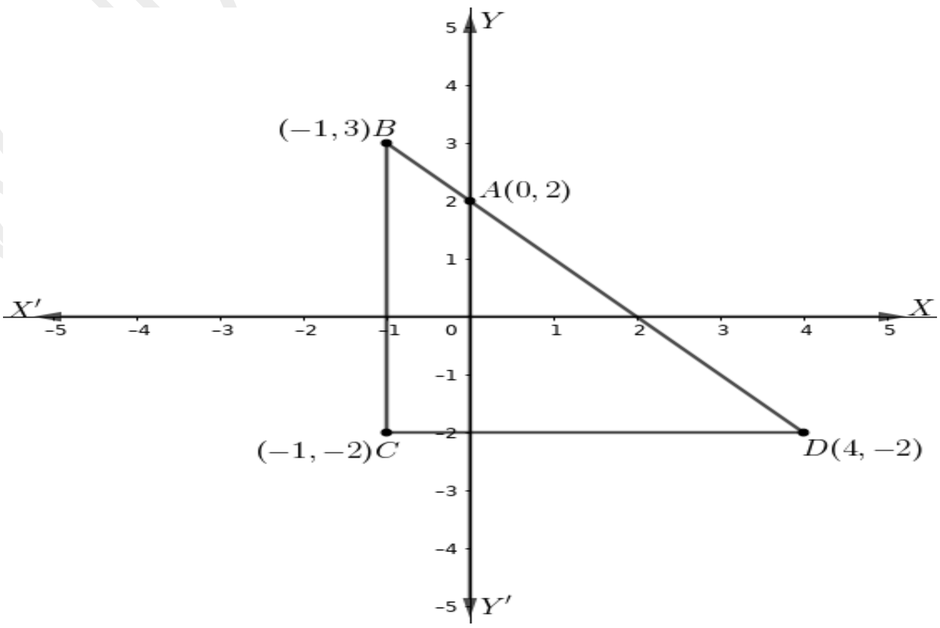
d) 62 + 64 + 66 + 68 + 70 + ... +120 = $2\times1365=2730$

e) 93 + 96 + 99 + 102 + 105 + ... +180 = $1365+2730=4095$

33 **a) Draw the axes and mark the points A (0 , 2) , B (-1 , 3) , C (-1 , - 2) , D (4 , - 2)**

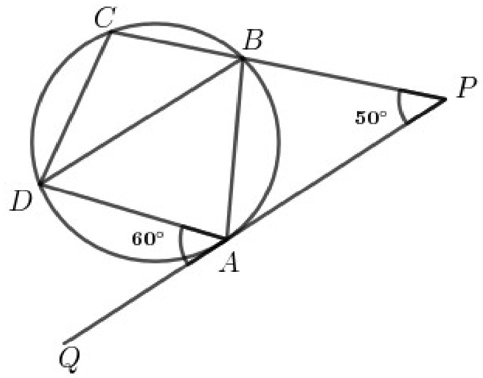
b) Join the points A,B,C,D in order and give the most suitable name for the polygon obtained ?

<u>Answer .</u>



b) Right triangle .

34 **In the figure PQ is a tangent . AB = PB , < DAQ = 60^0 , < APB = 50^0**



a) What is the measure of < ABD ?

b)What is the measure of < BAP ?

c) What is the measure of < ADB ?

d) What is the measure of < BCD ?

<u>Answer .</u>

a) $\angle ABD = 60^0$ **(In a circle , the angle which a chord makes with the tangent at one end on any side is equal to the angle which it makes on the part of the circle on the other side)**

b) $\angle BAP = 50^0$ **(AB = PB)**

c) $\angle ADB = 50^0$

d) $\angle BAD = 70^0$ **(Sum of the angles of a triangle is 180^0)**

$\angle BCD = 110^0$ **(ABCD is cyclic .Opposite angles of a cyclic quadrilateral are supplementary)**

35 **P(1 , 1) , Q(9 ,7) and R(2 , 8) are the vertices of a triangle .**

a) What is the length of PQ ?

b) prove that PQR is an isosceles triangle ?

c) What are the coordinates of the midpoint of the side PQ ?

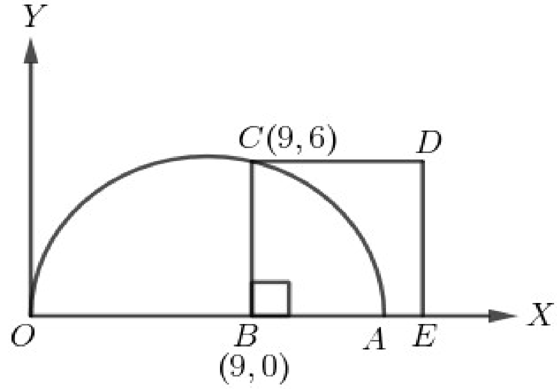
d) What is the perpendicular distance from the vertex R to the side PQ ?

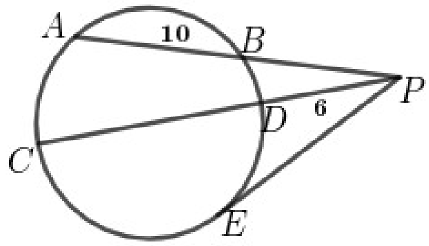
e) What is the area of the triangle PQR ?

<u>Answer .</u>

a) $PQ = \sqrt{(9-1)^2 + (7-1)^2} = 10$

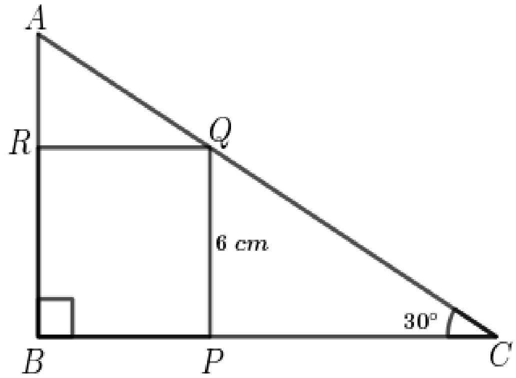
	b) $QR=\sqrt{(2-9)^2+(8-7)^2}=\sqrt{50}$ $PR=\sqrt{(2-1)^2+(8-1)^2}=\sqrt{50}$ **c) Coordinates of the midpoints of PQ =** $(\frac{1+9}{2}, \frac{1+7}{2})=(5,4)$ **d)Perpendicular distance from R to the side PQ =** $\sqrt{(2-5)^2+(8-4)^2}=5\ cm$ **e) Area of the triange PQR =** $\frac{1}{2}\times10\times5=25\ sq.cm$
36	**The sum of first 9 terms of an arithmetic sequence is 171 and the sum of first 10terms is 210 .** **a) What is its fifth term ?** **b) What is its tenth term ?** **c) What is its common difference ?** **d) What is its algebraic form ?** **e) What is the remainder when each term of this sequence is divided by its common difference ?**
	<u>Answer .</u> **a) Fifth etrm** = $\frac{171}{9}=19$ **b) Tenth term** = $S_{10}-S_9=210-171=39$ **c)** $common\,difference=\frac{term\,difference}{position\,difference}=\frac{39-19}{10-5}=\frac{20}{5}=4$ **d)** $x_1=x_5-4d=19-4\times4=19-16=3$ $dn+f-d=4n+3-4=4n-1$ **e)** 3

37	**In the figure OA is the diameter of the semicirle . BCDE is a square .** **a) What is the length of BC ?** **b) What are the coordinates of E ?** **c)What are the coordinates of D ?** **d) What are the coordinates of A ?** 
	<u>Answer .</u> **a)** $BC=6$ **b) Coordinates of E =** $(9+6\ ,\ 0)$ **=** $(15\ ,\ 0)$ **c) Coordinates of D =** $(15,6)$ **d)** $OB\times BA=BC^2$ ==> $9\times BA=6^2$ ==> $BA=\frac{6^2}{9}=\frac{36}{9}=4$ **Coordinates of A =** $(9+4\ ,\ 0)$ **=** $(13\ ,\ 0)$
38	**8 identical solid metal cones of base radius 6 centimetres and height 8 centimetres are melted and recast in to a larger cone of base radius 12 centimetres .** **a) What is the volume of a small cone ?** **b) What is the volume of the larger cone ?** **c) What is the height of the larger cone ?** **d) What is the surface area of the larger cone ?**
	<u>Answer .</u> **a) Volume of a small cone =** $\frac{1}{3}\times\pi\times6^2\times8=96\pi\ \ cu.cm$ **b) Volume of the larger cone =** $8\times\frac{1}{3}\times\pi\times6^2\times8=768\pi\ \ cu.cm$ **c) Height of the larger cone =** $\frac{768\pi\times3}{144\pi}=16\ cm$

	d) Slant height of the larger cone = $\sqrt{r^2+h^2} = \sqrt{12^2+16^2} = 20\ cm$ **Surface area of the larger cone =** $\pi\times12^2+\pi\times12\times20=384\pi\ sq.cm$
39	**In the figure two chords AB and CD are extended to meet the tangent through E at P . PA = 18 cm , AB = 10 cm , PD = 6 cm**  **a) What is the length of PB ?** **b) PC x PD = ...** **c) What is the length of CD ?** **d) What is the length of the tangent PE ?**
	<u>Answer .</u> **a)** $PB=8\ cm$ **b)** $PC\times PD = PA\times PB$ **or** $18\times8=144$ **or** PE^2 **c)** $PC\times PD = 144$ **==>** $PC\times6 = 144$ **==>** $PC=\frac{18\times8}{6}=24\ cm$ $CD = PD-PC = 24-6=18\ cm$ **d)** $PC\times PD = PE^2$ **==>** $PE=\sqrt{144}=12\ cm$
40	**If** $x^2-20x+96=(x-a)(x-b)$ **a) What is the value of** $a+b$ **?** **b) What is the value of** ab **?** **c) Write** $x^2-20x+96$ **as the product of two first degree polynomials ?**
	<u>Answer .</u> **a)** $a+b=20$ **b)** $ab=96$ **c)** $a=12$ $b=8$ $x^2-20x+96 = (x-12)(x-8)$

41

In the figure $BPQR$ **is a square .** $PQ=6\,cm, \angle C=30^\circ$



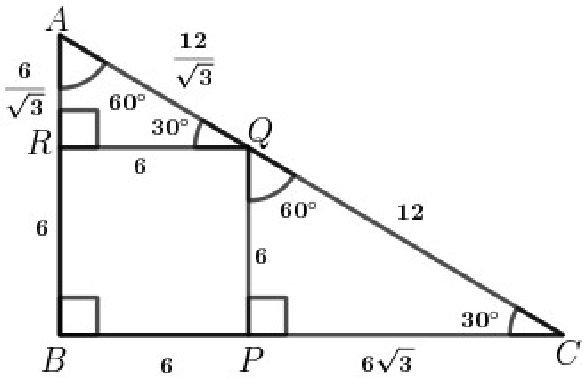
a) What is the measure of $\angle A$ **?**

b) What is the length of CQ **?**

c) What is the area of the triangle AQR **?**

d)What is the perimeter of the triangle ABC **?**

Answer .



a) $\angle A = 60^0$

b) $CQ = 12\ cm$

c) $AR = \frac{6}{\sqrt{3}}\ cm$

d) $QR = 6\ cm$

Area of the triangle AQR = $\frac{1}{2} \times QR \times AR = \frac{1}{2} \times 6 \times \frac{6}{\sqrt{3}} = \frac{18}{\sqrt{3}}\ sq.cm$

e) Perimeter of the triangle ABC = $(6+6\sqrt{3})+(6+\frac{6}{\sqrt{3}})+(\frac{12}{\sqrt{3}}+12)=24+6\sqrt{3}+\frac{18}{\sqrt{3}}\ cm$

42

In the figure , the circle touches the sides of the triangle ABC at the points P ,Q , R

AB = 12 cm , BC = 10 cm , AC = 14 cm .

a) Which other line has the same length as that of AP ?

b) If the length AP is taken as x , what is the length of BQ ?

c) What is the value of x ?

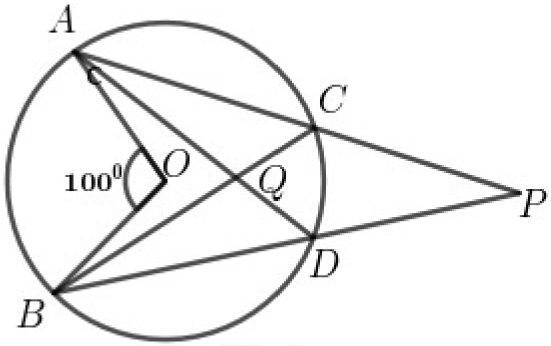
d) What are the lengths of the line CR ?

Answer .

a) $AP = AQ$ **(The tangents to a circle from a point are of the same length)**

b) $BP = BQ = 12 - x$

c) $CQ = CR = 14 - x$

	$BC = BQ + CQ$ ==> $(12-x)+(14-x)=10$ ==> $26 - 2x = 10$ $2x = 26-10 = 16$ ==> $x=\frac{26-10}{2}=8$ **d)** $CR = 14-x = 14-8 = 6\ cm$
43	**In the figure O is the centre of the circle .** **< AOB = 100 ^{0}** **a) What is the measure of < ACB ?** **b) What is the measure of < PDQ ?** **c) What is the sum of the angles < CQD and <CPD ?** 
	Answer . **a)** $\angle ACB = 50^0$ **(The angle made by an arc on its alternate arc is half its central angle)** **b)** $\angle ADB=50^0$ **(All angles made by an arc on the alternate arc are equal)** $\angle PDQ=180-50=130^0$ **(linear pair)** **c)** $\angle PCQ = 180-\angle ACB = 180-50 = 130^0$ $\angle CQD+\angle CPD = 360-(130+130) = 100^0$ **(Sum of the angles of a quadrilateral)**
44	**The perimeter of a rectangle is 56 centimetres and its diagonal is 20 centimetres.** **a) What is the sum of the lengths of its shorter and longer sides ?** **b) Write down a second degree equation b taking the shorter side as 14 - x ?** **c) What are the lengths of the sides ? ?**
	Answer . **a) Sum of the lengths of its shorter and longer sides =** $\frac{Perimeter}{2}$ **=** $\frac{56}{2}=28$ **b) Length of the shorter side =** $14-x$ **==> Length of the longer side =** $14+x$

$(14+x)^2+(14-x)^2=20^2$ ==> $2\times14^2+2\times x^2=400$

$2\times196+2\times x^2=400$ $\left(\ (a+b)^2+(a-b)^2=2\times a^2+2\times b^2\ \right)$

$392+2x^2=400$

c) $392+2x^2=400$ ==> $2x^2=400-392=8$ ==> $x^2=\frac{8}{2}=4$ ==> $x=\sqrt{4}=2$

Length of the shorter side = $14-x=14-2=12\ cm$

Length of the longer side = $14+x=14+2=16\ cm$

45 **In the figure ABCD is a rectangle . AB = 9 cm .**

< ABD = 60^0 , < CDE = 45^0 .

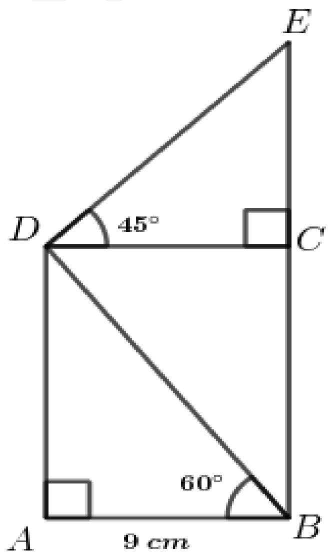
a) What is the measure of < ADB ?

b) What is the length of the side BD ?

c) What is the length of the side DE ?

d) What is the measure of < BDE ?

e)What is the ratio of the sides of a triangle having angles 30^0 , 45^0 and 105^0



<u>Answer .</u>

a) $\angle ADB=30^0$

b) $BD=18\ cm$ $\left(\ AB\ :\ AD\ :\ BD=1:\sqrt{3}:2\ \right)$

c) $DE=9\sqrt{2}\ cm$ $\left(\ CD\ :\ CE\ :\ DE=1:1:\sqrt{2}\ \right)$

d) $\angle BDE=60+45=105^0$

e) $DE:BD:BE=18\ :\ 9\sqrt{2}\ :\ 9+9\sqrt{3}$

$=\ 2\ :\ \sqrt{2}\ :\ 1+\sqrt{3}$