SSLC Examination March - 2019 .Mathematics
English Version -Questions with Solutions.

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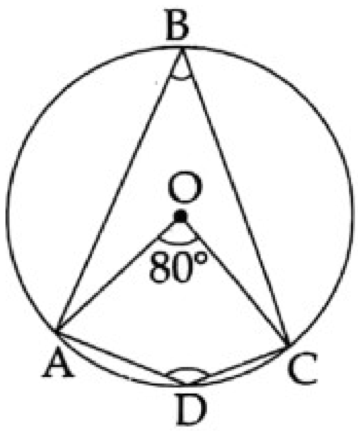
Question.

1. In the figure O is the centre of the circle. $\angle AOC = 80°$
   (a) What is the measure of $\angle ABC$?
   (b) What is the measure of $\angle ADC$?



Solution.

Given $\angle AOC = 80^0$.

a) The measurement $\angle ABC = \frac{1}{2} \times 80 = 40^0$.

b) The measurement $\angle ADC = 180 - 40 = 140^0$
(ABCD is a cyclic quadrilateral)

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Question.

2. (a) Write the first integer term of the arithmetic sequence $\frac{1}{7}, \frac{2}{7}, \frac{3}{7}$ ....
   (b) What is the sum of the first 7 terms of this sequence ?

Solution.

a) Given arithmetic sequence =

$\frac{1}{7}+\frac{2}{7}+\frac{3}{7}$,……….. d = 2/7 – 1/7 = 1/7.

Hence the first integer term = $\frac{7}{7}$ = 1 .

b) Sum = $\frac{n}{2}(x_1+x_n)$ = $\frac{7}{2}\left(\frac{1}{7}+\frac{7}{7}\right)=4.$ [$\frac{7}{2}\times\frac{8}{7}=4$] .

Hence the sum of the first 7 tearm be 4.

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Question.

3. (a) If C(−1, k) is a point on the line passing through the points A(2, 4) and B(4, 8) which number is k ?

(b) What is the relation between the x coordinate and the y coordinate of any point on this line ?

Solution.

Given points be A(2, 4) , B(4, 8)

Slope = $\frac{y_2-y_1}{x_2-x_1}$ = 8 – 4 / 4 – 2 = 4 – 2 = 2.

a) ie., $\frac{k-8}{-1-4}$ = 2 . Cross multiplay, we get

k = -2.

b) Let (x, y) be any point on the slope ,

ie., $\frac{y-8}{x-4}=2$; y – 8 = 2(x – 4) ; y – 8 = 2 x – 8

2x – y = 0

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Question.

4. (a) Find P(1) if $P(x) = x^2 + 2x + 5$.

(b) If $(x-1)$ is a factor of $x^2 + 2x + k$, What number is k ?

Solution.

Given polynomial , $P(x) = x^2 + 2x + 5$

$P(1) = 1^2 + 2 \times 1 + 5$

$= 1 + 2 + 5$; then k = -8 .

b) Given x – 1 is a factor , polynomial , $P(x) = x^2 + 2x + k$

$P(1) = 1^2 + 2 \times 1 + k = 0$

$= 1 + 2 + k$; then k = - 3.

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Question.

5. (a) What is the remainder on dividing the terms of the arithmetic sequence 100, 107, 114 ...... by 7 ?

(b) Write the sequence of all three digit numbers. Which leaves remainder 3 on division by 7 ? Which is the last term of this sequence ?

Solution.

Given sequence be 100, 107, 114,………..

a) d = 7 ; Remainder = 100/7 = 2.

b) 101, 108, 115 ……………..

Hence the last three digit term = 997.

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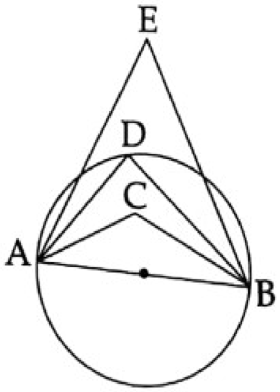
Question.

6. AB is the diameter of the circle. D is a point on the circle.



$\angle ACB + \angle ADB + \angle AEB = 270°$. Measure of one among $\angle ACB$, $\angle ADB$, $\angle AEB$ is $110°$. Write the measures of $\angle ADB$, $\angle ACB$, and $\angle AEB$.

Solution.

$\angle ADB = 90^0$ (Measurement of semi circle angle)

$\angle ACB + \angle ADB + \angle AEB = 270^0$ (Given)

ie., $\angle ACB + 90 + \angle AEB = 270^0$

$\angle ACB + \angle AEB = 270^0 - 90 = 180^0$.

The given condition any one of the $\angle ACB$,$\angle AEB$ be 110^0 .

take $\angle ACB = 110^0$

Hence $\angle AEB = 180 - 110 = 70^0$.

So the angles ,

$\angle ADB = 90^0$, $\angle ACB = 110^0$, $\angle AEB = 70^0$.

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Question.

7. If x is a natural number

(a) What number is to be added to x^2+6x to get a perfect square ?

(b) If $x^2+ax+16$ is a perfect square which number is 'a' ?

(c) If x^2+ax+b is a perfect square prove that $a^2=4b$.

Solution.

Given $x^2 + 6x$

a) $6x = 2ab$; $a = x$; $b = ?$; $b = \frac{6x}{2x} = 3$

Perfect square $= b^2 = 3^2 = 9$.

Hence 9 be added to them.

b) Given , $x^2 + ax + 16$ is perfect square

This is the form of $a^2 + 2ab + b^2 = (a + b)^2$

ie., $2ab = ax$; $a = x$; $b^2 = 16$; $b = \sqrt{16} = 4$

So, $(x + 4)^2 = x^2 + ax + 16$

Hence $a = 2ab = 2 \times 4 = 8$.

c) Here we can see that b = the square of the half of a

ie., $b = \left(\frac{a}{2}\right)^2$; $b = \frac{a^2}{4}$

ie., $a^2 = 4b$. Hence proved.

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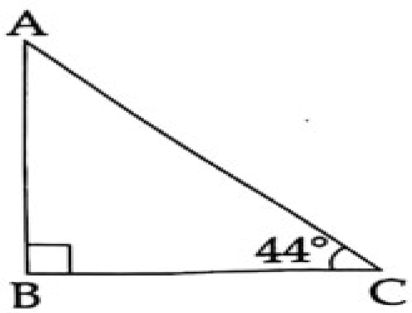
Question.

8. In the figure $\angle B = 90°$, $\angle C = 44°$



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

(b) Which among the following is tan 44° ?

$\left(\frac{AB}{BC}, \frac{AB}{AC}, \frac{BC}{AB}, \frac{BC}{AC}\right)$

(c) Prove that $\tan 44° \times \tan 46° = 1$.

Solution.

Gfiven $\angle B = 90^0$; $\angle C = 44^0$

a) The measurement of $\angle A = 180 - (90 + 44) = 46^0$.

b) $\tan 44^0 = \dfrac{opposite\ side}{adjacent\ side} = \dfrac{AB}{BC}$ (From the figure)

c) LHS = $\tan 44^0 \times \tan 46^0$

$$= \frac{AB}{BC} \times \frac{BC}{AB} = 1 = RHS$$

Hence proved.

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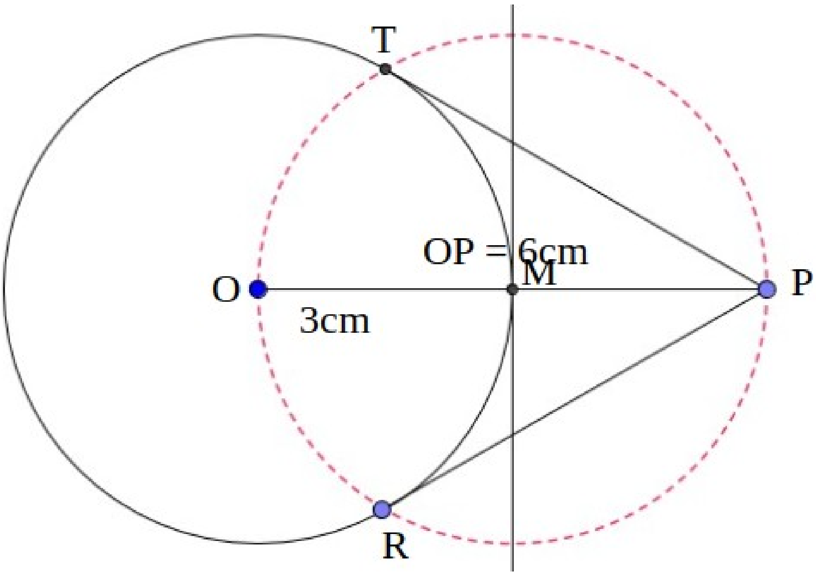
Question.

9. Draw a circle of radius 3 centimetres. Mark a point P at a distance 6 centimetres from the centre of the circle. Draw tangents from P to the circle.

Solution.

Constriction



Draw a circle with radius 3cm as center at O. From the center draw op as 6cm and draw perpendicular to OP and mark M on it. Draw a circle with center At M and cut it T and R respectively. Join PT and PR being the required tangents.

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Question.

10. (a) Find the coordinates of the point on x axis, which is at a distance 4 units from (3, 4).

(b) Find the coordinates of the points on x axis at a distance 5 units from (3, 4).

Solution.

a) A point on x -axis (x,0)

ie $(x - 3)^2 + (0 - 4)^2 = 4^2$

$(x - 3)^2 + 4^2 = 16$

$(x - 3)^2 = 0$

$x - 3 = 0$

$x = 3$

Point (3, 0) be from (3,4) to the distance 4 unit.

b) $(x - 3)^2 + (0 - 4)^2 = 5^2$

$(x - 3)^2 + 4^2 = 25$

$(x - 3)^2 = 9$

$x - 3 = \pm 3$

$x = 6$, $x = 0$

Hence (0,0) , (6,0) be the point from (3,4) at the distance 4 unit.

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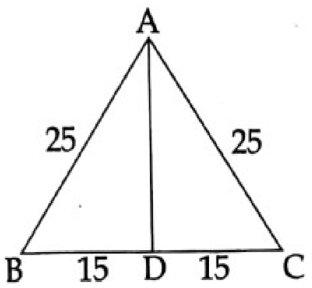
Question.

11. The given figure is the lateral face of a square pyramid. AB = AC = 25 centimetres and BD = DC = 15 centimetres.
    (a) What is the length of its base edge ?
    (b) Find the lateral surface area of the pyramid.



Solution.

a) From the figure base edge = BD + DC = 15 + 15 = 30cm.

b) LSA = 2al ; a = 30cm ; lateral edg (e) 25cm.

$$l = ? \; ; \; l = \sqrt{e^2 - \left(\frac{a}{2}\right)^2}$$

$$= \sqrt{25^2 - \left(\frac{30}{2}\right)^2} = \sqrt{625-225} = \sqrt{400} = 20$$

Hence LSA = 2al = $2 \times 30 \times 20 = 1200\, cm^2$

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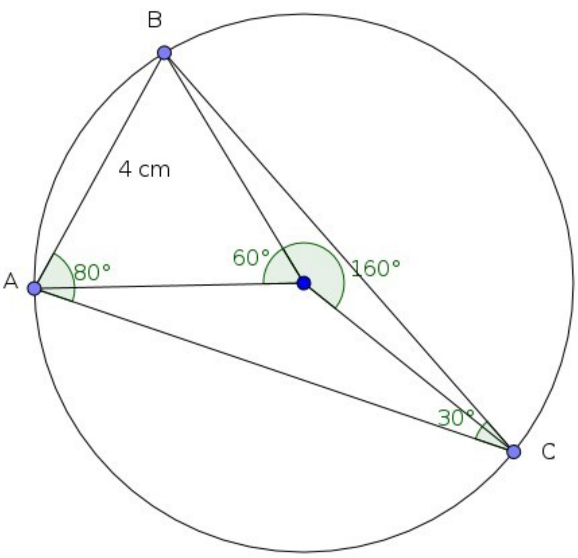
Question.

12. In triangle ABC, $\angle A = 30°$, $\angle B = 80°$, circumradius of the triangle is 4 centimetres. Draw the triangle. Measure and write the length of its smallest side.

Solution.

Constriction



Draw a circle with radius as 4cm. And then make any radius with in Then draw the twice of the angle ,which will given the question.
Draw another two radii and then joint it to make a ΔABC
Measure the length of the smaller side .
It becomes 4 cm.

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Question.

13. Find the following sums :

(a) $1+2+3+\dots\dots\dots+100$

(b) $1+3+5+\dots\dots\dots+99$

(c) $2+4+6+\dots\dots\dots+100$

(d) $3+7+11+\dots\dots\dots+199$

Solution.

a)Given 1+2+3+……..+ 100.

Sum = $\frac{n}{2}[n+1]$ = $\frac{100}{2}[100+1]=50\times 101=5050$

b) Given 1+3+5+……..+99.

$x_1 = 1$; $d = 3 - 1 = 2$; $x_n = 99$; n = ?

n = $\frac{x_n - x_1}{d}+1$ = $\frac{99-1}{2}+1=50$.

Sum = $\frac{n}{2}[x_1+x_n]$ = $\frac{50}{2}[1+99]=25\times 100=2500$.

c) Given 2+4+6+………+100.

$x_1 = 2$; $d = 4 - 2 = 2$; $x_n = 100$; n = ?

n = $\frac{x_n - x_1}{d}+1$ = $\frac{100-2}{2}+1=50$.

Sum = $\frac{n}{2}[x_1+x_n]$ = $\frac{50}{2}[2+100]=25\times 102=2550$.

d) Given 3+7+11+……….+ 199

$x_1 = 3$; $d = 7 - 3 = 4$; $x_n = 199$; n = ?

n = $\frac{x_n - x_1}{d}+1$ = $\frac{199-3}{4}+1=50$.

Sum = $\frac{n}{2}[x_1 + x_n]$ = $\frac{50}{2}[3+199] = 25 \times 202 = 5050$. .

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Question.

14. A box contains some green and blue balls. 7 red balls are put into it. Now the probability of getting a red ball from the box is $\frac{7}{24}$ and that of a blue ball is $\frac{1}{3}$.

(a) How many balls are there in the box ?

(b) How many of them are blue ?

(c) What is the probability of getting a green ball from the box ?

Solution.

Given probability of red ball = $\frac{7}{24}$

a) Hence total ball = 24 (Favorable / Total number)

b) Let the blue ball be 'b'

Probability of blue ball = $\frac{1}{3}$

ie., $\frac{b}{24} = \frac{1}{3}$; b = 8.

Number of blue ball = 8.

c) Number of green balls = 24 - (8 + 7) = 24 – 15 = 9 (F)

Probability of green ball P(Green) = $\frac{F}{N} = \frac{9}{24} = \frac{3}{8}$.

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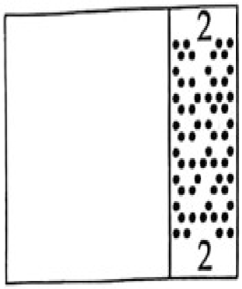
Question.

15. Land is acquired for road widening from a square ground, as shown in the figure. The width of the acquired land is 2 metres. Area of the remaining ground is 440 square metres.



(a) What is the shape of the remaining ground ?

(b) What is the length of the remaining ground ?

Solution.

a) Shape of the remaining ground be Rectangle.

b) Let the length be 'x'

Breadth = $x - 2$.

Area = $440\ m^2$. (Given)

ie., $x(x - 2) = 440$.

$x^2 - 2x = 440$

$x^2 - 2x - 440 = 0$ (Solve by any method)

$(x - 22)(x + 20) = 0$

$x - 22 = 0$ or $x + 20 = 0$

Hence $x = 22$ or -20 ; -20 rejectable ; so $x = 22$

Hence the length = 22m ; Breadth = $22 - 2 = 20$m.

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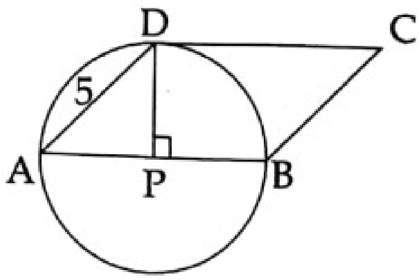
Question.

16. In the figure P is the centre of the circle. A,B and D are points on the circle. $\angle P = 90°$, AD = 5 centimetres.



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

(b) What is the area of triangle APD ?

(c) Find the area of the parallelogram ABCD.

Solution.

a) In ΔABD,

$\angle D = 90^0$ (Angle in the semi circle)

$\angle P = 90^0$, so that $\angle ADP = 45^0$.

Hence $\angle A = 45^0$.

b) In isosceles right angled ΔAPD, AD = 5cm.

We know that 45 : 45 : 90

$$\text{ie., } AP = PD = \frac{5}{\sqrt{2}}$$

$$\text{Area of the } \Delta APD = \frac{1}{2} \times bh = \frac{1}{2} \times AP \times PD$$

$$= \frac{1}{2} \times \frac{5}{\sqrt{2}} \times \frac{5}{\sqrt{2}} = \frac{25}{4} = 6.\ 25\ cm^2 .$$

c) Area of the parallelogram ABCD = bh

$$\text{Base } AB = \frac{5}{\sqrt{2}} + \frac{5}{\sqrt{2}} = \frac{10}{\sqrt{2}} = 5\sqrt{2}\ \text{cm}$$

$$h\,(PD) = \frac{5}{\sqrt{2}} \text{ cm}$$

Hence the area = $5\sqrt{2} \times \frac{5}{\sqrt{2}} = 25 \text{ cm}^2$.

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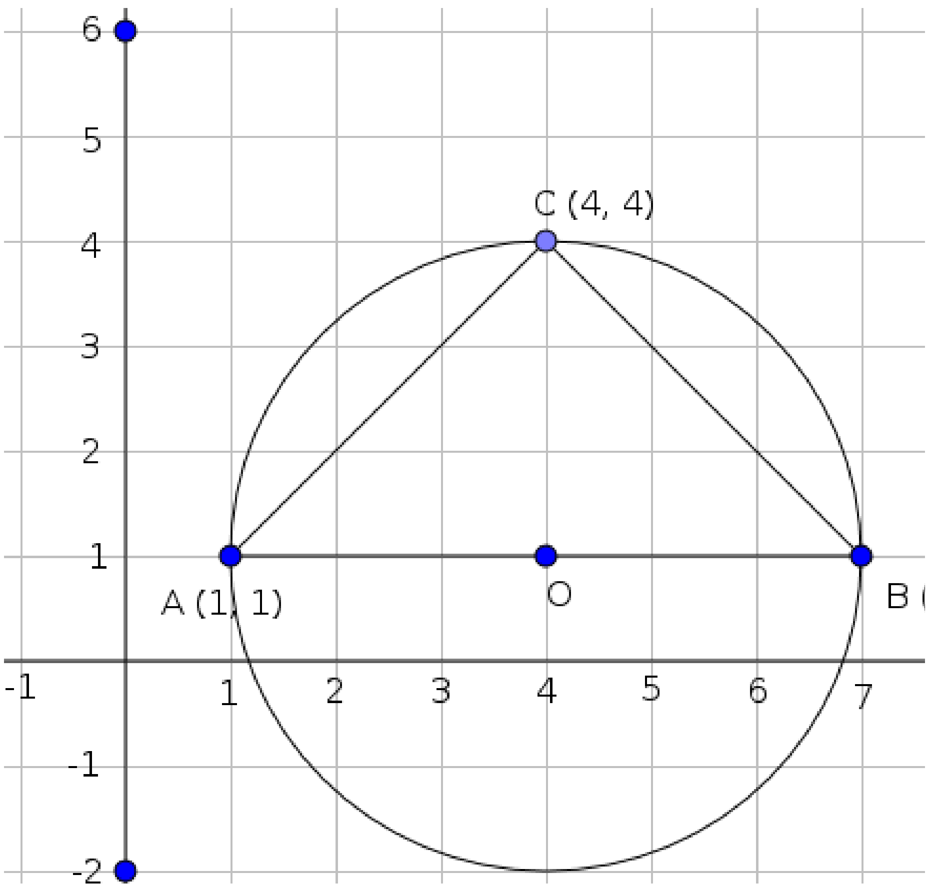
Question.

17. (a) Draw the coordinate axes and mark the points A(1, 1), B(7, 1).
(b) Draw an isosceles right triangle ABC with AB as hypotenuse.
(c) Write the coordinates of C.

Solution.

a) and b) see the figure. c) (4, 4)



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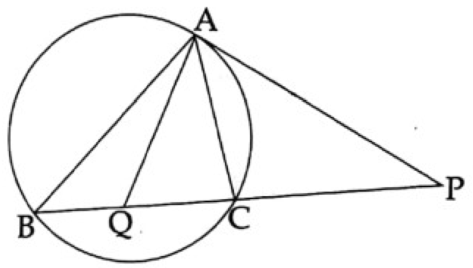
Question.

18. In the figure chord BC is extended to P. Tangent from P to the circle is PA. AQ is the bisector of $\angle BAC$.



(a) Write one pair of equal angles from the figure.

(b) If $\angle PAC = x$ and $\angle PCA = y$ prove that $\angle BAC = y - x$.

(c) Prove that $\angle PAQ = \frac{y+x}{2}$.

Solution.

a) A pair of equale angles = $\angle ABC = \angle PAC$

b) Given $\angle PAC = x$; $\angle PCA = y$

Given $\angle PAC = x$ ie., $\angle ABC$ is also be x

Given $\angle PCA = y$ ie., $\angle ACB – 180 – y$.

$\angle BAC = 180 - (\angle ABC + \angle ACB)$

$= 180 - (x + 180 – y)$

$= 180 – x – 180 + y$

$= - x + y = y – x$

Hence proved.

c) LHS = $\angle PAB = \angle PAC + \angle CAQ$

$= x + \angle BAC / 2$

$$= x + \frac{y-x}{2} = \frac{2x+y+x}{2} = \frac{x+y}{2} = \text{RHS}$$

Hence proved.

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Question.

19. If $x-1$ is a factor of the second degree polynomial $P(x)=ax^2+bx+c$ and $P(0) = -5$.

(a) What is the value of c ?

(b) Prove that $a+b=5$.

(c) Write a second degree polynomial whose one factor is $x-1$.

Solution.

Given polynomial = $ax^2 + bx + c$ and

$x - 1$ is a factor . P(0) = - 5.

a) If P(0) = - 5 , ie., c = - 5 .

b) $P(1) = a(1)^2 + b(1) + c = 0$

$= a + b + - 5 = 0$

$= a + b = 5$. Hence proved.

c) In $ax^2 + bx + c$, $a + b = 5$ and $c = -5$ will be satisfied

So we can write more than one polynomials .Such that

$3x^2 +2x-5$ or $2x^2 + 3x – 5$ or $4x^2 + x-5$.

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Question.

20. A circular sheet of paper is divided into two sectors. Central angle of one of them is 160°.

(a) What is the central angle of the remaining sector ?

(b) These sectors are bent into cones of maximum volume. If the radius of the small cone is 8 centimetres, what is the radius of the other ?

(c) What is the slant height of the cones ?

Solution.

Given center angle = 160^0 . Radius of the small cone (r) = 8cm

a) Center angle of the second sector = 360 – 160 = 200^0 .

b) $\frac{r}{l}=\frac{x^0}{360}$ (Formula)

$\frac{8}{l} = \frac{160}{360}$; l = $\frac{360\times 8}{160}=18\,cm$

Here sector's radii are equal

ie., $\frac{r}{l}=\frac{x^0}{360} = \frac{r}{18}=\frac{200}{360}$; r = $\frac{200\times 18}{360}=10\,cm.$

c) Slant height (l) = Radius of the sector

= 18cm.

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Question.

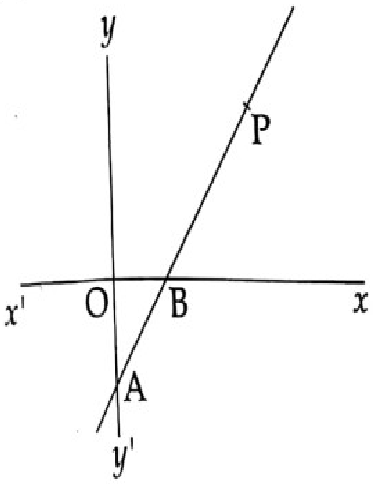
21. Equation of the line AB is $3x-2y=6$. P is a point on the line. The line intersects the y-axis at A and the x-axis at B.

(a) What is the x coordinate of A ?

(b) What is the length of OA ?

(c) What is the length of OB ?

(d) The x coordinate and the y coordinate of P are same. Find the coordinates of P.



Solution.

Given the equation of AB = 3x – 2y = 6.

a) x – coordinate of A = 0.

b) Put x – coordinate be 0 in the equation 3x – 2y = 6.

ie., 3 $\times$ 0 – 2y = 6. ; ie., - 2y = 6; y = 6/-2 = - 3.
The coodinate of A = (0, - 3) .
The length of OA = 3 unit.
c) y – coordinate of x -axis be 0.
ie., Put y = 0 in the equation 3x – 2y = 6
ie., 3x – 2 $\times$ 0 = 6 ; 3x = 6; x = 6/3 = 2.
The coordinate of B = (2, 0)
The length of OB = 2 unit.
d) Let y = x in tne equation 3x – 2y = 6 .
ie., 3x – 2x = 6 ; x = 6.
So, the coordinate of P be (6, 6).
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Question.

22. If the terms of the arithmetic sequence $\frac{2}{9}, \frac{3}{9}, \frac{4}{9}, \frac{5}{9}$.......... are represented as x_1, x_2, x_3 ......
then
(a) $x_1+x_2+x_3$ = ...
(b) $x_4+x_5+x_6$ = ...
(c) Find the sum of first 9 terms.
(d) What is the sum of first 300 terms ?

Solution.

Given sequence = 2/9, 3/9, 4/9 , 5/9 ,………….

a) $x_1 + x_2 + x_3 = \frac{2}{9}+\frac{3}{9}+\frac{4}{9}=\frac{9}{9}=1$.

b) $x_4 + x_5 + x_6 = \frac{5}{9}+\frac{6}{9}+\frac{7}{9}=\frac{18}{9}=2$.

c) $x_1 = 2/9$; $x_n = 10/9$; n = 9

Sum of the first 9 terms = $\frac{n}{2}(x_1+x_n) = \frac{9}{2}(2/9+10/9)$

$$= \frac{9}{2} \times \frac{12}{9} = 6.$$

d) $x_1 = 2/9$; $x_n = 301/9$; $n = 300$

Sum of the first 300 terms = $\frac{n}{2}(x_1 + x_n)$

$$= \frac{300}{2}(2/9+301/9) = \frac{300}{2} \times \frac{303}{9} = 5050 \ .$$

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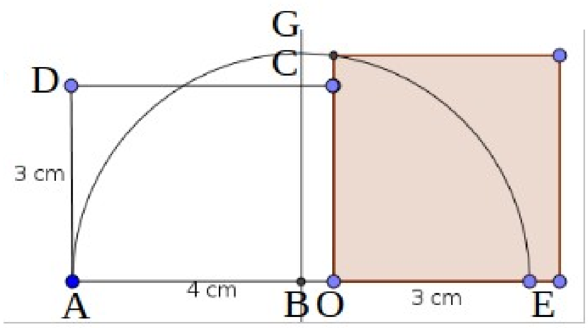
Question.

23. Draw a rectangle of area 12 square centimetres. Draw a square having the same area.

Solution.

Construction



Draw a rectangle ABCD , as AB = 4cm and BC = AD = 3cm. AB line be produced to E such that BC = BE . Make O as the midpoint of AE and draw a semi circle , OE as the radius with the center at O. . BC produced and cut at G on the semi circle and draw a rectangle with the side as BG. This is the required measured square.

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Question.

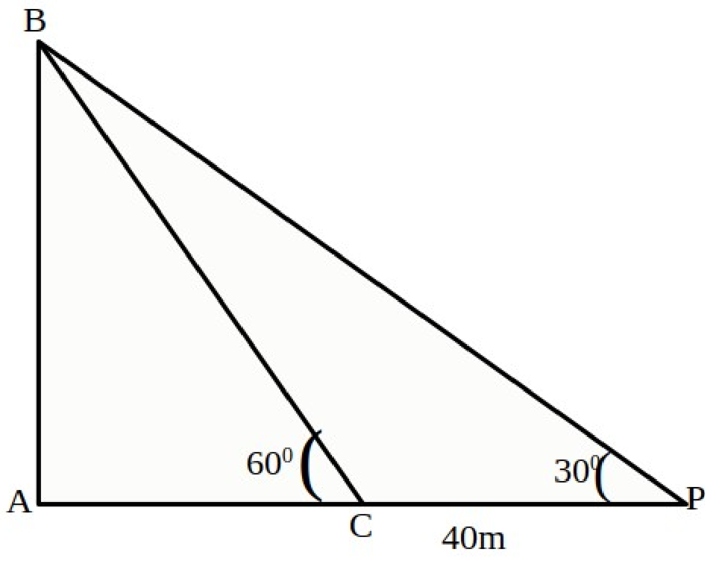
24. A boy standing at one bank of a river sees the top of a tree on the other bank directly opposite to the boy at an elevation of 60°. Stepping 40 metres back, he sees the top at an elevation of 30°.

(a) Draw a rough figure and find the height of the tree.

(b) What is the width of the river ?

Solution.

a)



In the figure

Tree = AB

Let C be the first and P be the second place of the boy respectively.

PC = 40m ; $\angle BPC = 30^0$;

$\angle BCA = 60^0$.

In ΔPCB ,

$\angle PBC = \angle BCA - \angle BPC$

$= 60 - 30 = 30^0$.

ΔPCD be an isosceles triangle. So, BC = PC = 40m.

In the right triangle ABC The angles are 30, 60, 90

ie., $1 : \sqrt{3} : 2$.

$$AB = \frac{BC}{2} \times \sqrt{3} = \frac{40}{2} \times \sqrt{3} = 20\sqrt{3}\,m$$

$$AC = \frac{BC}{2} = \frac{40}{2} = 20\,m.$$

Hence the height of the tree = AB = $20\sqrt{3}\,m$.

b) The width of the river = AC = 20m.

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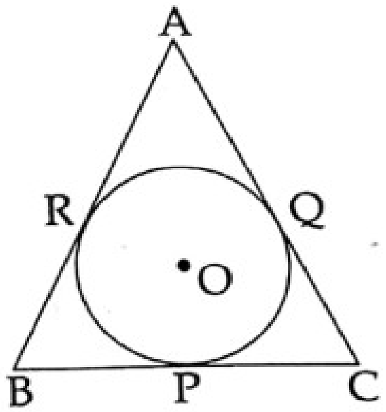
Question.

25. Circle with centre O touches the sides of the triangle at P, Q and R, AB=AC, AQ=4 centimetres and CQ=6 centimetres.



(a) What is the length of CP ?

(b) Find the perimeter and the area of the triangle.

(c) What is the radius of the circle ?

Solution.

Given, AB = AC , AQ = 4cm. CQ = 6cm

a) CP = CQ = 6cm (tangents are equal)

b) AC = AQ + CQ = 4 + 6 = 10cm.

AB = AC = 10cm.

AQ = AR = 4cm. ; BR = AB – AR = 10 – 4 = 6cm.

BP = BR = 6cm.

So, BC = BP + PC = 6 + 6 = 12cm.

Hence the perimeter of the Triangle ABC

= AB + BC +CA = 10 + 12 + 10 = 32cm.

Area of ΔABC = $\frac{1}{2} \times bh$

Join AP = h of the right triangle APB, BP = 6cm,

AB = 10cm

h = $\sqrt{10^2-6^2}=\sqrt{100-36}=\sqrt{64}=8\,cm$

Area of ΔABC = $\frac{1}{2} \times bh \quad = \frac{1}{2} \times 12 \times 8=48\,cm^2$

Or area can be find out the Hero's formula .

c) Radius = $\frac{Area}{Semi\ perimeter} = \frac{48}{15} = 3\,cm.$

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Question.

26. Radius of a cylinder is equal to its height. If the radius is taken as r, volume of the cylinder is $\pi r^2 \times r = \pi r^3$. Like this find the volumes of the solids, with the following measures.

Solids	Measures	Volume
Cone	radius = height = r	
Hemisphere	radius = r	
Sphere	radius = r	

(a) What is the ratio of the volumes of cone, hemisphere, cylinder and the sphere ?

(b) A solid metal sphere of radius 6 centimetres is melted and recast into solid cones of radius 6 centimetres and height 6 centimetres. Find the number of cones.

Solution.

Solids	Measures	Volume
Cone	Radius = heighr = r	$\frac{1}{3}\pi r^2 h =$ $\frac{1}{3}\pi \times r^2 \times r = \frac{1}{3}\pi r^3$
Hemisphear	Radius = r	$\frac{2}{3}\pi r^3$
Sphear	Radius = r	$\frac{4}{3}\pi r^3$

a) The ratio of volumes of cone, hemisphere, cylinder and sphear $= \frac{1}{3}\pi r^3 : \frac{2}{3}\pi r^3 : \pi r^3 : \frac{4}{3}\pi r^3 = 1:2:3:4.$

b) Given radius of the sphear = 6cm.

Radius of cone = 6cm ; Height of the cone = 6cm.

Number of cone = $\dfrac{Volume\ of\ sphear}{Volume\ of\ cone}$

$$= \frac{\frac{4}{3}\pi\times6\times6\times6}{\frac{1}{3}\pi\times6\times6\times6} = \frac{4}{3}\times3=4 \ .$$

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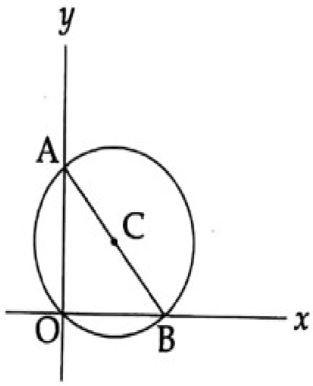
Question.

27. C is the centre of the circle passing through the origin. Circle cuts the y-axis at A(0, 4) and the x-axis at B(4, 0).



(a) Write coordinates of C.

(b) Write the equation of the circle.

(c) (0, 0) is a point on the circle. There is one more point on the circle with x and y coordinates equal. Which is that point ?

Solution.

Given A(0,4) , B(4,0) ; Origin (0,0)

a) Coordinate of C = Find the mid point

$$= \left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right) = \left(\frac{0+4}{2},\frac{4+0}{2}\right)$$

$$= \left(\frac{4}{2},\frac{4}{2}\right)=(2,2) \ .$$

b) Equation of the circle = $(x - a)^2 + (y - b)^2 = r^2$.

Diameter of the circle = Find the distance by distance formula

$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$; Points be A(0,4) , B(4,0)

$= \sqrt{4^2 + 4^2} = \sqrt{16+16} = \sqrt{32} = 4\sqrt{2}$

Radius = $\frac{4\sqrt{2}}{2} = 2\sqrt{2}$

Hence the equation of the circle be $(x - a)^2 + (y - b)^2 = r^2$.

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

$= x^2 - 4x + 4 + y^2 - 4y + 4 = 8$

$= x^2 + y^2 - 4x - 4y + 8 - 8 = 0$

$= x^2 + y^2 - 4x - 4y = 0$

c) Put x = y in the equation

$x^2 + y^2 - 4x - 4y = 0$

ie., $x^2 + x^2 - 4x - 4x = 0$

$2x^2 - 8x = 0$; $2x(x - 4) = 0$: $2x = 0$ or $x - 4 = 0$

$x = 0$, $x = 4$.

Hence the coordinatr be (4, 4).

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Question.

28. The table below shows the number of children in a class, sorted according to their heights.

Height (Centimetres)	Number of Children
130 -140	7
140 - 150	9
150 -160	10
160 -170	10
170 -180	9

If the students are directed to stand in a line according to the order of their heights starting from the smallest, then

(a) The height of the child at what position is taken as the median ?

(b) What is the assumed height of the child in the 17th position ?

(c) Find the median height.

Solution.

Height	Frequency	cf
130 - 140	7	7
140 - 150	9	16
150 - 160	10	26
160 -170	10	36
170 -180	9	45

Total Number = 45

a) Position of the Child with median height = $\frac{45+1}{2}$ = 23.

b) The assumed height of the 17th child $\frac{150+151}{2} = \frac{301}{2}$

= 150.5

c) Median height

$$l+\frac{\left(\frac{N}{2}-m\right)c}{f} = 150+\frac{\left(\frac{45}{2}-16\right)10}{10} =$$

$150+22.5-16=150+6.5=156.5$

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Question.

29. Read the following. Understand the Mathematical concepts in it and answer the questions that follow. **6x1=6**

The remainders obtained on dividing the powers of two by 7 have an interesting property. We can understand it from the table given below.

Number	2^1	2^2	2^3	2^4	2^5	2^6	2^7	....
Remainder	2	4	1	2	4	1	2	....

If the powers are 1, 4, 7, ... the remainder is 2

If the powers are 3, 6, 9, ... the remainder is 1

(a) What is the remainder on dividing 2^8 by 7 ?

(b) Write the sequence of powers of 2 leaving remainder 1 on division by 7.

(c) Check whether 2019 is a term of the arithmetic sequence 3, 6, 9, ...

(d) What is the remainder on dividing 2^{2019} by 7 ?

(e) Write the algebraic form of the arithmetic sequence 1, 4, 7, ...

(f) Write the algebraic form of the sequence $2^1, 2^4, 2^7$, ... (powers of two leaving remainder 2 on division by 7).

Solution.

a) Reminder be 4.

b) 2^3 , 2^6 , 2^9 ,………….

c) Given sequence be 3, 6, 9,…………

d = 6 – 3 = 3.

2019 be the multiple of common difference 3 .

yes, 2019 be a term of this sequence.

d) Reminder = 1.

e) Given sequence = 1, 4, 7,… ; d = 4 – 1 = 3.

Algebraic form = dn + (f-d)

= 3n + (1- 3) = 3n – 2 .

f) Algebraic form = 2^{3n-2} .

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