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GENIUS INSTITUTE
Near Gogate Jogalekar College, Ratnagiri.

Std. X (SSC) Mathematics -II

Time : 2 Hours Preliminary Paper - 2 (2022-23) Total Marks : 40

Note : 1. All questions are compulsory.
2. Use of calculator is not allowed
3. The numbers to the right of the questions indicate full marks.
4. Draw neat/graphs wherever necessary
5. Answer should be written in blue or black ink.

Q.1. (A) Choose the correct answer and write the letter of the alphabet of it : **4**

1) In $\triangle ABC$, $\angle A = 90^0$, $\angle B = 30^0$, $\angle C = 60^0$, BC = 8.4 cm, then AC = ?
A) 16.8 cm B) 4.4 cm C) 4.8 cm D) 4.2 cm

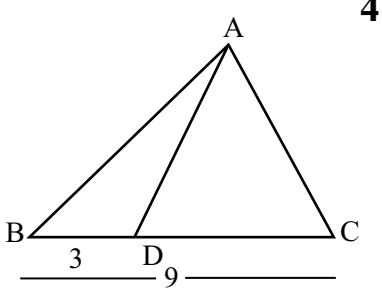
2) The measure of longest chord of the circle is 6.4 cm, then find the radius of the circle.
A) 12.8 cm B) 3.2 cm C) 6.4 cm D) 4.6 cm

3) P is the midpoint of line AB. point A(-1, 2) and point B(5, -6), then find the co-rdinates of point P.
A) (2, -2) B) (2, 2) C) (-2, 2) D) (2, 4)

4) If radius of the base of the cone is 7 cm and height is 24 cm, then what is the curved surface area of cone?
A) 110 cm^2 B) 440 cm^2 C) 550 cm^2 D) 330 cm^2

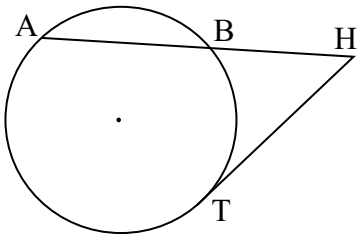
B) Solve the following sub-questions : **4**

1) $\triangle$In given figure BD = 3 and BC = 9, then B
A ($\triangle ABD$) : A($\triangle ADC$) = ?



2) Identify whether (4, 9, 12) is Pythagorean triplet.

3) In given figure, seg TH is tangent to the circle.
HA = 9 cm, HB = 4 cm; then find the HT.

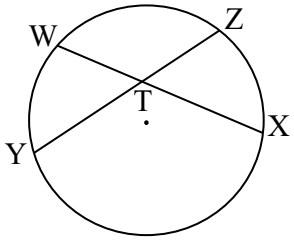


4) Find the centroid of the triangle whose vertices are (3, -5), (4, 3) and (11, -4)

Q. 2 (A) Complete and write *any* TWO activities from the following : **4**

1) In figure, WT = 4.8, TX = 8, YT = 6.4, Find TZ .

Solution : $l(WT) = 4.8$, $l(TX) = 8$, $l(YT) = 6.4$



Using property of intersecting secants,

WT x ☐ = ☐ x TZ

$\therefore 4.8 \times 8 = 6.4 \times TZ$

$$\therefore TZ = \frac{4.8 \times 8}{\square}$$

$\therefore$ $l(TZ) =$ ☐

2) Prove : $\tan^4\theta + \tan^2\theta = \sec^4\theta - \sec^2\theta$

Solution : LHS $= \tan^4\theta + \tan^2\theta$

$=$ ☐ $+ \tan^2\theta$ .....$[(a^2)^2] = a^4$

$=$ ☐$^2 + \sec^2\theta - 1$ .....$(1 + \tan^2\theta = \sec^2\theta)$

$= \sec^4\theta -$ ☐ $+$ ☐ $+ \sec^2\theta - 1$

$= \sec^4\theta - \sec^2\theta$

3) A bucket is frustum shaped. Its height is 28 cm. Radii of circular faces are 12 cm and 15 cm. Find the capacity of the bucket.

Solution : Capacity of the bucket = Volume of frustum

$= \frac{1}{3}\pi h$ ☐

$= \frac{1}{3} \times \frac{22}{7} \times 28 (15^2 + 12^2 + 15 \times 12)$

$= \frac{22 \times 4}{3} \times (225 + 144 + 180)$

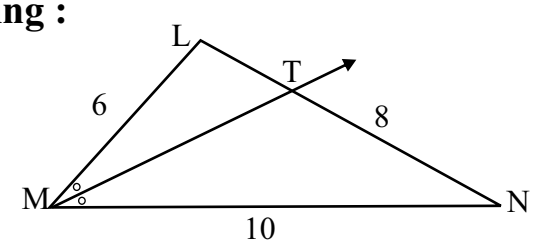
$= \frac{22 \times 4}{3} \times$ ☐

$= 88 \times$ ☐

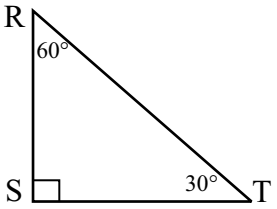
$=$ ☐ $cm^3 = 16.104$ litre

B) Solve *any* <u>FOUR</u> sub-questions from the following : **8**

1) In $\triangle LMN$, ray MT bisects $\angle LMN$. If LM = 6 MN = 10, TN = 8; then find LT

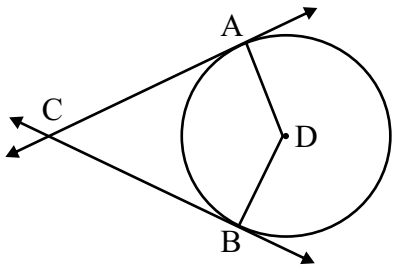


2) In $\triangle RST$, $\angle S = 90°$, $\angle T = 30°$, RT = 12 cm, then find RS and ST.



3) Find distance CD where C(-3a , a), D(a, -2a)

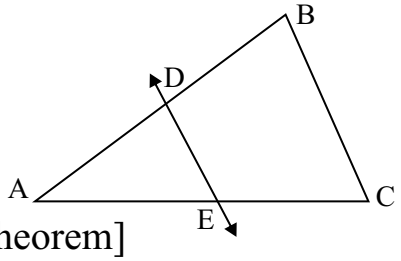
4) In the adjoining figure circle with Centre D touches the sides of $\angle ACB$ at A and B. If $\angle ACB = 50^0$, find measure of $\angle ADB$.



5) Prove : $\cos^2\theta(1 + \tan^2\theta) = 1$

Q. 3 (A) Complete and write *any* <u>ONE</u> activity from the following : **3**

1) In $\triangle ABC$, if line intersects of side AB and side AC at point D and point E respectively and parallel to the side BC, then Prove : $\frac{AD}{AB} = \frac{AE}{AC}$



Solution : In $\triangle ABC$, line DE || side BC ... [Given]

$\therefore \frac{AD}{\square} = \frac{\square}{EC}$ ... [Basic proportionality theorem]

$\frac{DB}{AD} = \frac{EC}{AE}$ ... [$\square$]

$\therefore \frac{DB + AD}{AD} = \frac{\square + \square}{AE}$ ... [By Componendo]

$\therefore \frac{\square}{AD} = \frac{AC}{\square}$ ... [A-D-B and A-E-C]

$\therefore \frac{AD}{AB} = \frac{AE}{AC}$ ... [By invertendo]

2) Find the ratio in which the line segment joining the points A(3,8) and B(-9, 3) is divided by the Y- axis.

Solution : Let A $(3, 8) \equiv (x_1, y_1)$ and B $(-9, 3) \equiv (x_2, y_2)$ are the given points.

We have to find a point on y-axis.

$\therefore$ Its x-co-ordinate will be $\square$

Let the points A and B divide in ration $m : n$

By section formula for internal division.

$$x = \frac{mx_2 + \square}{m + n}$$

$$\therefore \square = \frac{m(-9) + n(3)}{m + n}$$

$\therefore \square + 3n = 0$

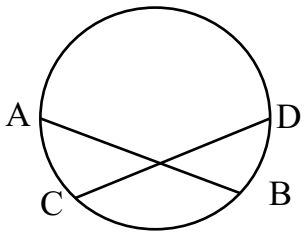
$\therefore 9m = \square$

$\therefore \frac{m}{n} = \frac{\square}{\square}$

B) Solve *any* <u>TWO</u> sub-questions from the following : **6**

1) Prove : In a right angled triangle, the square of the hypotenuse is equal to the sum of the squares of remaining two sides.

2) In figure, chord AB ≅ chord CD,
Prove that, arc AC ≅ arc BD



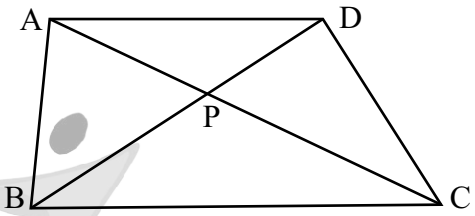
3) $\triangle ABC \sim \triangle PBQ$, In $\triangle ABC$, AB = 4.5 cm, $\angle B = 70^0$, BC = 5 cm. Ratio of the corresponding sides of two triangles is 7:4. Then construct $\triangle ABC$ and $\triangle PBQ$.

4) In the given figure, a cylindrical wrapper of flat tablets is shown. The radius of a tablet is 7 mm & its thickness is 5 mm. How many such tablets are wrapped in the wrapper?

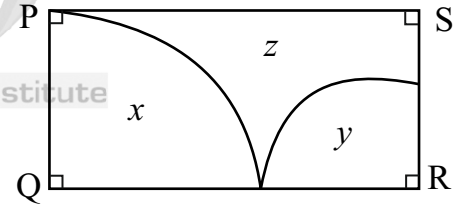
Q. 4 Attempt *any* <u>TWO</u> sub-questions from the following : **8**

1) $\Delta RHP \sim \Delta NED$, In ΔNED, NE = 6 cm. $\angle E = 60^0$, $\angle N = 55^0$, $\frac{HP}{ED} = \frac{4}{3}$ then construct ΔRHP and ΔNED.

2) In $\square ABCD$, seg AD || seg BC.
Diagonal AC and diagonal BD intersect each other in point P. Then
show that $\frac{AP}{PD} = \frac{PC}{BP}$

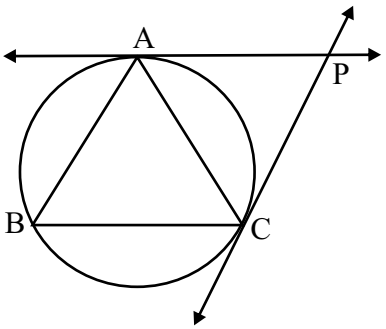


3) In $\square PQRS$ is a rectangle.
If PQ = 14 cm, QR = 21 cm, find the areas of the parts *x*, *y* and *z*.



Q. 5 Attempt *any* <u>ONE</u> sub-question from the following : **3**

1) In figure, tangents drawn from point A and point C intersect at point P. If $\angle APC = 50^0$, then find $\angle ABC$.



2) Two persons are standing on the same side of a tall building. When they look at the roof of the building, the elevation angles are 30^0 and 60^0 respectively. If the height of the building is 72 m, what is the distance between the two persons? ($\sqrt{3} = 1.73$)