

BOARD QUESTION PAPER : JULY 2015

GEOMETRY

Time: 2 Hours

Max. Marks: 40

Note:

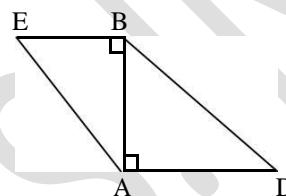
- i. Solve *All* questions. Draw diagrams wherever necessary.
- ii. Use of calculator is not allowed.
- iii. Figures to the right indicate full marks.
- iv. Marks of constructions should be distinct. They should not be rubbed off.
- v. Diagram is essential for writing the proof of the theorem.

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1. Solve any five sub-questions:

[5]

- i. In the figure drawn alongside,
seg BE ⊥ seg AB and seg BA ⊥ seg AD.



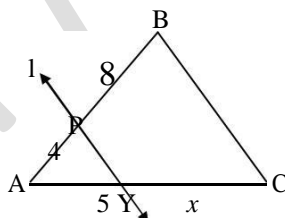
If BE = 6 and AD = 9, find $\frac{A(\triangle ABE)}{A(\triangle BAD)}$.

- ii. Find the diagonal of a square whose side is 16 cm.
- iii. If two circles with radii 8 and 3 respectively touch internally, then find the distance between their centres.
- iv. If $\cos \theta = \frac{\sqrt{3}}{2}$, then find the value of acute angle θ .
- v. If the slope of a line is 2 and y intercept is 5, then write the equation of that line.
- vi. Find the total surface area of a cube with side 9 cm.

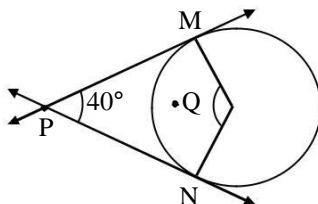
2. Solve any four sub-questions:

[8]

- i. In the given figure, line $l \parallel$ side BC, AP = 4, PB = 8, AY = 5 and YC = x. Find x.



- ii. In the figure alongside, Q is the centre of a circle and PM, PN are tangent segments to the circle. If $\angle MPN = 40^\circ$, find $\angle MQN$.



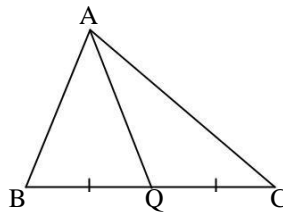
- iii. Draw a tangent at any point R on a circle of radius 3.5 cm and centre P.
- iv. Draw the figure for an angle in standard position. If the initial arm rotates 220° in the clockwise direction, then state the quadrant in which the terminal arm lies.
- v. The radius of the base of a right circular cylinder is 3 cm and its height is 7 cm, find the curved surface area.

- vi. A sector of a circle with radius 10 cm has central angle 72° . Find the area of the sector.
($\pi = 3.14$)

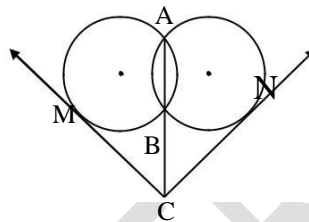
3. Solve any three sub-questions:

[9]

- i. In the given figure,
 $AB^2 + AC^2 = 122$, $BC = 10$. Find the length of the median on side BC.



- ii. In the figure, two circles intersect each other in points A and B. Seg AB is the chord of both circles. The point C is the exterior point of both the circles on the line AB. From the point C, tangents have been drawn to the circles touching at M and N. Prove that $CM = CN$.



- iii. Draw the circumcircle of ΔPMT in which $PM = 5.4$ cm, $\angle P = 60^\circ$, $\angle M = 70^\circ$.
iv. Show that: $\sec^2\theta + \operatorname{cosec}^2\theta = \sec^2\theta \cdot \operatorname{cosec}^2\theta$.
v. Find the value of k if $(-3, 11)$, $(6, 2)$ and $(k, 4)$ are collinear points.

4. Solve any two sub-questions:

[8]

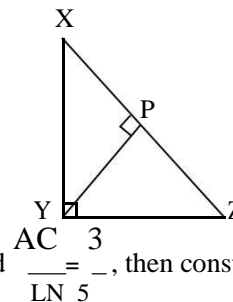
- i. Prove that “the opposite angles of a cyclic quadrilateral are supplementary”.
ii. A ship of height 24 m is sighted from a lighthouse. From the top of the lighthouse, the angles of depression to the top of the mast and base of the ship are 30° and 45° respectively. How far is the ship from the lighthouse? ($\sqrt{3} = 1.73$)
iii. In triangle ABC, the coordinates of vertices A, B and C are $(4, 7)$, $(-2, 3)$ and $(0, 1)$ respectively. Find the equations of the medians passing through the vertices A, B and C.

5. Solve any two sub-questions:

[10]

- i. In the figure drawn alongside, ΔXYZ is a right triangle, right angled at Y such that $YZ = b$ and $A(\Delta XYZ) = a$.
If $YP \perp XZ$, then show that

$$YP = \frac{2ab}{\sqrt{b^4 + 4a^2}}$$



- ii. $\Delta ABC \sim \Delta LMN$. In ΔABC , $AB = 5.1$ cm, $\angle B = 55^\circ$, $\angle C = 65^\circ$ and $\frac{AC}{LN} = \frac{3}{5}$, then construct ΔLMN .
iii. An ink container of cylindrical shape is filled with ink upto 71%. Ball pen refills of length 12 cm and inner diameter 2 mm are filled upto 84%. If the height and radius of the ink container are 14 cm and 6 cm respectively, find the number of refills that can be filled with this ink.