BOARD QUESTION PAPER :OCTOBER 2013
MATHS

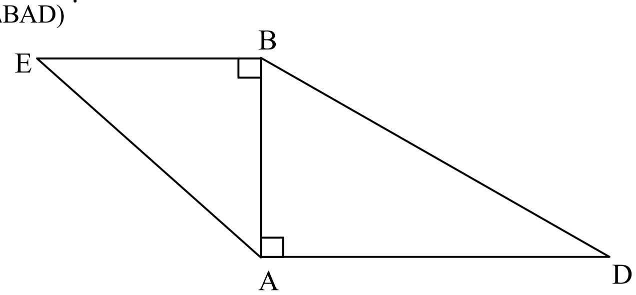
Time: 2 $\frac{1}{2}$ Hours **Max. Marks: 60**

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 the proof of the theorem.

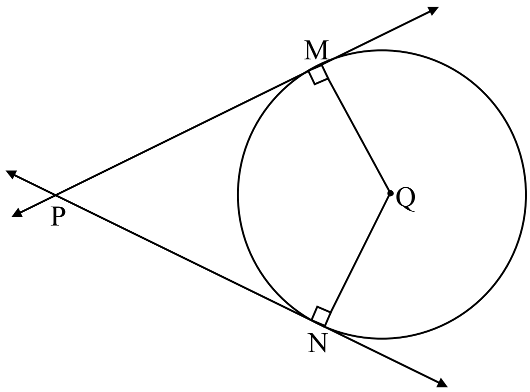
1. Solve any six sub-questions: **[6]**

i. In the following figure, seg BE $\perp$ seg AB and seg BA $\perp$ seg AD. If BE = 6 and AD = 9, find $\frac{A(\Delta ABE)}{A(\Delta BAD)}$.



ii. If two circles with radii 8 and 3 respectively touch internally, then find the distance between their centres.

iii. In the following figure, Q is the centre of circle and PM and PN are tangent segments to the circle. If $\angle$MPN = 40°, find $\angle$MQN.



iv. If $\theta = -60°$, find the value of $\cos\theta$.

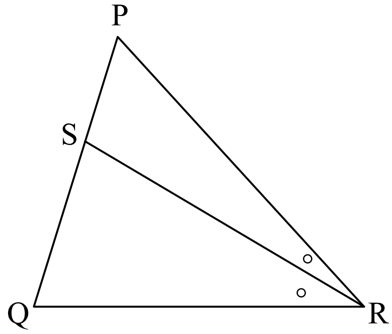
v. Find the slope of the line passing through A(–2, 1) and B(0, 3).

vi. Find the area of the sector of a circle with radius 6 cm and the length of arc is 15 cm.

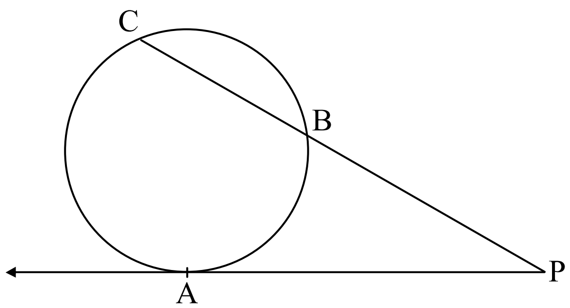
vii. Using Euler's formula, find V, if E = 30, F = 12.

2. Solve any five sub-questions: [10]

i. In ΔPQR, seg RS is the bisector of $\angle PRQ$. PS = 4, SQ = 12, PR = 13, find QR.



ii. In the following figure, a tangent segment PA touching a circle in A and a secant PBC intersects the circle at points C and B. If AP = 13 and BP = 6, find PC.



iii. If $\sin\theta = \frac{7}{25}$, where θ is an acute angle, find the value of $\cos\theta$ using identity.

iv. Find the trigonometric ratios $\tan\theta$ and $\cos\theta$ of an angle θ, which is in standard position, whose terminal arm passes through (7, 24).

v. P(–2, –3) is a point on the line $2y = \frac{11}{2}x + c$. Find c.

vi. The dimensions of a cuboid in cm arc $20 \times 18 \times 10$. Find its total surface area.

3. Solve any four sub-questions: [12]

i. The ratio of the areas of two triangles with common base is 4 : 3. Height of the larger triangle is 20 cm, then find the corresponding height of the smaller triangle.

ii. Draw the circumcircle of ΔKLM in which LM = 7 cm, $\angle L = 60°$, $\angle M = 55°$.

iii. A boy is at a distance of 70 m from a tree makes an angle of elevation of 60° with the top of the tree. What is the height of the tree? ($\sqrt{3} = 1.73$)

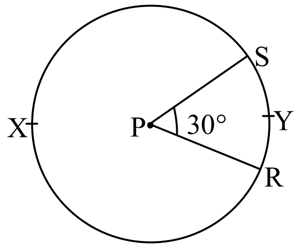
iv. Find the equation of the line passing through the points (–2, –3) and (–4, 7).

v. In the following figure, the radius of the circle is 7 cm and m(arc RYS) = 30°, then find:

a. Area of the circle

b. A(P-RYS)

c. A(P-RXS).



4. Solve any three sub-questions: **[12]**

i. Prove that, If a line parallel to a side of a triangle intersect the other sides in two distinct points, then the line divides those sides in proportion.

ii. Prove that the lengths of the two tangent segments to a circle drawn from external point are equal.

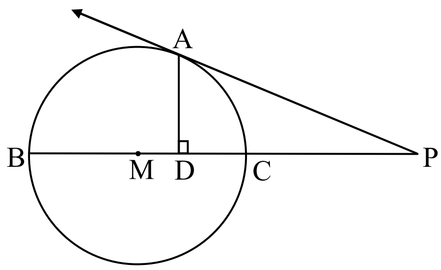
*iii. Construct ΔLMN such that $LM = 6.6$ cm, $\angle LNM = 65°$, where ND is median and $ND = 5$ cm.

iv. An observer standing on a bank of river observes the top of a tree on the opposite bank making an angle of elevation 60°. He moves 30 m backward and observes the top of the tree making an angle of elevation 30°. Find the height of the tree and the width of the river. ($\sqrt{3} = 1.73$)

5. Solve any four sub-questions: **[20]**

i. Prove that, in a triangle, the angle bisector divides the side opposite to the angle in the ratio of the remaining sides.

ii. In the following figure, BC is a diameter of the circle with centre M. PA is a tangent at A from P which is a point on line BC and $AD \perp BC$. Prove that $DP^2 = BP \times CP - BD \times CD$.



iii. The length of a semicircular tunnel is 2 km and diameter is 7 m. Find the expenditure for digging the tunnel at the rate of ₹ 600 per m^3. Find the expenditure for plastering inner side of the tunnel at the rate of ₹ 50 per sq. m. $\left(\pi = \frac{22}{7}\right)$

iv. If the points A(1, 2), B(4, 6), C(3, 5) are the vertices of a ΔABC, find the equation of the line passing through the midpoints of AB and AC.

v. Draw a triangle PQR right angled at Q such that PQ = 3 cm, QR = 4 cm. Now construct ΔAQB similar to ΔPQR, each of whose sides is $\frac{7}{5}$ times the corresponding side of ΔPQR.