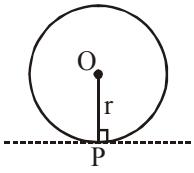
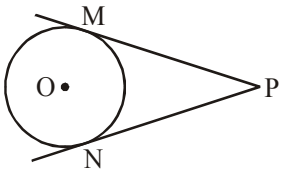
Tangency

Theorem 1 :



The tangent at any point of a circle is perpendicular to the radius drawn to the point of contact.

Theorem 2 :

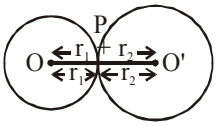


Two tangents can be drawn to a circle from an external point.

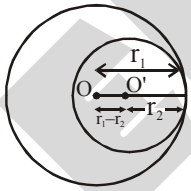
PM = PN

Theorem 3 :

If two circles touch one another, then the centres and the point of contact lie on a straight line.

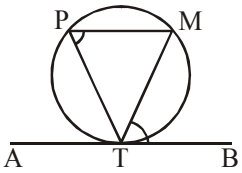


$OO' = r_1 + r_2$



$OO' = |r_1 - r_2|$

Theorem 4 (Alternate Segments Theorem) :



The angles made by a tangent to a circle with a chord drawn from the point of contact are respectively equal to the angles in the alternate segments of the circle.

$\angle MTB = \angle TPM$

POLYGON

(i) **Rectilinear Figure or Polygon :** A plane figure bound by (three or more) lines.

(Rectilinear figure may be closed or open while polygon is closed)

(ii) If a polygon has 'n' sides, then

(a) The number of diagonals is $d = \frac{n(n-1)}{2} - n$

(b) The sum of its interior angles = (2n – 4) right angles

or $= (n - 2) \times 180^\circ$

(iii) **Concave Polygon :** A polygon with at least one interior angle reflex.

Convex Polygon : If all interior angles are less than 180°, then the polygon is convex.

(iv) **Sum of all the exterior angles** of a polygon whose sides are produced in order is 360°.

(v) **Regular Polygon** is one in which all sides and angles are equal. In a regular polygon of 'n' sides, the value of each exterior angle is given by :

Ex. Angle = $\frac{360°}{n}$

and hence the value of each interior angle is :

Int. Angle = $180° - \frac{360°}{n}$

as the sum of the interior and the exterior angles at any vertex is 180°.

Answer the following questions :

1. In a regular polygon, if interior angle is 144°, then number of sides is

(A) 6 (B) 8 (C) 10 (D) 12

2. If four sides of a quadrilateral ABCD are tangential to a circle, then

(A) AC + AD = BD + CD (B) AB + CD = BC + AD

(C) AB + CD = AC + BC (D) AC + AD = BC + DB

3. If TP and TQ are two tangents to a circle with centre O so that $\angle POQ = 110°$. then $\angle PTQ$ is equal to

(A) 60° (B) 70° (C) 80° (D) 90°

4. The length of the tangent drawn from a point 8 cm away from the centre of a circle of radius 6 cm is

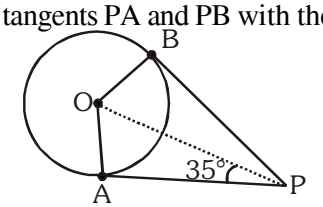
(A) $\sqrt{7}$ cm (B) $2\sqrt{7}$ cm (C) 10 cm (D) 5 cm

5. An equilateral triangle XYZ is inscribed in a circle with centre O. The measure of XOY is

(A) 60° (B) 120° (C) 45° (D) 75°

6. In figure, PA and PB are the two tangents drawn to the circle. O is the centre of the circle. A and B are the points of contact of the tangents PA and PB with the circle. If $\angle OPA = 35°$, then $\angle POB$ =

(A) 55°
(B) 65°
(C) 75°
(D) 85°



RACE # 06 (NP-I,II,II) **MATHEMATICS**

Q.	1	2	3	4	5	6	7	
A.	C	B	B	B	B	A	A	