

7. A milk container is made of a metal sheet in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm respectively. Find the cost of milk which the container can hold when fully filled at Rs. 20 per litre and the cost of the metal sheet used in making the container, at Rs. 8 per 100cm^2 (Take $\pi = 3.14$)
If the milkman uses plastic sheet instead of metal sheet at the rate of Rs. 2 per 100cm^2 to reduce his cost, find the cost of the plastic sheet used to make the container. Is his act justifying? Why should we reduce the use of plastics?
8. A teacher prepares a conical bucket as a teaching aid for her lesson. If the radii of the circular ends of the teaching aid which is 45 cm high are 28 cm and 7 cm, find the area of the sheet used in the teaching aid and its capacity. How does teaching aid contribute to the teaching – learning process? Give at least two ways
9. Harshit donates some part of his income to an orphanage every month. In a particular month, he wishes to donate toys for the children. Each toy is in the form of a cone mounted on a hemisphere of common base radius 7 cm. The total height of the toy is 31 cm. Find the total surface area of the toy. Also find the cost of 50 such toys if the cost of material used in the toy is Rs. 5 per 100cm^2 and the cost of making is Rs. 10 per toy [Use $\pi = 22/7$]
What value of Harshit are reflected here? Justify your answer.

CIRCLE

MCQ

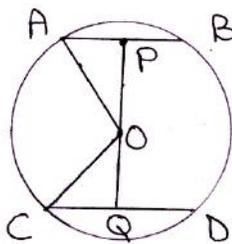
1. Number of tangents that can be drawn through a point on the circle is
(a) 3 (b) 2 (c) 1 (d) 0
2. The word tangent came from the Latin word
(a) tang (b) tangere (c) tangrant (d) axyere
3. The word tangent was introduced by
(a) De Moivre (b) Aryabhata (c) Disradi (d) Thomas Fincke
4. Number of tangents to circle which are parallel to a secant is
(a) 1 (b) 2 (c) 3 (d) infinite
5. $C(O, r_1)$ and $C(O, r_2)$ are two concentric circles with $r_1 > r_2$. AB is a chord of $C(O, r_1)$ touching $C(O, r_2)$ at c then
(a) $AB = r_1$ (b) $AB = r_2$ (c) $AB = BC$ (d) $AB = r_1 + r_2$
6. From a point Q, the length of the tangent to a circle is 12 cm and the distance of Q from the centre is 13 cm. The radius of circle
(a) 7 cm (b) 6.5 cm (c) 5 cm (d) 9 cm
7. TP and TQ are two tangents to a circle with centre O, so that $\angle POQ = 100^\circ$, then $\angle PTQ$ is equal to
(a) 60° (b) 70° (c) 80° (d) 90°
8. TP and TQ are two tangents to a circle with centre O, so that $\angle POQ = 120^\circ$, $\angle OPT$ is equal to
(a) 50° (b) 60° (c) 80° (d) 90°
9. Two concentric circles are of radii 13 cm and 15 cm. The length of chord of a larger circle which touches the smaller circle is
(a) 12 cm (b) 20 cm (c) 24 cm (d) 26 cm
10. A quadrilateral ABCD is drawn to circumscribe a circle. If $AB = 12$ cm, $BC = 15$ cm, $CD = 14$ cm, then AD is equal to
(a) 10 cm (b) 11 cm (c) 12 cm (d) 14 cm
11. A triangle ABC is drawn to circumscribe a circle. If $AB = 13$ cm, $BC = 14$ cm and $AE = 7$ cm, then AC is equal to
(a) 12 cm (b) 15 cm (c) 11 cm (d) 16 cm
12. A right $\triangle ABC$ right angled at A drawn to circumscribe a circle of radius 5 cm with centre O. If $AB = 17$ cm, $AC = 18$ cm, then OC is equal to
(a) 10 cm (b) 9 cm (c) 12 cm (d) 13 cm

13. A circle is inscribed in a triangle with sides 8, 15 and 17 cm. The radius of circle is
 (a) 6 cm (b) 5 cm (c) 4 cm (d) 3 cm
14. Distance between two parallel lines is 14 cm. The radius of circle which will touch both two line is
 (a) 6 cm (b) 7 cm (c) 12 cm (d) 14 cm
15. A line m is tangent to a circle with radius 5 cm. Distance between the centre of circle and the line m is
 (a) 3 cm (b) 4 cm (c) 5 cm (d) 6 cm
16. A line touches a circle of radius 4 cm. Another line is drawn which is tangent to the circle. If two lines are parallel then the distance between them
 (a) 4 cm (b) 6 cm (c) 7 cm (d) 25 cm
17. Two parallel lines touch the circle at points A and B respectively. If the area of the circle is $25\pi \text{ cm}^2$, then AB is equal to
 (a) 5 cm (b) 8 cm (c) 10 cm (d) 25 cm
18. In fig. if $\angle AOB = 125^\circ$, then $\angle COP$ is equal to
 (a) 62.5° (b) 45° (c) 35° (d) 55°
19. AB is a chord of the circle and AOC is the diameter such that $\angle ACB = 50^\circ$. If AT is the tangent to the circle at the point A, then $\angle BAT$ is equal to
 (a) 65° (b) 60° (c) 50° (d) 40°
20. From a point P which is at a distance of 13 cm from the centre O of a circle of radius 5 cm, the pair of tangents PQ and PR to a circle are drawn. Area of quad PQOR is
 (a) 60 cm^2 (b) 65 cm^2 (c) 30 cm^2 (d) 32.5 cm^2
21. AT is a tangent to the circle with centre O such that $OT = 4 \text{ cm}$ and $\angle OTA = 30^\circ$. Then AT is equal to
 (a) 4 cm (b) 2 cm (c) $2\sqrt{3} \text{ cm}$ (d) $4\sqrt{3} \text{ cm}$
22. If O is the centre of a circle, PQ is a chord and the tangent PR at P makes an angle of 50° with PQ, then $\angle POQ$ is equal to
 (a) 100° (b) 80° (c) 90° (d) 75°
23. If PQR is the tangent to a circle at Q whose centre O, AB is a chord parallel to PR and $\angle BQR = 70^\circ$, then $\angle AQB$ is equal to
 (a) 20° (b) 40° (c) 35° (d) 45°
24. If angle between two radii of a circle is 130° , the angle between the tangents at the ends of the radii is
 (a) 90° (b) 50° (c) 70° (d) 40°
25. The pair of tangents AP and AQ drawn from external point A to a circle with centre O are perpendicular to each other and length of each tangent is 5 cm. The radii of circle is
 (a) 10 cm (b) 7.5 cm (c) 5 cm (d) 2.5 cm
26. PQ is a tangent to a circle with centre O at point P. If OPQ is an isosceles triangle, then $\angle OQP$ is equal to
 (a) 15° (b) 30° (c) 45° (d) 60°
27. A circle touches all the four sides of a quadrilateral ABCD whose sides are $AB = 6 \text{ cm}$, $BC = 7 \text{ cm}$ and $CD = 4 \text{ cm}$. The length of side AD is

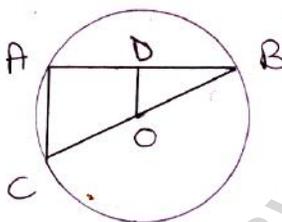
VERY SHORT ANSWER TYPE (2 marks)

- From the point P, the length of the tangent to a circle is 15 cm and the distance of P from the centre of the circle is 17 cm. Then what is the radius of circle.
- A tangent PQ at a point P to a circle of radius 6 cm meets a line through the centre O at a point Q so that $OQ = 10 \text{ cm}$, find the length of PQ.
- From a point Q, the length of the tangent to a circle is 24 cm and the distance Q from the centre is 25 cm, find the radius of the circle.
- If TP and TQ are two tangents to a circle with centre O so that $\angle POQ = 140^\circ$, find $\angle PTQ$.
- If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle 60° . Find $\angle POA$.

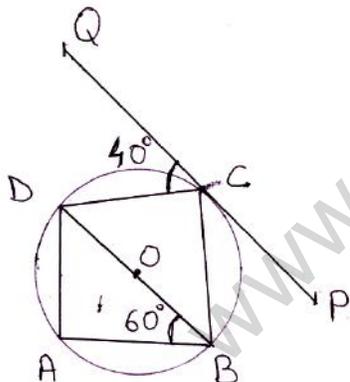
6. A point P is 13 cm from the centre of the circle. The length of the tangent drawn from P to the circle is 12 cm. Find the radius of the circle.
7. Find the length of the tangent drawn from a point whose distance from the centre of a circle is 25 cm. Given that radius of the circle 13 cm.
8. In the fig, O is the centre of the circle with radius 5 cm. $AB \parallel CD$, $AB = 6$ cm. Find OP.



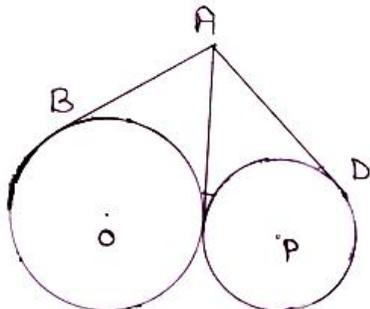
9. In the given fig, OD is perpendicular to the chord AB of a circle whose centre O. If BC is a diameter, find $\frac{CA}{OD} = ?$



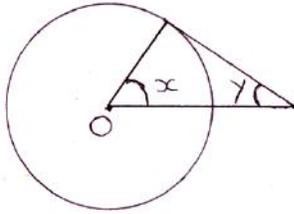
10. Two concentric circles are of radii 5 cm and 3 cm. Find out the length of the chord of larger circle which touches the smaller circle.
11. If fig, ABCD is a cyclic quadrilateral and PQ is tangent to the circle at C. If BD is the diameter, $\angle DCQ = 40^\circ$ and $\angle ABD = 60^\circ$, find $\angle BCP$.



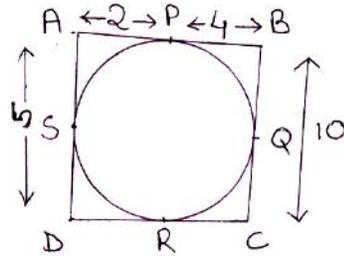
12. What is distance between two \parallel tangents of a circle of radius 7 cm.
13. PQ is a tangent drawn from a point to a circle with centre O and QOR is a diameter of the circle such that $\angle POR = 110^\circ$. Find $\angle OPQ$.
14. From an external point P, K tangents can be drawn to a circle. Find the value of K.
15. In the fig, AB, AC, AD are tangents of $AB = 5$ cm, find AD.



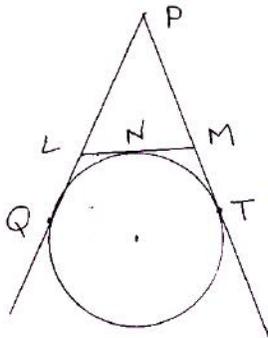
16. If PT is tangent to the circle O. Find $x + y$.



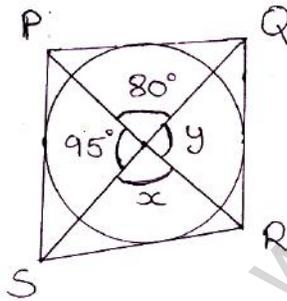
17. Find the quadrilateral's perimeter.



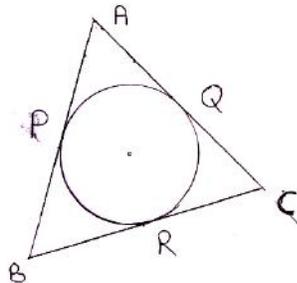
18. Given, $PQ = 28$ cm, Find the perimeter of $\triangle PLM$.



19. Quadrilateral PQRS circumscribes a circle. Find the degree measures of x and y .

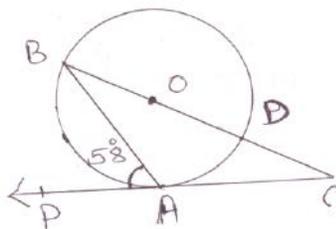


20. In the given fig, if $AP = PB$, then which two sides of $\triangle ABC$ are equal? Justify your answer.

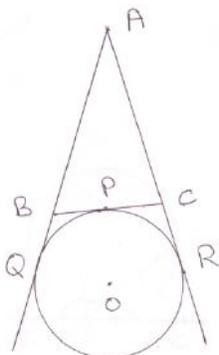


SHORT ANSWER TYPE ANSWERS

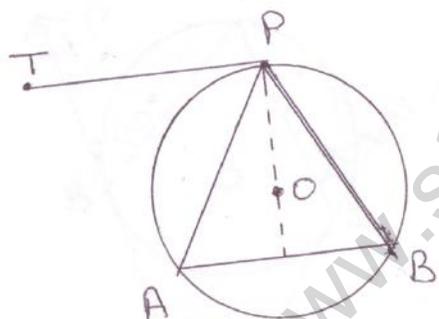
1. In fig, O is the centre of the circle, PQ is tangent to the circle at A. If $\angle PAB = 58^\circ$, find $\angle ABQ$ and $\angle AQB$.



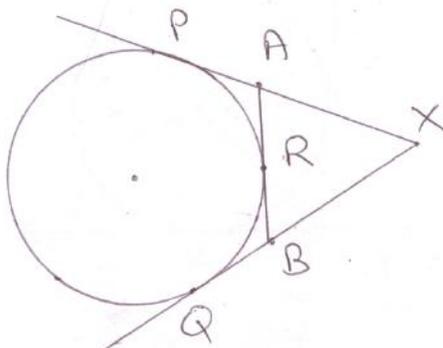
2. In fig, a circle touches the side BC of $\triangle ABC$ at P and touches AB and AC produced at Q and R respectively. If $AQ = 5$ cm, find the perimeter of $\triangle ABC$.



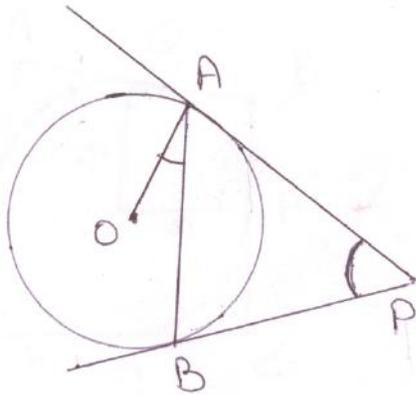
3. A tangent PT is drawn to a chord AB as shown in fig. Prove that APB is an isosceles triangle.



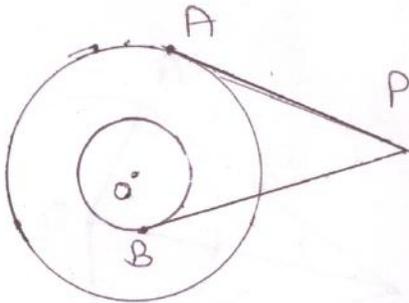
4. In the fig XP and XQ are two tangents to a circle with centre O from a point X outside the circle. ARB is the tangent to circle at R. Prove that $XA + AR = XY + BR$.



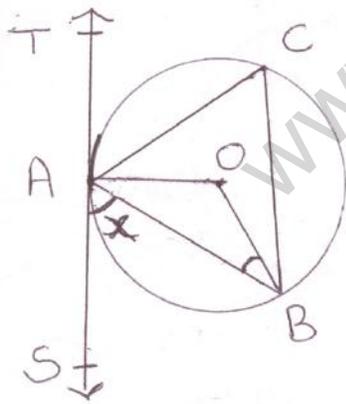
5. Two tangents PA and PB are drawn to a circle with centre O from an external point P. Prove that $\angle APB = 2\angle OAB$.



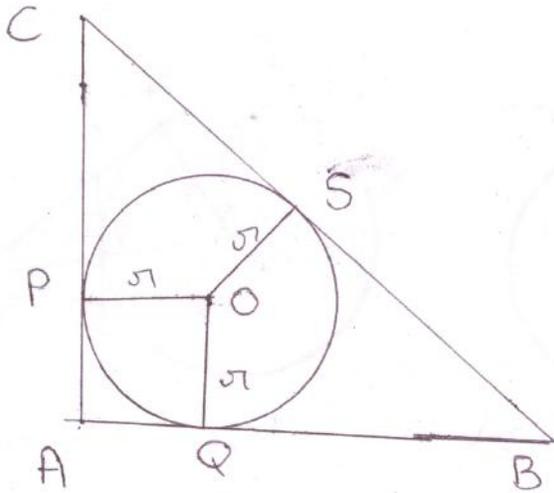
6. Prove that parallelogram circumscribing a circle is a rhombus.
 7. If all sides of a parallelogram touch a circle, show that llgm is a rhombus.
 8. If fig, there are two concentric circles with centre O and radii 5 cm and 3 cm. From an external point P tangents PA and PB are drawn to these circles. If AP = 12 cm, find the length of BP.



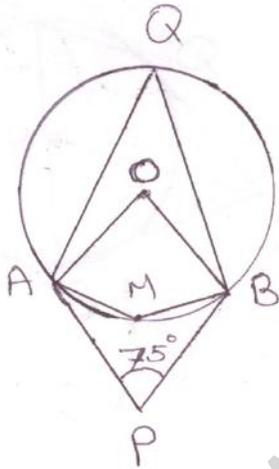
9. In the given fig, TAS is a tangent to a circle, with centre O, at the point A. If $\angle OBA = 32^\circ$, find the value of x.



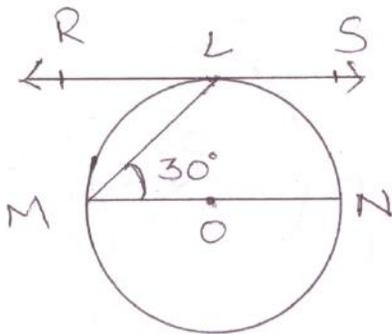
10. In the given fig, ABC is a right angled Δ . Right angled at A, with $AB = 6$ cm and $AC = 8$ cm. A circle with centre O has been inscribed inside the triangle. Calculate the value of r.



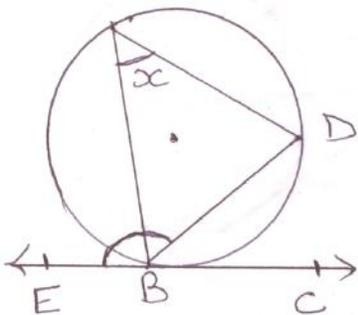
11. P is the midpoint of arc QPR of a circle. Show that the tangent at P is parallel to chord QR.
12. If ΔABC is an isosceles with $AB = AC$, and $C(0, r)$ is incircle of ΔABC touching BC at L . Prove that the point L bisects BC .
13. In the given fig, O is the centre of the circle. Determine $\angle AQB$ and $\angle AMB$.



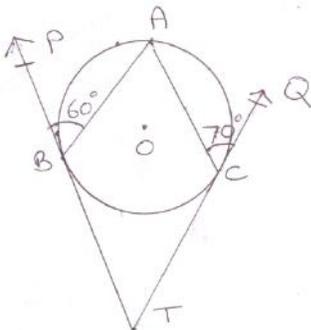
14. In the given fig, RS as the tangent to the circle at L and MN is a diameter. If $\angle NML = 30^\circ$, determine $\angle RLM$.



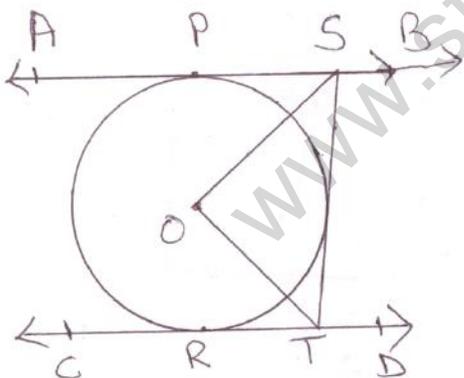
15. If the given fig, find x if $\angle EBD = 146^\circ$.



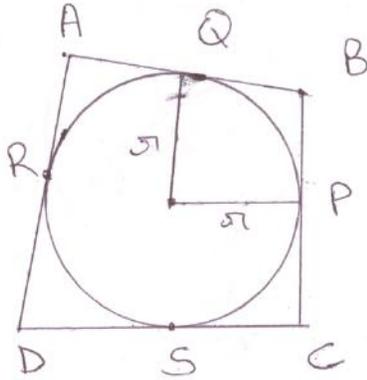
16. In the given fig, TBP and TCQ are tangent to the circle whose centre is O. Also $\angle PBA = 60^\circ$, $\angle ACQ = 70^\circ$. Determine $\angle BAC$ and $\angle BTC$.



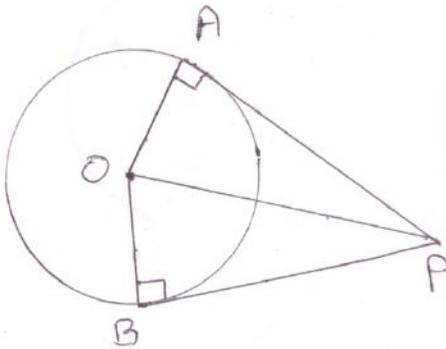
17. PQ and PR are tangents segments to a circle with centre O. If $\angle QPR = 80^\circ$, find $\angle QOR$.
18. Prove that in two concentric circles, the chord of the larger circle which touches the smaller circle is bisected at the point of contact.
19. In fig AB and CD are two parallel tangents to a circle with centre O. ST is tangent between the two parallel tangents touching the circle at Q. Show that $\angle SOT = 90^\circ$.



20. In the fig, a circle is inscribed in a quadrilateral ABCD in which $\angle B = 90^\circ$. If $AD = 23$ cm, $AB = 29$ cm and $DS = 5$ cm. Find the radius of the circle.

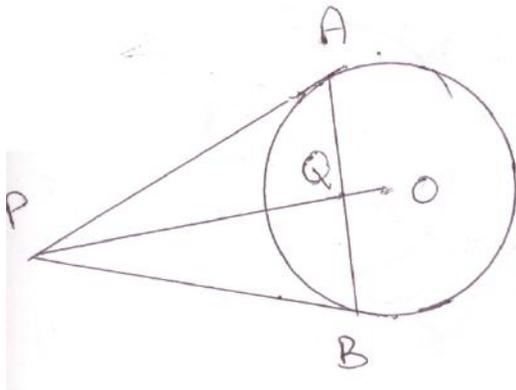


21. In fig, OP is equal to diameter of the circle. Prove that ABP is an equilateral Δ .

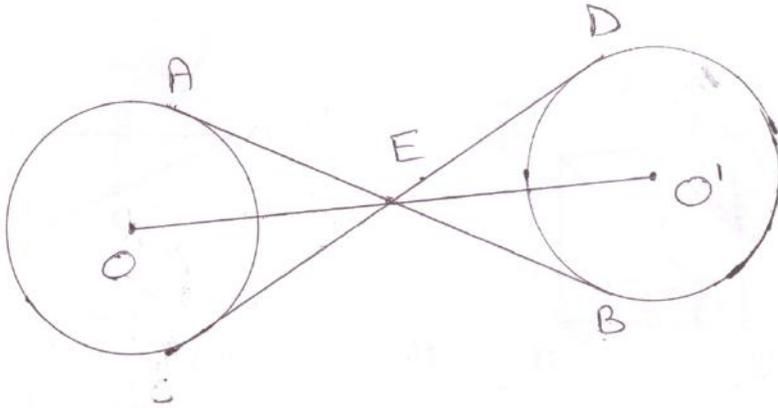


LONG ANSWER TYPE (4 marks)

- If a hexagon ABCDEF circumscribes a circle, prove that $AB + CD + EF = BC + DE + FA$.
- Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.
Using the above, do the following :
O is the centre of two concentric circles. AB is a chord of the larger circle touching the smaller circle at C. Prove that $AC = BC$.
- O is the centre of a circle. PA and PB are two tangents to a circle from a point P. Prove that (i) PAOB is a cyclic quadrilateral (ii) PO is the bisector of $\angle APB$ (iii) $\angle OAB = \angle OPA$.
- From an external point P, two tangents PA and PB are drawn to a circle with centre O as shown in the fig. Show that OP is perpendicular bisector of AB.



9. In fig, the common tangent, AB and CD to equal circles with centres O and O' intersect at E. Prove that O, E, O' are collinear.



10. If AB is a chord of a circle with centre O, AOC the diameter and AT is the tangent at A. Prove that $\angle BAT = \angle ACB$.
11. AB is a chord of length 24 cm of a circle of radius 13 cm. The tangents A and B intersect at a point C. Find the length of AC.

CONSTRUCTION

- To draw a pair of tangents to a circle which are inclined to each other at an angle of 90° , it is required to draw tangents at the end points of those two radii, of the circle, the angle between which is
 - 60°
 - 70°
 - 80°
 - 90°
- The instruments used for performing geometrical construction are
 - a scale and a protractor
 - a pair of set squares and a pair of compasses
 - a pair of compasses and a protractor
 - a graduated scale and a pair of compasses
- The construction of $\triangle ABC$, given that $CB = 4.5$ cm, $\angle C = 60^\circ$ is possible when difference of AB and AC is equal to
 - 4.9 cm
 - 5 cm
 - 5.2 cm
 - 4.1 cm
- To divide a line segment AB in the ratio 3 : 7, first draw a ray AX, so that $\angle BAX$ is an acute angle and, then mark points on ray AX at equal distance such that minimum number of these points is
 - 3
 - 7
 - 9
 - 10
- To draw a pair of tangents to a circle which are inclined to each other at an angle of 35° , it is required to draw tangents at end points of those two radii of the circle, the angle between which should be
 - 55°
 - 70°
 - 140°
 - 145°

LONG QUESTION

- Draw a pair of tangents to a circle of radius 2 cm that are inclined to each other at an angle of 90° .
- Construct a tangent to a circle of radius 2 cm from a point on the concentric circle of radius 2.6 cm and measure its length.
- Draw a triangle ABC in which $AB = 4$ cm, $BC = 6$ cm and $AC = 9$ cm. Construct a triangle similar to $\triangle ABC$ with scale factor $\frac{3}{2}$. Justify the construction. Are the two triangles congruent? Note that all the three angles and two sides of the two triangles are equal.