EXERCISE 9.4  (Optional)

7. Use result of Example 3 repeatedly.

EXERCISE 10.1

1. (i) Interior  (ii) Exterior  (iii) Diameter
   (iv) Semicircle  (v) The chord  (vi) Three

2. (i) True  (ii) False  (iii) False
   (iv) True  (v) False  (vi) True

EXERCISE 10.2

1. Prove exactly as Theorem 10.1 by considering chords of congruent circles.
2. Use SAS axiom of congruence to show the congruence of the two triangles.

EXERCISE 10.3

1. 0, 1, 2. Two
2. Proceed as in Example 1.
3. Join the centres O, O’ of the circles to the mid-point M of the common chord AB. Then, show \( \angle OMA = 90^\circ \) and \( \angle O'MA = 90^\circ \).

EXERCISE 10.4

1. 6 cm. First show that the line joining centres is perpendicular to the radius of the smaller circle and then that common chord is the diameter of the smaller circle.
2. If AB, CD are equal chords of a circle with centre O intersecting at E, draw perpendiculars OM on AB and ON on CD and join OE. Show that right triangles OME and ONE are congruent.
3. Proceed as in Example 2.
4. Draw perpendicular OM on AD.
5. Represent Reshma, Salma and Mandip by R, S and M respectively. Let KR = x m (see figure).

Area of \( \Delta ORS = \frac{1}{2} x \times 5 \). Also, area of \( \Delta ORS = \frac{1}{2} RS \times OL = \frac{1}{2} \times 6 \times 4 \).

Find x and hence RM.
6. Use the properties of an equilateral triangle and also Pythagoras Theorem.
EXERCISE 10.5

1. $45^\circ$ 
2. $150^\circ, 30^\circ$ 
3. $10^\circ$ 
4. $80^\circ$ 
5. $110^\circ$ 
6. $\angle BCD = 80^\circ$ and $\angle ECD = 50^\circ$

8. Draw perpendiculars AM and BN on CD (AB \parallel CD and AB < CD). Show $\triangle AMD \cong \triangle BNC$. This gives $\angle C = \angle D$ and, therefore, $\angle A + \angle C = 180^\circ$.

EXERCISE 10.6 (Optional)

2. Let O be the centre of the circle. Then perpendicular bisector of both the chords will be same and passes through O. Let $r$ be the radius, then $r^2 = \left(\frac{11}{2}\right)^2 + x^2 = \left(\frac{5}{2}\right)^2 + (6 - x)^2$, where $x$ is length of the perpendicular from O on the chord of length 11 cm. This gives $x = 1$. So, $r = \frac{5\sqrt{5}}{2}$ cm. 

3. 3 cm.

4. Let $\angle AOC = x$ and $\angle DOE = y$. Let $\angle AOD = z$. Then $\angle EOC = z$ and $x + y + 2z = 360^\circ$. 

$\angle ODB = \angle OAD + \angle DOA = 90^\circ - \frac{1}{2}z + z = 90^\circ + \frac{1}{2}z$. Also $\angle OEB = 90^\circ + \frac{1}{2}z$

8. $\angle ABE = \angle AD E$, $\angle ADF = \angle ACF = \frac{1}{2} \angle C$. 

Therefore, $\angle EDF = \angle ABE + \angle ADF = \frac{1}{2} (\angle B + \angle C) = \frac{1}{2} (180^\circ - \angle A) = 90^\circ - \frac{1}{2} \angle A$.

9. Use Q. 1, Ex. 10.2 and Theorem 10.8.

10. Let angle-bisector of $\angle A$ intersect circumcircle of $\triangle ABC$ at D. Join DC and DB. Then $\angle BCD = \angle BAD = \frac{1}{2} \angle A$ and $\angle DBC = \angle DAC = \frac{1}{2} \angle A$. Therefore, $\angle BCD = \angle DBC$ or, $DB = DC$. So, D lies on the perpendicular bisector of BC.

EXERCISE 12.1

1. $\frac{\sqrt{3}}{4} a^2$, 900.3 cm$^2$ 
2. ₹1650000 
3. 20$\sqrt{2}$ m$^2$ 

4. 21$\sqrt{11}$ cm$^2$ 
5. 9000 cm$^2$ 
6. 9$\sqrt{15}$ cm$^2$