Chapter 11

Construction

In the Chapter

In this chapter, you will be studying the following points:

- To divide a line segment in a given ratio.
- To construct a triangle similar to a given triangle as per a given scale factor which may be less than 1 or greater than 1.
- To construct the pair of tangents from an external point to a circle.

NCERT TEXT BOOK QUESTION (SOLVED)

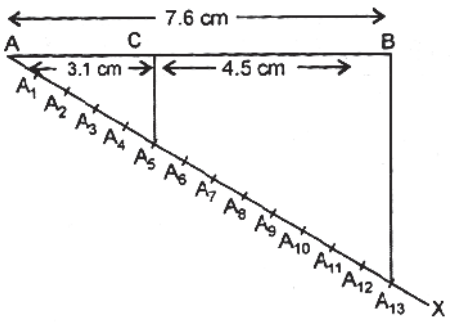
EXERCISE 11.1

Q.1. Draw a line segment of length 7.6 cm and divide it in the ratio 5 : 8. Measure the two parts.

Ans. Step of construction

(i) Draw AB = 5.6 cm

(ii) At a draw an acute ∠BAX below base AB



(iii) On AX make 5 + 8 i.e., 13 equal parts and mark them as $A_1, A_2, A_3, A_4, \ldots A_{13}$.

(iv) Join B to A_{13}. From A_5 draw $A_5C \parallel A_{13}B$. C is the required point of division and AC : CB = 5 : 8.

On measuring, we get

AC = 3.1 cm,

CB = 4.5 cm

Justification :

$A_5C \parallel A_{13}B$

$$\therefore \quad \frac{AA_5}{A_5A_{13}} = \frac{AC}{CB}$$

[Using basic proportionality theorem]

But $$\frac{AA_5}{A_5A_{13}} = \frac{5}{8}$$

Therefore, $$\frac{AC}{CB} = \frac{5}{8}$$

This shows that C divies AB in the ratio 5 : 8.

Q.2. Construct a triangle of sides 4 cm, 5 cm and 6 cm and then a triangle similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.

Ans. 1. Draw a line segment BC = 5 cm.

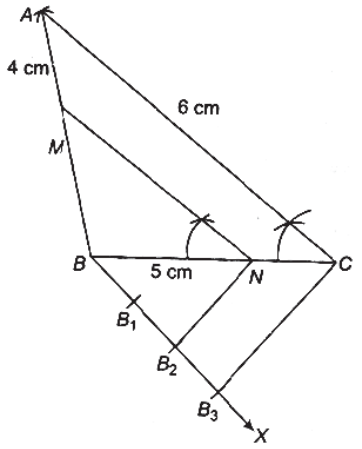
2. With B as centre and radius equal to 4 cm draw an arc.

3. With C as centre and radius equal to 6 cm, draw another arc cutting the previous arc at A.

4. Join AB and AC. so DABC is constructed.

5. Now, below BC draw a ray BX making an acute ∠CBX (say 60°)

6. Along BX, mark three points B_1, B_2, B_3 such that $BB_1 = B_1B_2 = B_2B_3$.



7. Join B_3C.
8. From B_2, draw $B_2N \parallel B_3C$ meeting BC at N.
   (By making an angle equal to $\angle BB_3C$.)
9. From N, draw NM || CA meeting AB at M.
   (By making an angle equal to $\angle BCA$).

Hence, ΔMBN is the required triangle, each of whose sides is $\frac{2}{3}$ of the corresponding sides of ΔABC.

Justification

By construction, $B_2N \parallel B_3C$

$$\therefore \quad \frac{BN}{NC}=\frac{2}{1}$$

$$\therefore \quad \frac{BC}{BN}=\frac{BN+NC}{BN}=1+\frac{NC}{BN}=1+\frac{1}{2}=\frac{3}{2} \text{ i.e., } \frac{BN}{BC}=\frac{2}{3}$$

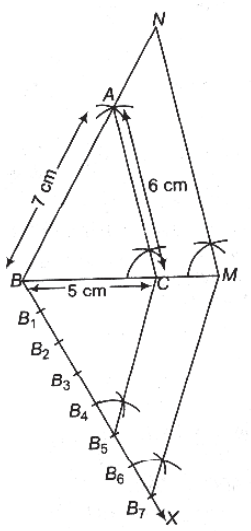
Also, NM || CA, we have $\Delta ABC \sim \Delta MBN$

$$\therefore \quad \frac{MB}{AB}=\frac{NM}{CA}=\frac{BN}{BC}=\frac{2}{3}$$

Q.3. Construct a triangle with sides 5 cm, 6 cm and 7 cm and then another triangle whose sides are $\frac{7}{5}$ of the corresponding sides of the first triangle.

Ans. Steps of construction

1. Draw a line segment BC = 5 cm
2. Taking B and C as centres draw two arcs of radii 7 cm and 6 cm intersecting each other at A.
3. Join BA and CA. ΔABC is the required triangle.
4. From B draw any ray BX downwards making an acute $\angle CBX$.
5. Locate seen points B_1, B_2, B_3, B_4, B_5, B_6 and B_7 on BX, such that $BB_1 = B_1B_2 = B_2B_3 = B_3B_4$, $B_4B_5 = B_5B_6 = B_6B_7$.



6. Join B_5C and from B_7 draw a line $B_7M \parallel B_5C$ intersecting the extended line segment BC at M.
7. From point M draw MN || CA intersecting the extended line segment BA at N. Then ΔNBM is the required triangle whose sides are $\frac{7}{5}$ of the corresponding sides of ΔABC.

Justification

By construction,

$$B_7M \parallel B_5C$$

$$\therefore \quad \frac{BC}{CM}=\frac{5}{2}$$

Now,
$$\frac{BM}{BC}=\frac{BC+CM}{BC}=1+\frac{CM}{BC}=1+\frac{2}{5}=\frac{7}{5}$$

$$\therefore \quad \frac{BM}{BC}=\frac{7}{5}$$

Also, $MN \parallel CA$

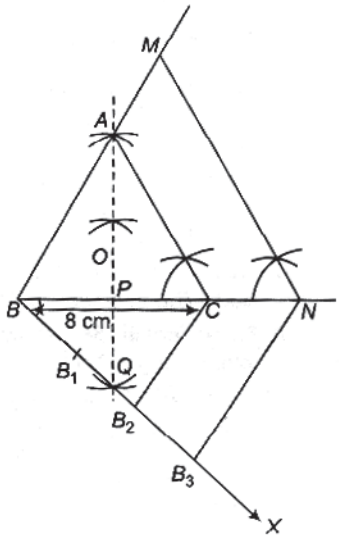
$\therefore$ $\Delta ABC \sim \Delta NBM$

and
$$\frac{NB}{AB}=\frac{BM}{BC}=\frac{MN}{CA}=\frac{7}{5}$$

Q.4. Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then another triangle whose sides are 11/2 times the corresponding sides of the isosceles triangle.

Ans. Steps of construction :

1. Draw line segment BC = 8 cm.



2. Construct OQ the perpendicular bisector of line segement BC meeting BC at P.

3. Along PO cut off PA = 4 cm.

4. Join AB and CA. So, ΔABC is the required isosceles triangle.

5. From B, draw any ray BX making an acute ∠CBX.

6. Locate three points B_1, B_2 and B_3 on BX such that $BB_1 = B_1B_2 = B_2B_3$.

7. Join, B_2C and from B_3 draw a line $B_3N \parallel B_2C$ intersecting the extended line segment BC at N.

8. From point N, draw NM || CA meeting BA produced at M.

Then, ΔMBN is the required triangle.

Justification

$$B_3N \parallel B_2C$$

$$\therefore \quad \frac{BC}{CN} = \frac{2}{1}$$

Now,
$$\frac{BN}{BC} = \frac{BC + CN}{BC}$$

$$= 1 + \frac{CN}{BC}$$

$$\Rightarrow \quad \frac{BN}{BC} = 1 + \frac{1}{2} = \frac{3}{2}$$

Also, NM || CA

$\therefore$ $\Delta ABC \sim \Delta MBN$

and $\frac{MB}{AB} = \frac{NM}{CA} = \frac{BN}{BC} = \frac{3}{2}$. Hence, the new triangle is similar to the given triangle whose sides are $\frac{3}{2}$ i.e., $1\frac{1}{2}$ times of the corresponding sides of the isosceles ΔABC.

Q.5. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and ∠ABC = 60°. Then construct a triangle whose sides are 3/4 of the corresponding sides of the triangle ABC.

Ans. Steps of construction

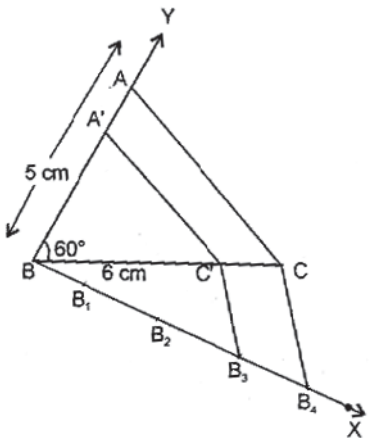
1. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and ∠ABC = 60°.

2. Draw any ray BX making an acute angle with BC on the side opposite to the vertex A.

3. Along BX, mark off 4 points B_1, B_2, B_3 and B_4 on BX such that $BB_1 = B_1B_2 = B_2B_3 = B_3B_4$.

4. Joint B_4 C and draw a line through B_3 parallel to B_4C intersecting BC to C'.

5. Draw a line through C' parallel to the line CA to intersect BA at A'.



Then A 'BC' is the required triangle.

Justification :

$B_4C \parallel B_3C'$ (By construction)

$$\therefore \quad \frac{BB_3}{BB_4} = \frac{3}{4}$$

[By the Basic proportionality Theorem]

But $\frac{BB_3}{BB_4} = \frac{3}{4}$ (By construction)

$$\therefore \quad \frac{BC'}{BC} = \frac{3}{4} \qquad \text{... (i)}$$

CA || C'A' (By construction)

$\therefore$ $\Delta BC'A \sim \Delta BCA$

(Using AA similarity condition)

$\therefore$ $\frac{A'B}{AB}=\frac{A'C}{AC}=\frac{BC'}{BC}=\frac{3}{4}$

[From (i)]

[By the basic proportionality theorem]

Q.6. Draw a triangle ABC with side BC = 7 cm, $\angle B = 45°$, $\angle A = 105°$. Then, construct a triangle whose sides are 4/3 times the corresponding sides of $\angle ABC$.

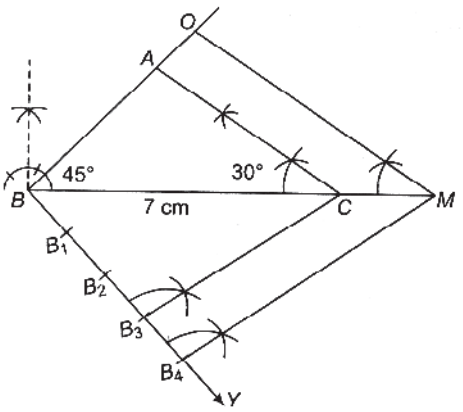
Ans. Steps of construction

1. According to given data, construction a ΔABC in which BC = 7 cm.

$\angle B = 45°, \angle C = 180° - (\angle A + \angle B)$

$= 180° - (105° + 45°)$

$= 180° - 150° = 30°$



2. Along BC, draw a ray. By making an acute $\angle CBY$.

3. Along BY mark four points B_1 B_2, B_3 and B_4 such that $BB_1 = B_1B_2 = B_2B_3 = B_3B_4$.

4. Join B_3C.

5. From B_4, draw B_4M || B_3C meeting BC produced at M.

6. From M, draw OM | | AC meeting BA produced at 0. Then, ΔOBM is the required triangle whose sides are 4/3 times of the corresponding sides of ΔABC.

Justification

By construction, B_4M | | B_3C

$\therefore$ $\frac{BC}{CM}=\frac{3}{1}$

Now, $\frac{BM}{BC}=\frac{BC+CM}{BC}=1+\frac{CM}{BC}=1+\frac{1}{3}=\frac{4}{3}$

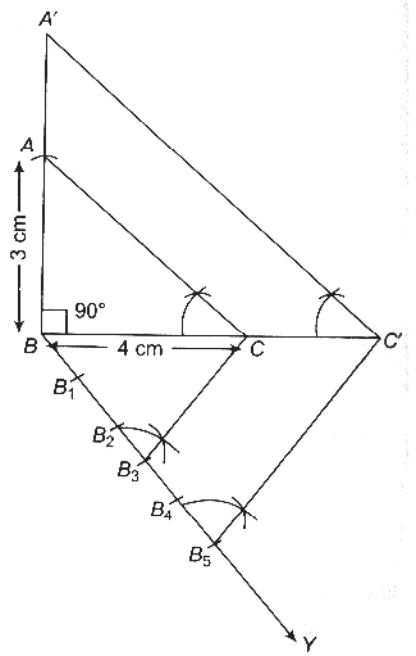
Also, MO || CA

$\therefore$ $\Delta ABC \sim \Delta OBM$

and $\frac{OB}{AB}=\frac{BM}{BC}=\frac{MO}{CA}=\frac{4}{3}$

Q.7. Draw a right triangle in which the sides (other than hypotenuse) are of lengths 4 cm and 3 cm. Then construct another triangle whose sides are 5/3 times the corresponding sides of the given triangle.

Ans. Steps of construction



1. Draw a line segment BC = 4 cm.

2. From B, draw a line AB = 3 cm which makes right angle at B.

3. Join AC. ΔABC is the given right triangle.

4. From B, draw an acute $\angle CBY$ downwards.

5. On BY, take five points B_1, B_2, B_3, B_4 and B_5 such the $BB_1 = B_1B_2 = B_2B_3 = B_3B_4 = B_4B_5$.

6. Join B_3C.

7. From point B_5, draw B_5C' | | B_3C producing BC to C'

8. From point C', draw C'A' | | CA producing BA to A'.

Hence, $\Delta A'BC'$ is the required triangle.

Justification

By Construction, B_5C' | | B_3C

$\therefore \quad \frac{BC}{CC'}=\frac{3}{2}$

Now, $\frac{BC'}{BC}=\frac{BC+CC'}{BC}=1+\frac{CC'}{BC}=1+\frac{2}{3}=\frac{5}{3}$

Also, $C'A' \,||\, CA$

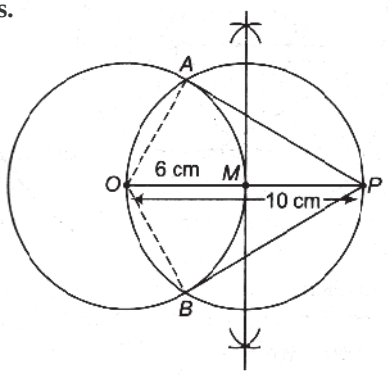
$\therefore \quad \Delta ABC \sim \Delta A'BC'$

and $\frac{A'B}{AB}=\frac{BC'}{BC}=\frac{A'C'}{CA}=\frac{5}{3}$

EXERCISE 11.2

Q.1. Draw a circle of radius 6 cm. From a point 10 cm away from its centre, construct the pair of tangents to the circle and measure their lengths.

Ans.



Steps of construction :

1. Construct a circle of radius 6 cm.
2. Join PO and bisect it. Let M be the mid-point of PO.
3. Taking M as centre and MO as radius, draw a circle. Let it intersect the given circle at the points Q and R.
4. Join PQ and PR.
5. PQ and PR are the required two tangents.
6. PQ = PR = 8 cm.

Justificiation

Join OQ and OR.

$\angle OQP$ and $\angle ORP$ are the angles in semi-circles.

$\therefore \quad \angle OQP = 90° = \angle ORP.$

Also, since OQ, OR are radii of the circle, PQ and PR will be the tangents to the circle at Q and R respectively.

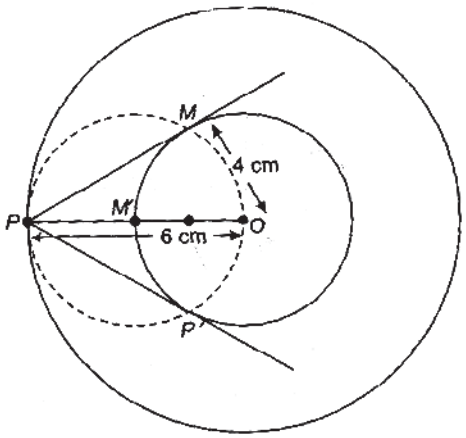
Q.2. Construct a tangent to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm and measure its length. Also verify the measurement by actual calculation.

Ans. Given, two concentric circles of radii 4 cm and 6 cm with common centre O.

We have to draw tangents to inner circle from a point of outer circle.

Steps of construction

1. Draw two concentric circles with centre at O and radii 4 cm and 6 cm.



2. Take any point P on outer circle. Join OP.
3. Now, bisect OP. Let M' be the mid-point of OP.

Taking M' as centre and OM' as radius draw a circle (dotted) which cuts the inner circle at M and P'.

4. Join PM and PP'. Thus, PM and PP' are required tangents.
5. On measuring PM and PP', we get PM = PP' = 4.46 cm.

Calculation

In right ΔOMP, $\angle PMO = 90°$

$\therefore \quad PM^2 = OP^2 - OM^2$

$\Rightarrow \quad PM^2 = (6)^2 - (4)^2 = 36 - 16 = 20$

$\Rightarrow \quad PM = \sqrt{20} = 4.46$

Hence, the length of tangent is 4.47 cm.

Justification : Join OM and OP' which are radius.

The $\angle OMP$ is an angle lies in the semi-circle and therefore $\angle OMP = 90°$.

$\Rightarrow \quad OM \perp OP$

Since, OM is radius of the circle, so MP has to be a tangent to the circle.

Similarly, PP' is also a tangent to the circle.

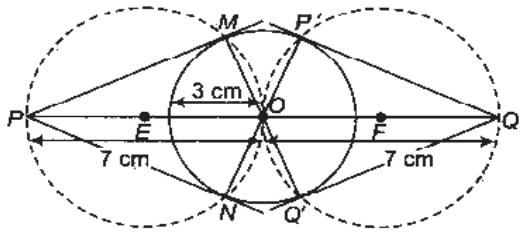
Q.3. Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents

to the circle from these two points P and Q.

Ans. Given two points P and Q on the diameter of a circle with radius 3 cm.

and OP = OQ = 7 cm

We have to construct the tangents to the circle from the given points P and Q.



Steps of construction

1. Draw a circle of radius 3 cm with centre at O.
2. Produce its diameter on both sides and take points P and Q on diameter such that OP = OQ = 7 cm.
3. Bisect OP and OQ. Let E and F be the mid-points of OP and OQ, respectively.
4. Take E as centre and OE as radius draw a circle which intersect the given circle (0, 3) at two points P' and Q'.

Again, taking F as centre and OF as radius draw a circle which intersect the given circle (0, 3) at two points P' and Q'.

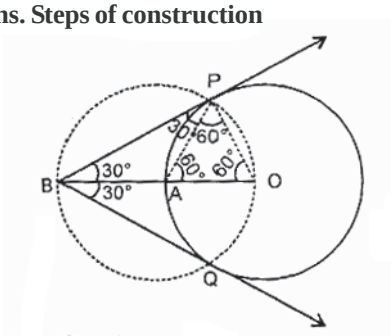
5. Join PM, PN, QP' and QQ'. These are the required tangents from P and Q to the given circle (0, 3).

Justification

Join OM and ON. The ∠OMP is the angle lies in the semi-circle and therefore, ∠OMP = 90°. Since, OM is radius of the circle. So, MP has to be tangent to the circle. Similarly PN, QP' and QQ' are also tangents to the give circle.

Q.4. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.

Ans. Steps of construction



1. Take a point O on the plane of the paper and draw a circle of radius OA = 5 cm.
2. Produce OA to B such that OA = AB = 5 cm.
3. Taking A as the centre draw a circle of radius AO = AB = 5 cm.
4. It cuts the circle at P and Q.
5. Join BP and BQ to get the desired tangents.

Justification :

In ΔOAP, we have

OP = OP = 5 cm (= radius)

Also, AP = 5 cm (Radii of circle)

∴ ΔOAP is equilateral.

⇒ ∠PAO = 60°

⇒ ∠BAP = 120°

In ∠BAP, we have

BA = AP and ∠BAP = 120°

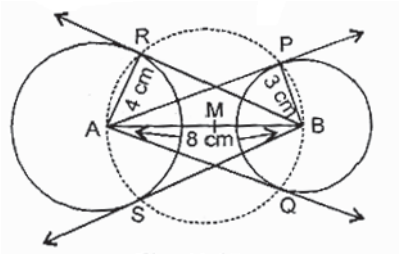
∴ ∠ABP = ∠APB = 30°

⇒ ∠PBQ = 60°

Q.5. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.

Ans. Step of construction

1. Draw a line segment AB = 8 cm



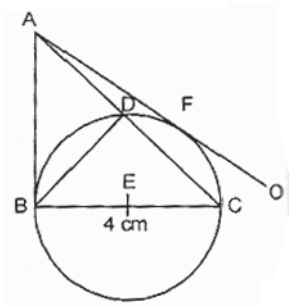
2. Draw a circle with centre A and radius 4 cm. Draw another circle with centre B and radius 3 cm.
3. Let M be the mid-point of AB. Taking M as centre and AM as radius draw a circle which intersects the circles at P, Q, R and S.
4. Join AP, AQ, BR and BS. These are required tangents.

Q.6. Let ABC be a right triangle in which AB = 6 cm, BC = 8 cm and ∠B = 90°. BD is the perpendicular from B on AC. The circle through B, C, D is drawn. Construct the tangents from A to this circle.

Ans. Steps of construction

1. Draw line segments BC = 4 cm and AB = 3 cm perpendicular to each other. Join AC. ΔABC is the right triangle.

2. Taking mid-point E of BC as centre, draw a circle with radius 2 cm, passing through B, C and D.



at B, *i.e.*, AB ⊥ BC.

Its length AB = 3 cm.

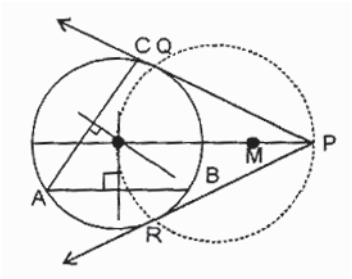
Taking centre A, draw an arc of 3 cm (AB = AF) cutting the circle at F.

Join AF. AF and AB are the required tangents.

Q.7. Draw a circle with the help of a bangle. Take a point outside the circle. Construct the pair of tangents from this point to the circle.

Ans. Steps of construction :

1. Draw a circle with the help of bangle.

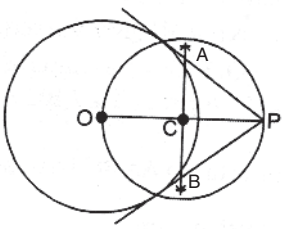


2. Draw two chords AB and AC. Perpendicular bisectors of AB and AC intersect each other at O, which is the centre of the circle.
3. Taking a point P outside the circle, join OP.
4. Let M be the mid-point of OP. Taking M as centre and OM as radius draw a dotted circle which intersect the given circle at Q and R.
5. Join PQ and PR. Thus, PQ and PR are required tangents.

Additional Questions

Q.1. Construst a tangent to a circle of radius 4 cm from a point which is at a distance of 6 cm from its centre.

Ans. Steps of construction

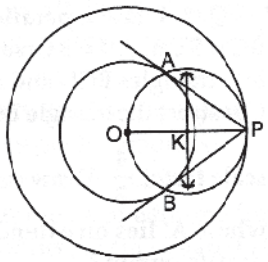


1. Draw a circle with centre O and radius 4 cm.
2. Draw OP = 6 cm.
3. Draw the right bisector of OP intersecting OP and C.
4. With C as centre and radius as CO or CP draw a circle intersecting the first circle at A and B.
5. Draw PA and PB. Now PA and PB are the required tangents.

Q.2. Draw two concentric circles of radii 3 cm and 5 cm. Taking a point on outer circle construct the pair of tangents to the other. Measure the length of a tangent and verify it by actual calculation.

Ans. Steps of construction

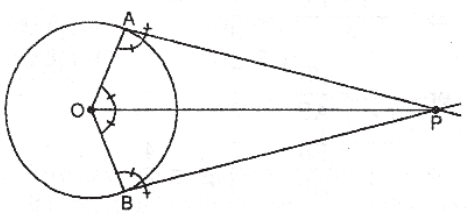
1. Draw two concentric circles with centre O and radii ad 3 cm and 5 cm.
2. Take a point P on the outer circle.



3. Draw OP.
4. Draw the right bisector of OP which meets OP at K.
5. With K as centre and OK as radii, draw a circle intersecting the inner circle of A and B.
6. Join PA and PB. Now PA and PB are the required tangents Now PA = PB = 4 cm.

Q.3. Draw a circle of radius 4 cm. Construct a pair of tangents to it, the angle between which is 60°. Also justify the construction. Measure the distance between the centre of the circle and the point of intersection of tangents.

Ans. Steps of construction



1. Draw a circle of radius 4 cm with centre O.
2. Angle between tangents = 60°.
∴ Angle between corresponding radii = 180° – 160 = 120°

Draw two radii OA and OB such that ∠AOB = 120°

3. Draw perpendicular at OA at A. Draw perpendicular to OB at B.
4. Let the perpendiculars intersect each other at P.

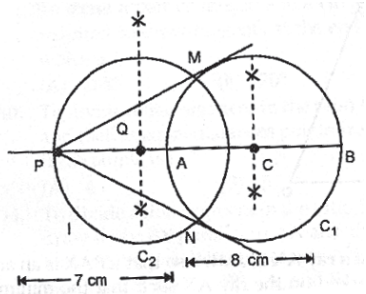
Now PA and PB are the tangents.

5. Join OP. Now OP = 10 cm.

Q.4. Draw a circle of diameter 8 cm. From a point P, 7 cm away from its centre construct a pair of tangents to the circle.

Ans. Steps of construction

1. Draw a line segment AB = 8 cm.

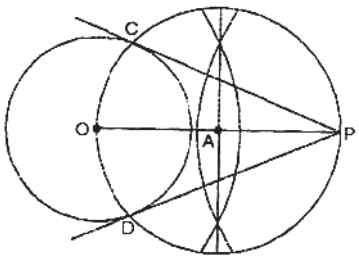


2. Draw a circle (C_1) taking C as centre which is the perpendicular bisector of AB *i.e.,* radius AC = CB = 4 cm.
3. Produce AB and cut off CP = 7 cm.
4. Draw a perpendicular bisector of CP.
5. Taking Q as centre and radius = (PQ) draw a circle C_2 which intersects the circle C_1 at M and N.
6. Join PO and PN.

Now, Pm and PN are the required two tangents.

Q.5. Draw circle of radius 5 cm. From a point P, 13 cm away from its centre, draw two tangents to the circle.

Ans. Steps of Construction



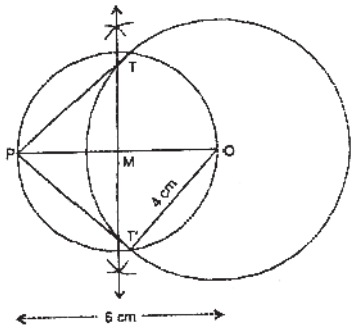
1. Draw a circle of radius 5 cm with centre O.
2. Draw OP = 13 cm.
3. Draw the right bisector of OP where A is the mid-point of OP.
4. With centre A and radius as OA or AP draw a circle which meets the previous circle at C and D.
5. Join PC and PD.

Thus, PC and PD are the required tangents.

Q.6. Construct a circle whose radius is equal to 4 cm. Let P be a point whose distance fro its centre is 6 cm. Construct two tangents to it from P.

Ans. Steps of construction :

1. Take a point O in the plane of the paper and draw a circle of radius 4 cm.

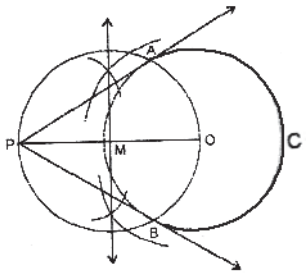


2. Make a point P at a distance of 6 cm from the centre O and join OP.
3. Bisect the line segment OP. Let the point of bisection be M.
4. Taking M as centre and OM as radius, draw a circle to intersect the given circle at the points T and T'.
5. Join PT and PT' to get the required tangents.

Q.7. Draw a circle of radius 3 cm. From a point 5 cm away from its centre, construct the pair of tangents to the circle.

Ans. Steps of construction

1. Construct a circle C_1 (say) of radius 3 cm.



2. P is a point 5 cm away from the centre of circle C_1.

3. Join OP.

4. Draw $\perp$ bisector of OP which intersects OP at M.

5. Taking M as centre and OM as radius draw a circle which intersects the circle C_1 at A and B.

6. Join PA and PB.

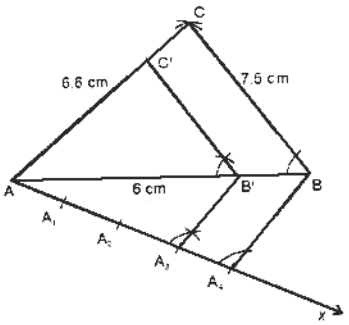
7. On, measuring we find PA = PB = 4 cm.

Thus PA and PB are the required tangents.

Q.8. Draw a ΔABC with sides AB = 6 cm, BC = 7.5 cm and AC = 6.6 cm. Construct another triangle whose sides are 3/4 of the corresponding sides of ΔABC.

Ans. Steps of construction :

1. Draw AB = 6 cm.



2. With A and B as centres taking 6.6 cm and 7.5 cm as radii, draw two arcs intersecting each other at C.

3. Join AC and BC.

Now ΔABC is the given triangle.

4. Draw ΔBAX an acute angle.

5. Along AX draw points A_1, A_2, A_3, A_4 at equal distances such that

$AA_1 = A_1A_2 = A_2A_3 = A_3A_4$.

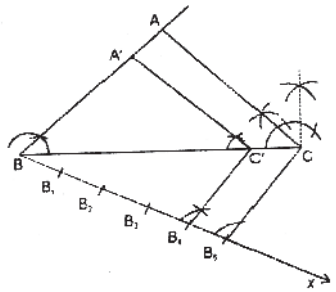
6. Join BA_4.

7. Draw $A_3B' \,||\, A_4B$ which intersects AB at B'.

8. Draw B'C' || BC which intersects AC at C'.

Now, DAB'C' is the requried triangle.

Q.9. Construct a ΔABC in which BC = 6.5 cm, ∠B = 60° and ∠C = 45°. Constuct another triangle whose sides are $\frac{4}{5}$ of the corresponding sides of ΔABC.



Ans. Steps of construction :

1. Draw BC = 6.5 cm.

2. At B and C. draw ∠B = 60° and ∠C = 45° and the arms meet at A.

Now ΔABC is the given triangle.

3. Draw an acute ∠CBX.

4. Along BX mark 5 points at equal distance as shown in the figure.

5. Join B_5C.

6. Through B_4, draw $B_4C' \,||\, B_5C$ which meets BC at C'.

7. Through C', draw C'A' || CA which meets BA at A'.

Now ΔA'BA' is required triangle.

Q.10. Draw a circle of radius 3 cm. From a point P, 7 cm away from the centre of the circle, draw two tangents to the circle. Also measure the lengths of the tangents.

Ans. Steps of constructions :

1. Draw a line-segment AB = 6 cm.

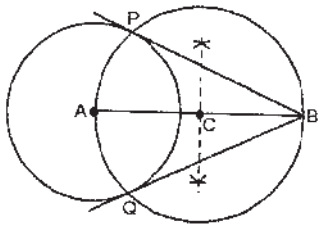
2. With A as centre draw a circle of radius 3 cm.

3. Draw '*l*' label in diag the perpendicular bisector of AB intensecting AB at C.

4. With C as centre and radius AC' (or BC) draw a circle which intersects the precious circle at P and Q.

5. Join BP and BQ.

Now BP and BQ are the required two tangents.



Multiple Choice Questions

Q.1. To draw two tangents to a circle, which are inclined at an angle of 60°, the perpendiculars are to be drawn at the ends of two radii which are at an angle of :

(a) 60° (b) 120°
(c) 90° (d) 75°

Ans. (b)

Q.2. The centre of a circle is not known. Can we draw a pair of tangents to this circle from a point P outside the circle ?

(a) Yes (b) No
(c) cannot say (d) none of these

Ans. (a)

Q.3. 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 the end points of those radii of the circle, the angle between which is :

(a) 105° (b) 70°
(c) 140° (d) 145°

Ans. (d)

Q.4. From an external point P, to construct tangents to a circle centre at O, OP is joined and then another circle is drawn, taking M as centre and OM as radius, the point M is the mid-point of intersection of OP and :

(a) perpendicular bisector of OP
(b) M and O coincide
(c) M and P coincide
(D) the circle

Ans. (a)

Q.5. In which of the following cases construction of a triangle is possible, when its sides are :

(a) 2.5 cm, 3.5 cm, 6 cm
(b) 2.5 cm, 3 cm, 6 cm
(c) 2.5 cm, 4.5 cm, 6.5 cm
(d) 2.5 cm, 2.5 cm, 6 cm

Ans. (c)

Q.6. To a circle, two tangents are to be drawn which are inclined at an angle of 70°. For that we have to draw perpendiculars to two radii which are at an angle of :

(a) 110° (b) 120°
(c) 90° (d) 70°

Ans. (a)

Q.7. To construct tangents to a circle from an external point, inclined to each other at an angle of 70° it is required to draw tangents at the ends of two radii, the angle between which is :

(a) 70° (b) 100°
(c) 110° (d) 180°

Ans. (c)

Q.8. A segment AB is divided at point P such that $\frac{PB}{AB}=\frac{3}{7}$, then the ratio of AP : PB is

(a) $\frac{4}{7}$ (b) 7 : 4
(c) 7 : 3 (d) 4 : 3

Ans. (d)

Q.9. To Find a point P on a line segement AB such that $\frac{AP}{AB}=\frac{3}{7}$, the segment AB is to be divided in the ratio :

(a) 3 : 7 (b) 7 : 3
(c) 4 : 3 (d) 3 : 4

Ans. (d)

Q.10. If a similar triangle whose sides are $\frac{3}{5}$ times the corresponding sides of a given triangle is to be constructed, the point on the side of a given triangle divides the side in the ratio is :

(a) 3 : 2 (b) 2 : 3
(c) 3 : 5 (d) 5 : 3

Ans. (c)