NCERT Solutions for Class 10 Maths Chapter 11 Ex 11.2 | Updated 2026-27

⚡ Quick Revision Box — Chapter 11 Ex 11.2

- **Chapter:** 11 — Constructions | **Exercise:** 11.2 | **Class:** 10 Maths (NCERT)
- **Topic:** Construction of Tangents to a Circle using compass and ruler
- **Key Theorem:** Tangent ⊥ Radius at point of contact → angle OAP = 90°
- **Tangent Length Formula:** $l = \sqrt{(d^2 - r^2)}$ where d = distance from external point to centre, r = radius
- **Number of Tangents:** Exactly 2 tangents from any external point; 1 tangent if point is on circle; 0 if inside
- **Key Construction Step:** Bisect OP → draw semicircle with OP as diameter → intersection points are tangent points
- **Angle Relationship:** If tangents are inclined at angle θ, then angle between radii = 180° - θ
- **Total Questions in Ex 11.2:** 7 (all require justification of construction)

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The **NCERT Solutions for Class 10 Maths Chapter 11 Ex 11.2** on this page cover all 7 construction questions from the Constructions chapter of your NCERT Maths textbook, fully updated for the **2026-27** CBSE board exam. You can find complete NCERT Solutions for Class 10 across all subjects on our site. These solutions are part of our broader collection of NCERT Solutions for all classes. Each answer includes a step-by-step construction procedure and justification, exactly as required by the CBSE marking scheme. The NCERT official textbook requires students to justify every construction — our answers do this in full.

Chapter Overview — Constructions Class 10 Maths (NCERT 2026-27)

Chapter 11 of the Class 10 NCERT Maths textbook is titled **Constructions**. It has two exercises: Exercise 11.1 covers division of a line segment in a given ratio, and **Exercise 11.2** covers construction of tangents to a circle. This page focuses entirely on Exercise 11.2.

In CBSE board exams, the Constructions chapter typically carries **4 marks** in the form of one construction question. These questions appear in the long-answer section and require you to draw accurately with a compass and ruler, then write a justification. Marks are awarded for both the diagram and the written justification.

To do well in Exercise 11.2, you need to be comfortable with the Pythagoras theorem (Chapter 6), properties of circles and tangents (Chapter 10), and basic compass-ruler constructions from earlier classes.

Detail	Information
Chapter	11 — Constructions
Exercise	11.2
Textbook	NCERT Mathematics — Class 10
Class	10
Subject	Mathematics
Marks Weightage	4 marks (1 construction question in board exam)
Difficulty Level	Medium to Hard
Academic Year	2026-27

Key Concepts and Theorems for Tangent Construction

Tangent-Radius Perpendicularity Theorem

Key Concept: The tangent to a circle at any point is perpendicular to the radius drawn to that point. If O is the centre and A is the point of tangency, then $\angle OAP = 90°$. This is the single most important fact for all constructions in this exercise.

Tangents from an External Point

From any external point, exactly **two tangents** can be drawn to a circle, and they are equal in length. If P is the external point and PA, PB are the two tangents, then PA = PB.

The length of the tangent is calculated using Pythagoras theorem:

$$l = \sqrt{(d^2 - r^2)}$$

where d is the distance from the external point to the centre and r is the radius of the circle.

Angle Between Tangents and Radii

If two tangents from an external point P are inclined to each other at angle θ, then the angle between the two radii drawn to the points of tangency is 180° - θ. This relationship is used directly in Question 4.

The Semicircle Method for Tangent Construction

To construct tangents from external point P to a circle with centre O:

1. Join O and P. Find midpoint M of OP.
2. Draw a circle with M as centre and MO (= MP) as radius.
3. This circle intersects the original circle at points A and B.
4. PA and PB are the required tangents.

Why does this work? Since OP is a diameter of the new circle, any angle inscribed in a semicircle is 90°. So ∠ OAP = 90°, confirming PA is a tangent.

NCERT Solutions for Class 10 Maths Chapter 11 Ex 11.2 — All 7 Questions

Below are complete, step-by-step solutions for all 7 questions from **NCERT Solutions for Class 10 Maths Chapter 11 Ex 11.2**. Every answer includes the construction steps and the required justification.

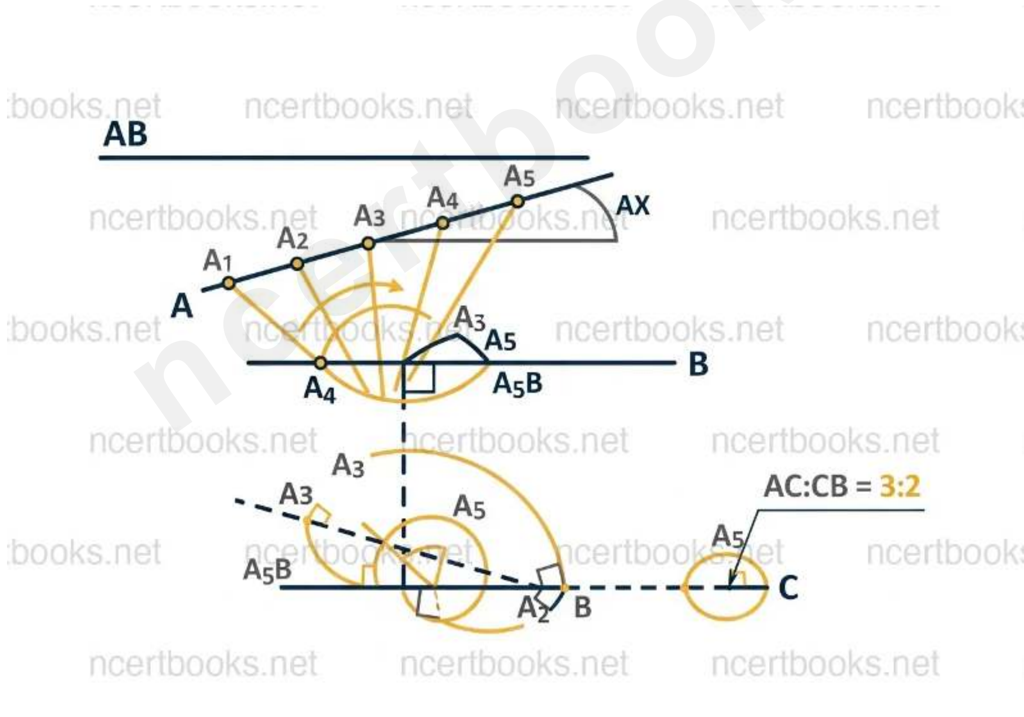

Fig 11.1: Dividing a line segment AB in ratio 3:2 using basic proportionality theorem

Question 1

Medium

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.

Step 1: Draw a circle with centre O and radius 6 cm using a compass.

Step 2: Mark a point P such that OP = 10 cm (measure carefully with a ruler).

Step 3: Find the midpoint M of OP by drawing the perpendicular bisector of OP.

Step 4: Draw a circle with centre M and radius MO = MP = 5 cm.

Step 5: Let this new circle intersect the original circle at points A and B.

Step 6: Join PA and PB. These are the required pair of tangents.

Measurement: On measuring, PA = PB ≈ 8 cm.

Verification using Pythagoras theorem:

$$PA = \sqrt{(OP^2 - OA^2)} = \sqrt{(10^2 - 6^2)} = \sqrt{(100 - 36)} = \sqrt{(64)} = 8 \text{ cm}$$

Justification: Since OP is the diameter of the circle with centre M, angle OAP = 90° (angle in a semicircle). In right triangle OAP, OA is the radius = 6 cm and OP = 10 cm, so PA is indeed a tangent to the original circle. Similarly, PB is a tangent.

∴ **Length of each tangent = 8 cm**

Board Exam Note: This type of question typically appears in 2-3 mark sections of CBSE board papers. Showing step-by-step working and the justification is mandatory for full marks.

Question 2

Medium

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.

Key Concept: Two concentric circles share the same centre O. A point P on the larger circle (radius 6 cm) is at distance 6 cm from O. We need to draw a tangent from P to the inner circle (radius 4 cm).

Step 1: Draw a circle C_1 with centre O and radius 4 cm.

Step 2: Draw a concentric circle C_2 with centre O and radius 6 cm.

Step 3: Take any point P on C_2.

Step 4: Join OP. Find midpoint M of OP by drawing the perpendicular bisector of OP.

Step 5: Draw a circle with centre M and radius MO = 3 cm.

Step 6: Let this circle intersect C_1 at points A and B.

Step 7: Join PA and PB. These are the two required tangents from P to the inner circle.

Measurement: On measuring, PA = PB ≈ 4.47 cm.

Verification:

$$PA = \sqrt{(OP^2 - OA^2)} = \sqrt{(6^2 - 4^2)} = \sqrt{(36 - 16)} = \sqrt{(20)} = 2\sqrt{(5)} \approx 4.47 \text{ cm}$$

Justification: OP is the diameter of the circle with centre M, so ∠ OAP = 90°. Therefore OA ⊥ PA, which means PA is a tangent to circle C_1. The measured length matches the calculated value of $2\sqrt{(5)}$ cm.

∴ **Length of tangent = $2\sqrt{(5)} \approx 4.47$ cm**

Board Exam Note: This type of question typically appears in 2-3 mark sections of CBSE board papers. Always write the verification calculation to score full marks.

Question 3

Medium

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.

Step 1: Draw a circle with centre O and radius 3 cm.

Step 2: Draw a diameter of the circle and extend it on both sides.

Step 3: Mark point P on one side of O such that OP = 7 cm, and point Q on the other side such that OQ = 7 cm.

Step 4 (Tangents from P): Find midpoint M_1 of OP. Draw a circle with centre M_1 and radius M_1O = 3.5 cm. Let it intersect the original circle at A and B. Join PA and PB — these are the tangents from P.

Step 5 (Tangents from Q): Find midpoint M_2 of OQ. Draw a circle with centre M_2 and radius M_2O = 3.5 cm. Let it intersect the original circle at C and D. Join QC and QD — these are the tangents from Q.

Verification of tangent lengths:

$$PA = \sqrt{(OP^2 - OA^2)} = \sqrt{(7^2 - 3^2)} = \sqrt{(49 - 9)} = \sqrt{(40)} = 2\sqrt{(10)} \approx 6.32 \text{ cm}$$

By symmetry, QC = QD = $2\sqrt{(10)} \approx 6.32$ cm as well.

Justification: In each case, OP (or OQ) acts as the diameter of the auxiliary circle. The angle subtended by this diameter at A (or C) is 90°, so OA ⊥ PA, confirming PA is a tangent. The same applies to all four tangent lines.

∴ Four tangents are drawn: PA, PB from P and QC, QD from Q. Each tangent length = $2\sqrt{(10)} \approx 6.32$ cm.

Board Exam Note: This type of question typically appears in long answer sections of CBSE board papers. Drawing both sets of tangents clearly and labelling all points earns full marks.

Question 4

Hard

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

Key Concept: If the two tangents from external point P are inclined at ∠APB = 60°, then since OAPB is a cyclic quadrilateral (O, A, P, B lie on a circle), we have:

$$\angle AOB = 180° - 60° = 120°$$

So we need to draw two radii OA and OB with ∠AOB = 120°, then draw tangents at A and B.

Step 1: Draw a circle with centre O and radius 5 cm.

Step 2: Draw any radius OA.

Step 3: Draw another radius OB such that ∠AOB = 120° (use a protractor).

Step 4: At point A, draw a line perpendicular to OA (i.e., tangent at A).

Step 5: At point B, draw a line perpendicular to OB (i.e., tangent at B).

Step 6: Let these two tangent lines meet at point P. PA and PB are the required tangents.

Justification: ∠OAP = ∠OBP = 90° (tangent ⊥ radius). In quadrilateral OAPB, the sum of angles = 360°. So ∠APB = 360° - 90° - 90° - 120° = 60°. This confirms the tangents are inclined at 60°.

∴ The pair of tangents PA and PB are drawn, inclined to each other at 60°.

Board Exam Note: This type of question typically appears in long answer sections of CBSE board papers. The justification using angle sum of quadrilateral OAPB is essential for full marks.

Question 5

Hard

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.

Step 1: Draw a line segment AB = 8 cm.

Step 2: Draw circle C_1 with centre A and radius 4 cm.

Step 3: Draw circle C_2 with centre B and radius 3 cm.

Step 4 (Tangents from B to circle C_1): Find midpoint M_1 of AB. Draw a circle with centre M_1 and radius M_1A = 4 cm. Let it intersect circle C_1 at points P and Q. Join BP and BQ — these are the tangents from B to circle C_1.

Step 5 (Tangents from A to circle C_2): The midpoint of AB is M_1 (same point). Draw a circle with centre M_1 and radius M_1B = 4 cm. Let it intersect circle C_2 at points R and S. Join AR and AS — these are the tangents from A to circle C_2.

Why does this work? For tangents from B to C_1: AB is the diameter of the auxiliary circle, so $\angle APB = 90°$, confirming $BP \perp AP$, i.e., BP is tangent to C_1. Similarly for the other tangents.

Tangent lengths:

$$BP = \sqrt{(AB^2 - AP^2)} = \sqrt{(8^2 - 4^2)} = \sqrt{(64 - 16)} = \sqrt{(48)} = 4\sqrt{(3)} \approx 6.93 \text{ cm}$$

$$AR = \sqrt{(AB^2 - BR^2)} = \sqrt{(8^2 - 3^2)} = \sqrt{(64 - 9)} = \sqrt{(55)} \approx 7.42 \text{ cm}$$

Justification: In both cases, AB serves as the diameter of the auxiliary circle. The angle at the intersection point is 90° (angle in a semicircle), confirming the lines are tangents to the respective circles.

∴ Tangents from B to circle C_1: length = $4\sqrt{(3)} \approx 6.93$ cm. Tangents from A to circle C_2: length = $\sqrt{(55)} \approx 7.42$ cm.

Board Exam Note: This type of question typically appears in long answer sections of CBSE board papers. Clearly label all four tangent lines and both auxiliary circles.

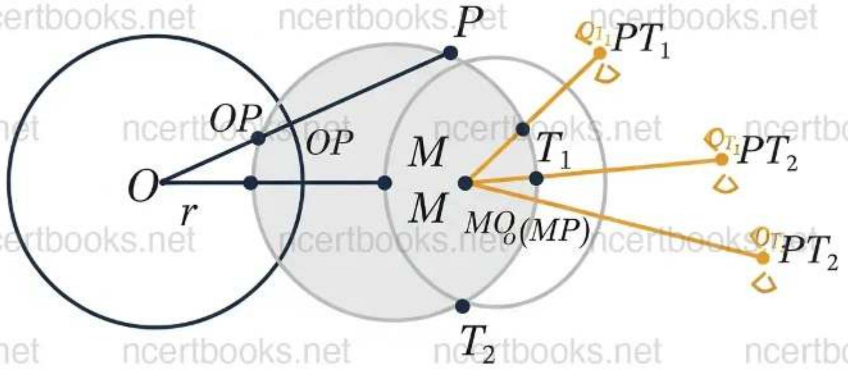

Fig 11.2: Constructing tangents to a circle from an external point P

Question 6

Hard

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.

Key Concept: First, construct the right triangle ABC. Then find D (foot of perpendicular from B to AC). Then find the circumcircle of triangle BCD. Finally, draw tangents from A to this circle.

Step 1: Draw BC = 8 cm. At B, draw a perpendicular. Mark A on this perpendicular such that AB = 6 cm. Join AC.

Step 2: From B, draw BD perpendicular to AC. D is the foot of the perpendicular on AC.

Step 3: Find the circumcircle of triangle BCD. Since ∠ BDC = 90°, BC is the diameter of this circumcircle. Find midpoint O of BC — this is the centre of the required circle. Radius = OB = OC = 4 cm.

Step 4: Now draw tangents from A to this circle (centre O, radius 4 cm). Find midpoint M of AO. Draw a circle with centre M and radius MA = MO. Let it intersect the circle at points P and Q.

Step 5: Join AP and AQ. These are the required tangents from A to the circle through B, C, D.

Why is BC the diameter? Since ∠ BDC = 90° (BD ⊥ AC), D lies on the circle with BC as diameter (angle in a semicircle = 90°). B and C also lie on this circle. So the circle through B, C, D has BC as its diameter.

Verification: AO can be calculated. In right triangle ABC, $AC = \sqrt{(AB^2 + BC^2)} = \sqrt{(36 + 64)} = 10$ cm. O is midpoint of BC, so AO can be found using coordinate geometry. Place B at origin, C at (8, 0), A at (0, 6). O = (4, 0).

$$AO = \sqrt{((4-0)^2 + (0-6)^2)} = \sqrt{(16 + 36)} = \sqrt{(52)} = 2\sqrt{(13)} \text{ cm}$$

$$\text{Tangent length} = \sqrt{(AO^2 - r^2)} = \sqrt{(52 - 16)} = \sqrt{(36)} = 6 \text{ cm}$$

Justification: Since OP is a diameter of the auxiliary circle, ∠ OPA = 90°, confirming AP is tangent to the circle through B, C, D. The tangent length equals AB = 6 cm, which is consistent with the geometry.

∴ Tangents from A to the circle through B, C, D are constructed. Tangent length = 6 cm.

Board Exam Note: This type of question typically appears in long answer sections of CBSE board papers. Identifying BC as the diameter of the circumcircle of BCD is the key insight that earns marks.

Question 7

Medium

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.

Key Challenge: When a circle is drawn using a bangle, its centre is not known. You must first locate the centre using the perpendicular bisector method.

Step 1 (Find the centre): Place the bangle on paper and trace the circle. Draw any two chords AB and CD of this circle.

Step 2: Draw the perpendicular bisector of chord AB.

Step 3: Draw the perpendicular bisector of chord CD.

Step 4: The two perpendicular bisectors meet at point O. This is the centre of the circle.

Step 5: Measure the radius r = OA (distance from O to any point on the circle).

Step 6 (Construct tangents): Take a point P outside the circle. Join OP. Find midpoint M of OP.

Step 7: Draw a circle with centre M and radius MO = MP.

Step 8: Let this circle intersect the original circle at points X and Y. Join PX and PY. These are the required tangents.

Justification: The perpendicular bisector of a chord always passes through the centre of the circle (standard theorem). So the intersection of two perpendicular bisectors gives the centre O. Once O is known, the standard tangent construction applies: since OP is a diameter of the auxiliary circle, $\angle OXP = 90°$, so $OX \perp XP$, confirming PX is a tangent.

∴ The centre O is found using perpendicular bisectors of two chords, and the pair of tangents PX and PY are constructed from external point P.

Board Exam Note: This type of question typically appears in 2-3 mark sections of CBSE board papers. The step of finding the centre using perpendicular bisectors is the key part examiners look for.

Formula Reference Table — Constructions Chapter 11

Formula Name	Formula	Variables Defined
Tangent Length from External Point	$l = \sqrt{d^2 - r^2}$	l = tangent length, d = distance from point to centre, r = radius
Angle Between Radii (given tangent angle)	$\angle AOB = 180° - \theta$	θ = angle between the two tangents from external point P
Angle in Semicircle	∠ in semicircle = 90°	Angle subtended by diameter at any point on the circle
Tangent-Radius Angle	$\angle OAP = 90°$	O = centre, A = point of tangency, P = external point
Equal Tangents	PA = PB	PA and PB are tangents from same external point P

Solved Examples Beyond NCERT — Extra Practice for CBSE Class 10 Maths

Extra Example 1 — Tangent Length Calculation

Easy

A point P is at a distance of 13 cm from the centre of a circle of radius 5 cm. Find the length of the tangent from P to the circle.

Step 1: Use the tangent length formula.

$$l = \sqrt{(d^2 - r^2)} = \sqrt{(13^2 - 5^2)} = \sqrt{(169 - 25)} = \sqrt{(144)} = 12 \text{ cm}$$

∴ **Tangent length = 12 cm**

Extra Example 2 — Angle Between Tangents

Medium

Two tangents PA and PB are drawn from an external point P to a circle. If $\angle APB = 80°$, find $\angle AOB$.

Step 1: Use the relationship between the angle at the external point and the angle at the centre.

$$\angle AOB = 180° - \angle APB = 180° - 80° = 100°$$

Why? In quadrilateral OAPB, $\angle OAP = \angle OBP = 90°$. Sum of all angles = 360°. So $\angle AOB + \angle APB = 180°$.

∴ **$\angle AOB = 100°$**

Extra Example 3 — Concentric Circle Tangent

Medium

Two concentric circles have radii 5 cm and 13 cm. Find the length of the chord of the outer circle that is tangent to the inner circle.

Step 1: Let O be the common centre. The chord of the outer circle is tangent to the inner circle, so the perpendicular from O to the chord = 5 cm (radius of inner circle).

Step 2: Half-length of chord = $\sqrt{(13^2 - 5^2)} = \sqrt{(169 - 25)} = \sqrt{(144)} = 12$ cm.

Step 3: Full chord length = $2 \times 12 = 24$ cm.

∴ **Chord length = 24 cm**

Topic-Wise Important Questions for CBSE Board Exam — Constructions Tangents

1-Mark Questions (Definition / Fill in the Blank)

1. A tangent to a circle is perpendicular to the __________ drawn to the point of contact. **Answer: radius**
2. How many tangents can be drawn from a point outside a circle? **Answer: 2**
3. If PA and PB are tangents from P to a circle, then PA __ PB. **Answer: = (PA = PB)**

3-Mark Questions

1. **Q:** Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.
   A: Let O be the centre and P be the point of tangency. Assume the tangent is not perpendicular to OP. Then there exists a point Q on the tangent closer to O than P, meaning $OQ < OP$. But Q is outside the circle (tangent touches at only one point), so $OQ > r = OP$ — a contradiction. Therefore, the tangent must be perpendicular to the radius OP.
2. **Q:** Draw a circle of radius 4 cm. From a point 7 cm away from its centre, construct a pair of tangents and find their length.
   A: Use the standard semicircle method. Tangent length = $\sqrt{(7^2 - 4^2)} = \sqrt{(49 - 16)} = \sqrt{(33)} \approx 5.74$ cm.

5-Mark (Long Answer) Questions

1. **Q:** Draw a pair of tangents to a circle of radius 4 cm which are inclined to each other at an angle of 45°. Give justification.
   A: Since the tangents are inclined at 45°, the angle between the radii = $180° - 45° = 135°$. Draw two radii OA and OB with $\angle AOB = 135°$. Draw perpendiculars at A and B. They intersect at P, giving the required tangents. Justification: In quadrilateral OAPB, $\angle OAP = \angle OBP = 90°$, so $\angle APB = 360° - 90° - 90° - 135° = 45°$. ✓

Common Mistakes Students Make in Class 10 Maths Constructions

Mistake 1: Students draw the auxiliary circle with the wrong radius — using OP instead of OP/2.

Why it's wrong: The auxiliary circle must have OP as its *diameter*, not radius. So the radius of the auxiliary circle is OP/2 (i.e., OM where M is the midpoint of OP).

Correct approach: Always find the midpoint M of OP first, then draw the circle with centre M and radius MO.

Mistake 2: Students skip the justification and only draw the diagram.

Why it's wrong: The NCERT exercise explicitly says "give also the justification of the construction." CBSE examiners deduct marks if justification is missing.

Correct approach: Always write 2–3 lines explaining why the construction works, referencing the theorem that angle in a semicircle = 90°.

Mistake 3: In Question 4, students use $\angle AOB = 60^\circ$ instead of 120°.

Why it's wrong: The angle between the radii is supplementary to the angle between the tangents: $\angle AOB = 180^\circ - \angle APB = 180^\circ - 60^\circ = 120^\circ$, not 60°.

Correct approach: Always apply the formula $\angle AOB = 180^\circ - \theta$ before drawing.

Mistake 4: In Question 7, students guess the centre of the bangle circle instead of finding it geometrically.

Why it's wrong: Guessing introduces error. The examiner checks whether you used the perpendicular bisector method.

Correct approach: Draw two chords and their perpendicular bisectors. Their intersection is the exact centre.

Mistake 5: Students draw tangent lines that do not actually touch the circle at exactly one point.

Why it's wrong: Inaccurate compass work leads to lines that cut the circle at two points (secants) instead of tangents.

Correct approach: Use a sharp pencil, set the compass width accurately, and double-check that the tangent line touches the circle at exactly the point where the auxiliary circle intersects the original circle.

Exam Tips for 2026-27 CBSE Board Exam — Chapter 11 Constructions

- **Always write justification:** The 2026-27 CBSE marking scheme awards separate marks for justification in construction questions. Never skip it.

- **Use sharp pencil and compass:** Construction marks depend on accuracy. A blunt pencil or loose compass loses you marks even if the method is correct.
- **Label all points:** Mark O (centre), P (external point), A and B (tangent points), M (midpoint) clearly. Examiners check labelling.
- **Know the angle formula:** ∠AOB = 180° − ∠APB is a frequently tested concept in both MCQ and construction questions in the 2026-27 pattern.
- **Verify with Pythagoras:** After drawing, always calculate the expected tangent length using $l = \sqrt{d^2 - r^2}$ and compare with your measured length. This shows the examiner you understand the concept.
- **Bangle question:** If asked to draw a circle with a bangle, finding the centre using perpendicular bisectors is a guaranteed step — practise this separately.

For more practice on **cbse class 10 maths ncert solutions** across all chapters, visit our NCERT Solutions for Class 10 hub page. You can also explore NCERT Solutions for all classes on our site.

Key Points to Remember — Chapter 11 Constructions (Class 10 Maths)

- A tangent to a circle is perpendicular to the radius at the point of contact: ∠ OAP = 90°.
- From an external point, exactly two tangents can be drawn to a circle, and they are equal in length.
- Tangent length formula: $l = \sqrt{d^2 - r^2}$ where d = distance from point to centre.
- The angle between the two radii to the tangent points = 180° minus the angle between the tangents.
- To find the centre of a circle: draw perpendicular bisectors of any two chords; their intersection is the centre.
- The construction method relies on the theorem: angle in a semicircle = 90°.
- For the circle through B, C, D in Question 6: since ∠BDC = 90°, BC is the diameter of that circle.

Frequently Asked Questions — Constructions Tangents Class 10 Maths

How do you construct a pair of tangents to a circle from an external point?

Join the external point P to the centre O. Find the midpoint M of OP. Draw a circle with M as centre and MO as radius. Where this new circle intersects the original circle, call those points A and B. Join PA and PB — these are the required tangents. The justification is that angle OAP = 90° (angle in a semicircle), so OA ⊥ PA, confirming PA is a tangent.

What is the length of a tangent from a point 10 cm away from the centre of a circle of radius 6 cm?

Using the Pythagoras theorem, tangent length = $\sqrt{(OP^2 - r^2)} = \sqrt{(10^2 - 6^2)} = \sqrt{(100 - 36)} = \sqrt{(64)}$ = 8 cm. This is the standard formula for tangent length from an external point. The formula works because the tangent is perpendicular to the radius at the point of contact, forming a right triangle.

How to draw a pair of tangents inclined at 60 degrees to a circle of radius 5 cm?

If the tangents are inclined at 60°, the angle between the two radii at the points of tangency is 180° − 60° = 120°. Draw a circle of radius 5 cm. Draw two radii OA and OB with ∠AOB = 120°. Draw perpendiculars at A and B — these are the tangent lines. They meet at point P, giving the required pair of tangents inclined at 60°. Verify: in quadrilateral OAPB, sum of angles = 360°, so ∠APB = 360° − 90° − 90° − 120° = 60°.

What theorem justifies the construction of tangents to a circle in Class 10?

Two theorems are used. First: a tangent to a circle is perpendicular to the radius at the point of contact (∠OAP = 90°). Second: the angle in a semicircle is 90°. The construction uses a circle with OP as diameter; since the angle in a semicircle is 90°, any point A on this circle satisfies ∠OAP = 90°, which is exactly the condition for PA to be a tangent to the original circle.

How do you find the centre of a circle drawn with a bangle for Class 10 constructions?

Trace the bangle on paper to get the circle. Draw any two chords AB and CD inside the circle. Draw the perpendicular bisector of AB and the perpendicular bisector of CD using a compass. The point where these two perpendicular bisectors intersect is the centre O of the circle. This works because the perpendicular bisector of any chord always passes through the centre of the circle.

How many marks does the Constructions chapter carry in the 2026-27 CBSE Class 10 board exam?

The Constructions chapter typically carries 4 marks in the CBSE Class 10 Maths board exam for 2026-27. One construction question appears in the long-answer section. Marks are split between the accuracy of the diagram and the written justification. Always write the justification to secure full marks. Practise both Ex 11.1 (division of line segment) and Ex 11.2 (tangent constructions) for complete preparation.
