

# NCERT Solutions Class 10th Maths Chapter 11 Exercise 11.1 - Constructions 2026-27

## Quick Revision Box

- **Chapter Focus:** Division of line segments and construction of similar triangles
- **Key Tools:** Compass, ruler, and protractor for geometric constructions
- **Exercise 11.1:** Contains 7 construction-based questions worth 4-6 marks each
- **Line Division Formula:** To divide line AB in ratio  $m:n$ , construct  $(m+n)$  equal parts
- **Similar Triangle Construction:** Use scale factor method with ray technique
- **Exam Weightage:** 8-10 marks from Constructions chapter in CBSE board exam
- **Time Required:** 15-20 minutes per construction question in exam
- **Common Mistakes:** Inaccurate measurements and missing construction marks

## Chapter Overview — NCERT Solutions Class 10th Maths Chapter 11 Exercise 11.1

The NCERT Solutions Class 10th Maths Chapter 11 Exercise 11.1 focuses on geometric constructions, specifically the division of line segments and construction of similar triangles. This chapter from the NCERT Mathematics textbook for Class 10 is crucial for the 2026-27 CBSE board examination as construction questions carry significant marks.

Chapter 11 Constructions covers fundamental geometric construction techniques using compass and ruler. Students learn to divide line segments in given ratios and construct triangles similar to given triangles with specific scale factors. These skills are essential for solving geometry problems in board exams.

The chapter typically contributes 8-10 marks in the CBSE Class 10 Mathematics board exam. Questions from this chapter appear as 4-mark or 6-mark construction problems. Students must show all construction steps clearly and maintain accuracy in measurements to score full marks.

Chapter	Textbook	Class	Subject	Marks Weightage	Difficulty Level
Chapter 11 - Constructions	NCERT Mathematics	Class 10	Mathematics	8-10 marks	Medium

Students can access comprehensive study materials and practice questions from the [official NCERT website](https://www.ncertbooks.net) to strengthen their understanding of geometric constructions.

### NCERT Solutions Exercise 11.1 — Division of Line Segments

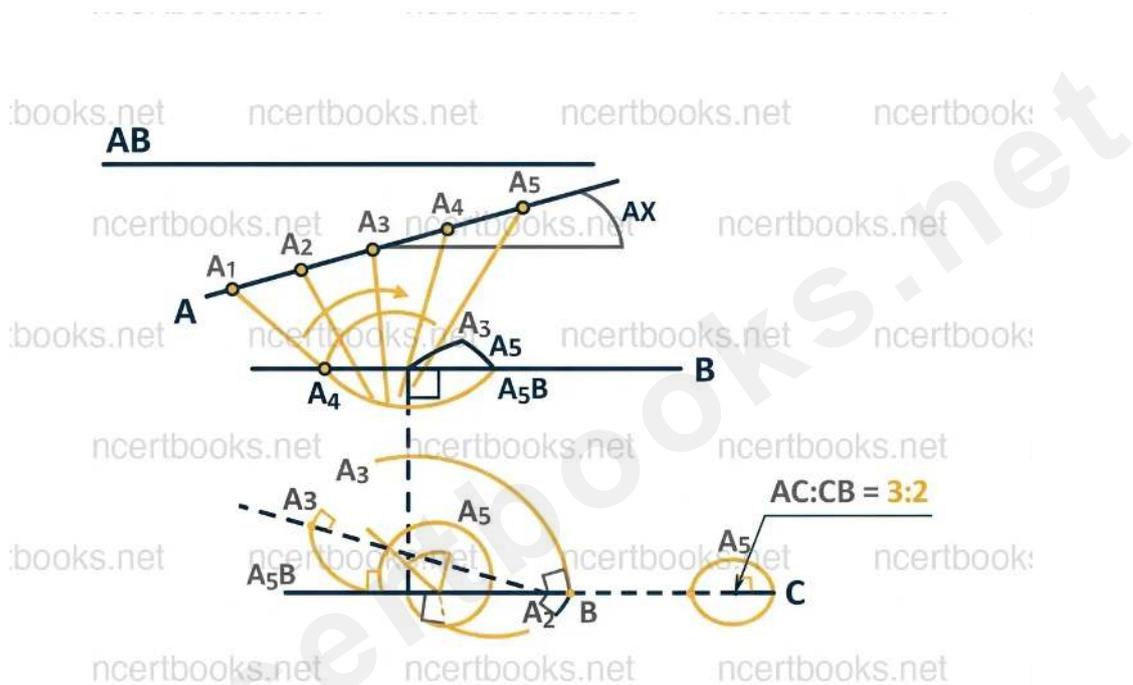


Fig 11.1: Dividing a line segment AB in ratio 3:2 using basic proportionality theorem

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

**Answer:**

**Steps of Construction:**

1. Draw a line segment  $AB = 7.6$  cm using a ruler.
2. Draw a ray  $AX$  making an acute angle with  $AB$ .
3. Mark 13 equal divisions ( $5+8=13$ ) on ray  $AX$ :  $A_1, A_2, A_3, \dots, A_{13}$ .
4. Join  $A_{13}$  to  $B$ .
5. From point  $A_5$ , draw a line parallel to  $A_{13}B$  intersecting  $AB$  at point  $P$ .
6. Point  $P$  divides  $AB$  in the ratio 5:8.

**Measurement:**

- $AP = 2.9$  cm (approximately)
- $PB = 4.7$  cm (approximately)
- Verification:  $AP:PB = 2.9:4.7 \approx 5:8$

**Question 2: Construct a triangle of sides 4 cm, 5 cm and 6 cm and then a triangle similar to it whose**

**Answer:**

**Steps of Construction:**

1. Draw a line segment  $BC = 6$  cm.
2. With B as center and radius 4 cm, draw an arc.
3. With C as center and radius 5 cm, draw another arc intersecting the first arc at A.
4. Join AB and AC to form triangle ABC.
5. Draw a ray BX making an acute angle with BC below BC.
6. Mark 3 equal divisions on BX:  $B_1, B_2, B_3$  (since  $\frac{2}{3}$ , denominator is 3).
7. Join  $B_3$  to C.
8. From  $B_2$ , draw a line parallel to  $B_3C$  intersecting BC at  $C'$ .
9. From  $C'$ , draw a line parallel to CA intersecting BA at  $A'$ .
10. Triangle  $A'BC'$  is the required similar triangle.

**Verification:**

- $A'B = (\frac{2}{3}) \times 4 = \frac{8}{3}$  cm
- $BC' = (\frac{2}{3}) \times 6 = 4$  cm
- $A'C' = (\frac{2}{3}) \times 5 = \frac{10}{3}$  cm

**Question 3: Construct a triangle of sides 4 cm, 5 cm and 6 cm and then a triangle similar to it whose**

**Answer:**

**Steps of Construction:**

1. Draw a line segment  $BC = 6$  cm.
2. With B as center and radius 4 cm, draw an arc.
3. With C as center and radius 5 cm, draw another arc intersecting the first arc at A.
4. Join AB and AC to form triangle ABC.
5. Draw a ray BX making an acute angle with BC below BC.
6. Mark 5 equal divisions on BX:  $B_1, B_2, B_3, B_4, B_5$  (since  $5/3$ , numerator is 5).
7. Join  $B_3$  to C (denominator is 3).
8. From  $B_5$ , draw a line parallel to  $B_3C$  intersecting the extended line BC at  $C'$ .
9. From  $C'$ , draw a line parallel to CA intersecting the extended line BA at  $A'$ .
10. Triangle  $A'BC'$  is the required similar triangle.

**Verification:**

- $A'B = (5/3) \times 4 = 20/3$  cm
- $BC' = (5/3) \times 6 = 10$  cm
- $A'C' = (5/3) \times 5 = 25/3$  cm



**Question 5:** Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and  $\angle ABC = 60^\circ$ . Then construct a

**Answer:**

**Steps of Construction:**

1. Draw a line segment BC = 6 cm.
2. At point B, construct an angle of  $60^\circ$  using compass.
3. From B, cut an arc of radius 5 cm on the  $60^\circ$  ray to get point A.
4. Join AC to complete triangle ABC.
5. Draw a ray BX making an acute angle with BC below BC.
6. Mark 4 equal divisions on BX:  $B_1, B_2, B_3, B_4$  (since  $\frac{3}{4}$ , denominator is 4).
7. Join  $B_4$  to C.
8. From  $B_3$ , draw a line parallel to  $B_4C$  intersecting BC at  $C'$ .
9. From  $C'$ , draw a line parallel to CA intersecting BA at  $A'$ .
10. Triangle  $A'BC'$  is the required similar triangle.

**Verification:**

- $A'B = \left(\frac{3}{4}\right) \times 5 = 3.75$  cm
- $BC' = \left(\frac{3}{4}\right) \times 6 = 4.5$  cm
- $A'C' = \left(\frac{3}{4}\right) \times AC$

**Question 6:** Draw a triangle ABC with side  $BC = 7$  cm,  $\angle B = 45^\circ$ ,  $\angle A = 105^\circ$ . Then construct a triangle similar to ABC with a scale factor of  $\frac{4}{3}$ .

**Answer:**

**Steps of Construction:**

1. Draw a line segment  $BC = 7$  cm.
2. At point B, construct an angle of  $45^\circ$ .
3. At point C, construct an angle of  $30^\circ$  (since  $\angle C = 180^\circ - 105^\circ - 45^\circ = 30^\circ$ ).
4. Let the two rays intersect at point A to form triangle ABC.
5. Draw a ray BX making an acute angle with BC below BC.
6. Mark 4 equal divisions on BX:  $B_1, B_2, B_3, B_4$  (since  $\frac{4}{3}$ , numerator is 4).
7. Join  $B_3$  to C (denominator is 3).
8. From  $B_4$ , draw a line parallel to  $B_3C$  intersecting the extended line BC at  $C'$ .
9. From  $C'$ , draw a line parallel to CA intersecting the extended line BA at  $A'$ .
10. Triangle  $A'BC'$  is the required similar triangle.

**Properties:**

- All sides of triangle  $A'BC'$  are  $\frac{4}{3}$  times the corresponding sides of triangle ABC
- All angles remain the same:  $\angle A' = 105^\circ$ ,  $\angle B' = 45^\circ$ ,  $\angle C' = 30^\circ$

**Question 7: Draw a right triangle in which the sides (other than hypotenuse) are of lengths 4 cm and 3 cm.**

**Answer:**

**Steps of Construction:**

1. Draw a line segment  $BC = 4$  cm.
2. At point B, draw a perpendicular line.
3. From B, cut an arc of radius 3 cm on the perpendicular to get point A.
4. Join AC to complete the right triangle ABC with right angle at B.
5. Draw a ray BX making an acute angle with BC below BC.
6. Mark 5 equal divisions on BX:  $B_1, B_2, B_3, B_4, B_5$  (since  $5/3$ , numerator is 5).
7. Join  $B_3$  to C (denominator is 3).
8. From  $B_5$ , draw a line parallel to  $B_3C$  intersecting the extended line BC at  $C'$ .
9. From  $C'$ , draw a line parallel to CA intersecting the extended line BA at  $A'$ .
10. Triangle  $A'BC'$  is the required similar triangle.

**Measurements:**

- Original triangle:  $BC = 4$  cm,  $AB = 3$  cm,  $AC = 5$  cm (hypotenuse)
- New triangle:  $BC' = 20/3$  cm,  $A'B = 5$  cm,  $A'C' = 25/3$  cm
- Right angle is maintained at B in both triangles

## Important Questions for Exams — Constructions Class 10

**[4 Marks] Construct a triangle with sides 5 cm, 6 cm, and 7 cm. Then construct another triangle whose sides are  $\frac{4}{5}$  of the corresponding sides of the first triangle.**

**Answer:** Follow the standard construction method: Draw triangle ABC with given sides, then use ray method with 5 equal divisions. Join the 5th point to C, and from the 4th point draw parallel line to get the scaled triangle. The new triangle will have sides 4 cm, 4.8 cm, and 5.6 cm respectively.

**[2 Marks] What is the basic principle behind dividing a line segment in a given ratio?**

**Answer:** The basic principle uses the concept of similar triangles and parallel lines. When we construct equal divisions on a ray and draw parallel lines, we create proportional segments. If a line segment needs to be divided in ratio  $m:n$ , we create  $(m+n)$  equal parts and use the  $m$ th division point to draw the parallel line.

**[6 Marks] Draw a triangle ABC where AB = 4 cm, BC = 6 cm, and AC = 5 cm. Construct a triangle similar to ABC with sides 5.6 cm, 8.4 cm, and 7 cm.**

**Answer:** First construct triangle ABC using SSS construction method. Then draw ray BX below BC with acute angle. Mark 7 equal divisions on BX (numerator of  $7/5$ ). Join 5th point to C. From 7th point, draw parallel to this line to intersect extended BC at C'. From C', draw parallel to CA to intersect extended BA at A'. Triangle A'BC' is the required triangle with sides 5.6 cm, 8.4 cm, and 7 cm.

**[1 Mark] In construction of similar triangles, why do we always draw the ray from one vertex of the triangle?**

**Answer:** We draw the ray from one vertex to maintain the vertex angle unchanged in the similar triangle. This ensures that the new triangle has the same angles as the original triangle while scaling the sides by the required factor.

**[4 Marks] Divide a line segment of 9 cm in the ratio 2:7. Also find the lengths of the two parts.**

**Answer:** Draw line segment AB = 9 cm. Draw ray AX at acute angle. Mark 9 equal divisions ( $2+7=9$ ). Join 9th point to B. From 2nd point draw parallel line intersecting AB at P. Point P divides AB in ratio 2:7. Measurements: AP = 2 cm and PB = 7 cm (since  $9 \times \frac{2}{9} = 2$  cm and  $9 \times \frac{7}{9} = 7$  cm).

## Common Mistakes Students Make in Constructions

- **✗ Inaccurate measurements** → **✓** Use sharp pencil and measure twice before marking
- **✗ Not showing construction arcs** → **✓** Keep all construction marks visible for full marks
- **✗ Drawing obtuse angles instead of acute** → **✓** Always draw acute angle for ray in constructions
- **✗ Incorrect number of divisions** → **✓** For ratio  $m:n$ , mark  $(m+n)$  equal parts for division,  $m$  or  $n$  parts for similar triangles
- **✗ Joining wrong points** → **✓** For scale factor  $p/q$ : mark  $q$  divisions, join  $q$ th point, draw parallel from  $p$ th point
- **✗ Not labeling points clearly** → **✓** Label all vertices and construction points with clear letters

## Exam Tips for NCERT Solutions Class 10th Maths Chapter 11

### Exercise 11.1

- **Practice with compass daily:** Spend 15 minutes daily practicing basic constructions to improve accuracy and speed for 2026-27 board exam.
- **Show all construction steps:** CBSE marking scheme awards 1-2 marks for construction arcs and lines, even if final answer is slightly incorrect.
- **Use 2H pencil for constructions:** Sharp, hard pencil ensures clean construction lines and accurate measurements in exam.
- **Double-check measurements:** Verify each measurement twice before proceeding to next step - wrong initial measurement affects entire construction.
- **Time management strategy:** Allocate 15-20 minutes per 4-mark construction question and 25 minutes for 6-mark questions in board exam.
- **Learn alternative methods:** Know both ray method and parallel line method for similar triangle construction as backup options.

## Frequently Asked Questions — Constructions Class 10

### How many questions are there in NCERT Solutions Class 10th Maths Chapter 11 Exercise 11.1?

Exercise 11.1 contains 7 construction-based questions covering line segment division and similar triangle construction. Each question requires step-by-step geometric construction using compass and ruler. These questions are designed to test your understanding of proportional division and scaling techniques. All questions are important for CBSE board exam preparation as they carry 4-6 marks each.

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### What is the difference between scale factor greater than 1 and less than 1 in triangle construction?

When scale factor is less than 1 (like  $\frac{2}{3}$ ), the new triangle is smaller than original, and we draw parallel line from a point closer to the base vertex. When scale factor is greater than 1 (like  $\frac{5}{3}$ ), the new triangle is larger, and we extend the base line and draw parallel line from a point farther from the base vertex. The number of divisions on the ray equals the numerator of the scale factor.

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### Why do we draw an acute angle ray in line segment division constructions?

An acute angle ray ensures that the construction remains within reasonable page boundaries and makes it easier to draw parallel lines accurately. If we draw an obtuse angle, the construction becomes too spread out and difficult to manage. The acute angle also ensures that when we draw parallel lines, they intersect the original line segment properly within the given space.

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### How do I verify if my construction is correct in exam?

For line segment division, measure both parts and check if their ratio matches the given ratio. For similar triangles, measure the sides of both triangles and verify that the ratio equals the given scale factor. Also check that corresponding angles are equal in both triangles. If measurements are approximately correct (within  $\pm 0.1$  cm), your construction is acceptable for board exam marking.

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### **What tools are allowed for constructions in CBSE board exam?**

CBSE allows compass, ruler (scale), set squares, and protractor for geometric constructions. Use a sharp 2H pencil for construction lines and HB pencil for final diagrams. Erasers are allowed but use them carefully to avoid damaging the paper. Calculator is not needed for construction questions as they involve geometric methods rather than numerical calculations.

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### **Is Chapter 11 Constructions important for competitive exams like JEE?**

While geometric constructions are not directly asked in JEE, the concepts of similar triangles, proportional division, and coordinate geometry principles learned in this chapter are very important. The logical thinking and geometric visualization skills developed through constructions help in solving complex geometry problems in competitive exams. Focus on understanding the underlying mathematical principles rather than just the construction steps.

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Source: ncertbooks.net — Updated for CBSE Academic Year 2026-27