Class 10 Maths Chapter 6: Triangles - Notes, Important Questions and MCQs (2026-27)

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These Triangles Class 10 notes cover NCERT Class 10 Maths Chapter 6 as per the 2026-27 syllabus: similar figures, the Basic Proportionality Theorem (Thales theorem) with proof, its converse, and the AA, SSS and SAS criteria for similarity – with solved examples, 10 MCQs and a free PDF.

Use the table of contents below to jump to the part you need, or read top to bottom for a complete revision of the chapter.

Table of Contents

- Chapter Overview
- Important Topics and Concepts
- Solved Examples
- Similarity Criteria Compared
- Key Results at a Glance
- Important Formulas and Definitions
- Short Answer Questions
- Long Answer Questions
- MCQs with Answers
- Quick Revision Points
- Chapter Summary
- Exam Tips and PYQ Pattern
- Frequently Asked Questions
- Conclusion

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Chapter Overview

Two figures are similar if they have the same shape but not necessarily the same size. All congruent figures are similar, but similar figures need not be congruent. Two polygons with the same number of sides are similar if their corresponding angles are equal and corresponding sides are in the same ratio.

For triangles, similarity can be proved with fewer conditions using the AA (or AAA), SSS and SAS criteria. The Basic Proportionality Theorem links parallel lines with proportional sides and is the most important proof in the chapter.

Important Topics and Concepts

Similar Figures

- All circles are similar; all squares are similar; all equilateral triangles are similar.

- A square and a rhombus with equal sides are not necessarily similar (angles may differ).
- A rectangle and a square are not necessarily similar (sides not in proportion).
- Similar polygons need BOTH equal corresponding angles and proportional corresponding sides.

Basic Proportionality Theorem (BPT / Thales Theorem)

- Statement: If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.
- In $\triangle ABC$, if DE $\parallel$ BC with D on AB and E on AC, then AD/DB = AE/EC.
- Proof idea: join BE and CD, draw DM $\perp$ AC and EN $\perp$ AB; compare areas: ar(ADE)/ar(BDE) = AD/DB and ar(ADE)/ar(DEC) = AE/EC; since ar(BDE) = ar(DEC) (same base DE, between the same parallels), the ratios are equal.
- Corollaries: AB/AD = AC/AE and AB/DB = AC/EC.

Converse of BPT

- If a line divides any two sides of a triangle in the same ratio, then it is parallel to the third side.
- Mid-point theorem follows: the line joining the mid-points of two sides is parallel to the third side.

Criteria for Similarity of Triangles

- AAA / AA: if two angles of one triangle are equal to two angles of another, the triangles are similar.
- SSS: if corresponding sides are in the same ratio, the triangles are similar.
- SAS: if one angle is equal and the sides including it are proportional, the triangles are similar.
- Write similarity in the correct order of corresponding vertices, e.g. $\triangle ABC \sim \triangle PQR$.

Solved Examples

Board-pattern questions with full working.

- In $\triangle ABC$, DE $\parallel$ BC, AD = 1.5 cm, DB = 3 cm, AE = 1 cm. Find EC. By BPT, 1.5/3 = 1/EC $\rightarrow$ EC = 2 cm.
- In $\triangle ABC$, D and E lie on AB and AC with AD = 4 cm, DB = 4.5 cm, AE = 8 cm, EC = 9 cm. Is DE $\parallel$ BC? AD/DB = 8/9 and AE/EC = 8/9 $\rightarrow$ equal, so by the converse of BPT, DE $\parallel$ BC.
- A 1.6 m girl walks away from a lamp-post 3.6 m high at 1.2 m/s. Find her shadow after 4 s. She is 4.8 m from the post. By AA similarity, 3.6/1.6 = (4.8 + x)/x $\rightarrow$ 3.6x = 7.68 + 1.6x $\rightarrow$ x = 3.84 m.
- Diagonals of trapezium ABCD (AB $\parallel$ DC) meet at O. Show AO/BO = CO/DO. $\triangle AOB \sim \triangle COD$ (alternate angles and vertically opposite angles, AA), so AO/CO = BO/DO, i.e. AO/BO = CO/DO.

Similarity Criteria Compared

Use the one that matches the given data.

Criterion	What you need	Typical clue
AA	Two pairs of equal angles	parallel lines, common angle, right angles
SSS	All three sides proportional	three side lengths given
SAS	One equal angle + including sides proportional	common/vertically opposite angle with two ratios

Key Results at a Glance

Result	Statement
BPT	DE ∥ BC ⇒ AD/DB = AE/EC
Converse of BPT	AD/DB = AE/EC ⇒ DE ∥ BC
AA	Two angles equal ⇒ similar
SSS	Sides in same ratio ⇒ similar
SAS	Included angle equal + sides proportional ⇒ similar
Similar triangles	Corresponding angles equal and sides proportional

Important Formulas and Definitions

Formula / Term	Meaning / Use
Similar figures	Same shape, not necessarily same size
Congruent figures	Same shape and same size
Corresponding sides	Sides opposite to equal angles
Scale factor	Ratio of corresponding sides of similar figures
BPT	Basic Proportionality Theorem, also called Thales theorem
Converse	The theorem with hypothesis and conclusion interchanged

Short Answer Questions

Q1. State whether all isosceles triangles are similar.

No. Their angles can differ, so they need not be similar.

Q2. In △ABC, DE ∥ BC. If AD/DB = 3/5 and AC = 5.6 cm, find AE.

AE/EC = 3/5, so AE = (3/8) × 5.6 = 2.1 cm.

Q3. Are two squares always similar? Give a reason.

Yes. All angles are 90° and all sides are in the same ratio.

Q4. If △ABC ~ △DEF with AB = 4 cm, DE = 6 cm and BC = 5 cm, find EF.

4/6 = 5/EF → EF = 7.5 cm.

Q5. In △PQR, E and F are points on PQ and PR. If PE = 3.9, EQ = 3, PF = 3.6, FR = 2.4 cm, is EF ∥ QR?

PE/EQ = 1.3, PF/FR = 1.5. Ratios differ, so EF is not parallel to QR.

If two angles of one triangle are respectively equal to two angles of another triangle, the triangles are similar.

Q7. If a line joins the mid-points of two sides of a triangle, what can you say about it?

It is parallel to the third side (converse of BPT / mid-point theorem).

Q8. A vertical pole 6 m long casts a 4 m shadow; a tower casts a 28 m shadow at the same time. Find the height of the tower.

By AA similarity, 6/4 = h/28 → h = 42 m.

Long Answer Questions

Q1. State and prove the Basic Proportionality Theorem.

Given: In △ABC, DE ∥ BC, D on AB, E on AC. To prove: AD/DB = AE/EC.

Construction: Join BE and CD; draw DM ⊥ AC and EN ⊥ AB.

ar(ADE) = ½ × AD × EN, ar(BDE) = ½ × DB × EN, so ar(ADE)/ar(BDE) = AD/DB. Similarly ar(ADE)/ar(DEC) = AE/EC.

△BDE and △DEC are on the same base DE and between the same parallels DE and BC, so ar(BDE) = ar(DEC).

Hence AD/DB = AE/EC. Proved.

Q2. L is a point on AC, M on AB and N on AD such that LM ∥ CB and LN ∥ CD. Prove that AM/AB = AN/AD.

In △ABC, LM ∥ CB, so by BPT AM/AB = AL/AC.

In △ADC, LN ∥ CD, so by BPT AN/AD = AL/AC.

Both ratios equal AL/AC.

Therefore AM/AB = AN/AD.

Hence proved.

Q3. Prove that if a line divides two sides of a triangle in the same ratio, it is parallel to the third side (converse of BPT).

Given: In △ABC, D on AB, E on AC with AD/DB = AE/EC. To prove: DE ∥ BC.

Suppose DE is not parallel to BC; draw DE′ ∥ BC meeting AC at E′.

By BPT, AD/DB = AE′/E′C. So AE/EC = AE′/E′C.

Adding 1 to both sides: AC/EC = AC/E′C, so EC = E′C, meaning E and E′ coincide.

Therefore DE ∥ BC. Proved.

MCQs with Answers

1. All ____ triangles are similar.(a) isosceles (b) equilateral (c) scalene (d) rightAnswer: (b) equilateral

2. BPT is also called(a) Pythagoras theorem (b) Thales theorem (c) Euclid theorem (d)

3. If DE ∥ BC in △ABC with AD = 2, DB = 3, AE = 4, then EC =(a) 5 (b) 6 (c) 8 (d) 1.5Answer: (b) 6 – 2/3 = 4/EC

4. Two triangles are similar if their corresponding angles are(a) proportional (b) equal (c) supplementary (d) complementaryAnswer: (b) equal

5. Which is NOT a similarity criterion?(a) AA (b) SSS (c) SAS (d) RHSAnswer: (d) RHS – RHS is congruence

6. △ABC ~ △PQR means AB corresponds to(a) QR (b) PQ (c) PR (d) ACAnswer: (b) PQ

7. A square and a rhombus are(a) always similar (b) never similar (c) similar only if the rhombus is a square (d) congruentAnswer: (c) similar only if the rhombus is a square

8. If △ABC ~ △DEF and AB/DE = 2/3, then BC/EF =(a) 2/3 (b) 3/2 (c) 4/9 (d) 9/4Answer: (a) 2/3

9. Line joining the mid-points of two sides of a triangle is(a) perpendicular to the third side (b) parallel to the third side (c) equal to the third side (d) a medianAnswer: (b) parallel to the third side

10. Which theorem is NOT in the 2026-27 Class 10 syllabus for proof?(a) BPT (b) Converse of BPT (c) Areas of similar triangles theorem (d) AA criterionAnswer: (c) Areas of similar triangles theorem – removed in rationalisation

Quick Revision Points

- Similar = same shape; congruent = same shape and size.
- Polygons similar ⇔ equal angles AND proportional sides.
- BPT: DE ∥ BC ⇒ AD/DB = AE/EC; converse also true.
- Criteria: AA, SSS, SAS (write vertices in order).
- Shadow/height problems use AA similarity.
- Learn the BPT proof with construction.

Chapter Summary

Triangles introduces similar figures – figures of the same shape. For triangles, similarity follows from the AA, SSS or SAS criteria, and similar triangles have equal corresponding angles and proportional corresponding sides.

The Basic Proportionality Theorem states that a line parallel to one side of a triangle divides the other two sides in the same ratio; its converse proves lines parallel. These results solve problems on heights, shadows, trapeziums and ratio of segments.

Exam Tips and PYQ Pattern

- The BPT proof is a frequent 3–5 mark question – practise the construction and area argument.
- Name similar triangles in the correct vertex order.
- Shadow and lamp-post problems are common case-based questions.
- State the criterion (AA/SSS/SAS) as the reason in every step.

- The area theorem and Pythagoras proofs are not required in 2026-27; focus on BPT and criteria.

Frequently Asked Questions

Is this chapter in the 2026-27 CBSE syllabus?

Yes. It is part of the NCERT Class 10 Mathematics textbook and the rationalised CBSE syllabus for 2026-27.

Can I download these notes as a PDF?

Yes. Use the free PDF link at the top of this page – no signup needed.

What is the Basic Proportionality Theorem?

If a line is parallel to one side of a triangle and meets the other two sides, it divides them in the same ratio.

What are the criteria for similarity of triangles?

AA (AAA), SSS and SAS.

Conclusion

Triangles becomes simple once you know BPT and the three similarity criteria thoroughly. Practise the proofs and solved examples here, and save the free PDF for quick revision.

More Notes: Class 10 Maths Chapter 5: Arithmetic Progressions notes | Class 10 Maths Chapter 7: Coordinate Geometry notes | All Class 10 Maths notes

Author Bio: Written and reviewed by the Nextoper Editorial Team, a group of CBSE mathematics educators who build chapter notes directly from the NCERT textbook and past board paper patterns.

Freshness Note: These notes follow the NCERT Class 10 Maths textbook, Mathematics (Reprint 2026-27), and the CBSE syllabus for the 2026-27 session. Last checked on 16 November 2026.