Triangles Class 10 Important Questions

10 questions · 27 marks · no calculator · step-marked answers

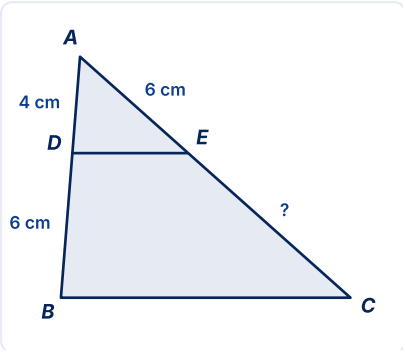
Name _____ Date _____ Score / 27

- Original questions in the board paper's question types, from 1-mark MCQs to a case study. Try every question before you look at the answers.
- No calculator: as in the CBSE board exam, everything works by hand.
- Worked answers with step marks for 5 questions start after the questions. The other 5 open free on the chapter page with a free account (no card): the link is next to each one.
- Online, with more practice: cbsemathrevision.com/class-10/triangles

Section A · Multiple choice and assertion–reason (1 mark each)

1. **1 mark · Basic Proportionality Theorem and its converse**

In $\triangle ABC$, D lies on AB and E on AC with $DE \parallel BC$. If $AD = 4$ cm, $DB = 6$ cm and $AE = 6$ cm, then EC is



DE ∥ BC: AD = 4 cm, DB = 6 cm, AE = 6 cm

(a) 6 cm

(b) 4 cm

(c) 9 cm

(d) 8 cm

2. **1 mark · Similar figures**

$\triangle ABC \sim \triangle PQR$ with $\frac{AB}{PQ} = \frac{2}{3}$. If the perimeter of $\triangle PQR$ is 36 cm, the perimeter of $\triangle ABC$ is

(a) 24 cm

(b) 54 cm

(c) 16 cm

(d) 18 cm

3. 1 mark · Criteria for similarity of triangles

In the following question, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

Assertion (A): A triangle with sides 3 cm, 4 cm, 5 cm is similar to a triangle with sides 6 cm, 8 cm, 10 cm.

Reason (R): All equilateral triangles are similar.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

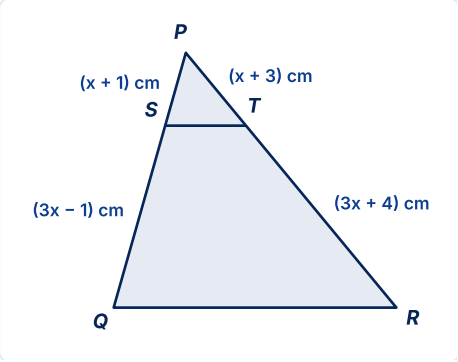
(c) Assertion (A) is true but Reason (R) is false.

(d) Assertion (A) is false but Reason (R) is true.

Section B · Short answer (2 marks each)

4. 2 marks · Basic Proportionality Theorem and its converse

In $\triangle PQR$, S and T are points on PQ and PR with $ST \parallel QR$. If $PS = (x+1)$ cm, $SQ = (3x-1)$ cm, $PT = (x+3)$ cm and $TR = (3x+4)$ cm, find x.



ST ∥ QR with sides in terms of x

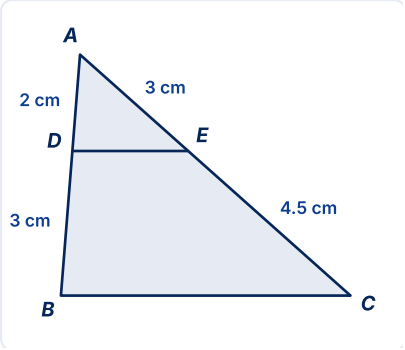
5. 2 marks · Applications of similarity

A girl 160 cm tall casts a shadow 120 cm long. At the same time a building casts a shadow 18 m long. Find the height of the building.

Section C · Short answer (3 marks each)

6. **3 marks · Basic Proportionality Theorem and its converse**

D and E are points on the sides AB and AC of $\triangle ABC$ with $AD = 2$ cm, $DB = 3$ cm, $AE = 3$ cm and $EC = 4.5$ cm. Show that $DE \parallel BC$.



AD = 2 cm, DB = 3 cm, AE = 3 cm, EC = 4.5 cm

7. **3 marks · Similar figures**

$\triangle ABC \sim \triangle DEF$, with $AB = 6$ cm, $BC = 9$ cm, $CA = 12$ cm and $DE = 4$ cm. Find EF, FD and the perimeter of $\triangle DEF$.

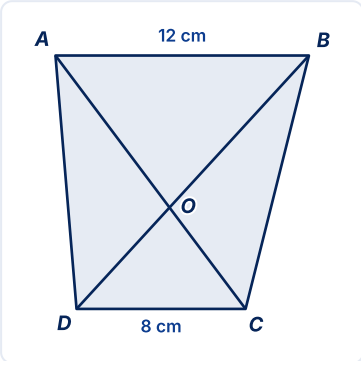
Section D · Long answer (5 marks each)

8. **5 marks · Basic Proportionality Theorem and its converse**

State and prove the Basic Proportionality Theorem.

9. **5 marks · Criteria for similarity of triangles**

$ABCD$ is a trapezium with $AB \parallel DC$, and its diagonals meet at O. (a) Prove that $\triangle AOB \sim \triangle COD$ and hence that $\frac{AO}{OC} = \frac{BO}{OD}$. (b) If $AB = 12$ cm, $DC = 8$ cm and $AC = 15$ cm, find AO and OC.



Trapezium ABCD: AB ∥ DC, AB = 12 cm, DC = 8 cm

Section E · Case study (4 marks)

10. **4 marks · Applications of similarity**

Wheelchair ramp. A straight ramp starts at point A on level ground and rises to point C, which is 75 cm above the point B on the ground directly below it, with $AB = 9$ m. A vertical support PQ stands at P on AB, with Q on the ramp and $AP = 3$ m.

i. Name two similar triangles and the similarity criterion. *[1 mark]*

ii. Find the height of the support PQ. *[1 mark]*

iii. A second support RS is 50 cm high. How far from A must it stand? *[2 marks]*

Answers and worked solutions

Question 1 — 1 mark

By BPT, $\frac{AD}{DB} = \frac{AE}{EC} : \frac{4}{6} = \frac{6}{EC} \Rightarrow EC = 9$ cm **A1**

Correct option: (c) 9 cm

Question 2 — 1 mark

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/triangles#iq-2

Question 3 — 1 mark

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/triangles#iq-3

Question 4 — 2 marks

Answer: $x = 7$

By BPT, $\frac{x+1}{3x-1} = \frac{x+3}{3x+4}$, so

$(x+1)(3x+4) = (x+3)(3x-1)$ **M1**

$3x^2 + 7x + 4 = 3x^2 + 8x - 3 \Rightarrow x = 7$ **A1**

Question 5 — 2 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/triangles#iq-5

Question 6 — 3 marks

Answer: $DE \parallel BC$

$\frac{AD}{DB} = \frac{2}{3}$ and $\frac{AE}{EC} = \frac{3}{4.5} = \frac{2}{3}$ **M1**

So $\frac{AD}{DB} = \frac{AE}{EC}$ **A1**

By the converse of the Basic Proportionality Theorem, $DE \parallel BC$ **R1**

Question 7 — 3 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/triangles#iq-7

Question 8 — 5 marks

Answer: Proved

Statement: a line drawn parallel to one side of a triangle, cutting the other two sides at distinct points, divides those sides in the same ratio. Given $\triangle ABC$ with $DE \parallel BC$, prove $\frac{AD}{DB} = \frac{AE}{EC}$ **M1**

Construction: join BE and CD; draw $EN \perp AB$ and $DM \perp AC$ **M1**

$\frac{\text{ar}(ADE)}{\text{ar}(BDE)} = \frac{\frac{1}{2} AD \cdot EN}{\frac{1}{2} DB \cdot EN} = \frac{AD}{DB}$ and similarly $\frac{\text{ar}(ADE)}{\text{ar}(DEC)} = \frac{AE}{EC}$ **A1**

$\triangle BDE$ and $\triangle DEC$ are on the same base DE and between the same parallels DE and BC, so $\text{ar}(BDE) = \text{ar}(DEC)$ **R1**

Hence $\frac{AD}{DB} = \frac{AE}{EC}$ **A1**

Question 9 — 5 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/triangles#iq-9

Question 10 — 4 marks

i. $\triangle APQ \sim \triangle ABC$ (AA: common $\angle A$, and $\angle APQ = \angle ABC = 90°$) **A1**

ii. $\frac{PQ}{75} = \frac{AP}{AB} = \frac{3}{9} \Rightarrow PQ = 25$ cm **A1**

iii. $\frac{AR}{9} = \frac{50}{75}$ **M1**

$AR = 6\,m$ **A1**

More on this chapter, free: revision notes, a Route to 95 and practice with instant feedback at cbsemathrevision.com/class-10/triangles
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