

CLASS 10 — MATHEMATICS

Chapter: Triangles

Practice Worksheet | CBSE Pattern

Maximum Marks: 40

Time Allowed: 1 hour 30 minutes

Name: _____

Class/Section: _____ Date: _____

General Instructions:

1. All questions are compulsory.
2. Read each question carefully before answering.
3. Show complete working for questions requiring calculations or proofs.
4. Select only one option for each MCQ.
5. Marks for each question are indicated alongside the question.
6. Write mathematical steps clearly and use appropriate notation.

This paper has 21 questions in five sections: A (Q1–Q10, 1 mark each), B (Q11–Q15, 2 marks each), C (Q16–Q19, 3 marks each), D (Q20, 4 marks) and E (Q21, case study, 4 marks).

Figures are not drawn to scale.

SECTION A

Multiple Choice Questions — Q1 to Q10 carry 1 mark each.

- Q1.** Which of the following statements is always true? **[1 mark]**
- (A) All isosceles triangles are similar.
(B) All equilateral triangles are similar.
(C) All right triangles are similar.
(D) All rectangles are similar.
- Q2.** In $\triangle ABC$, D and E are points on AB and AC respectively such that $DE \parallel BC$. If $AD = 2$ cm, $DB = 3$ cm and $AE = 4$ cm, then EC is **[1 mark]**
- (A) 6 cm
(B) $\frac{8}{3}$ cm
(C) 4.5 cm
(D) 5 cm
- Q3.** If $\triangle ABC \sim \triangle PQR$, $\frac{AB}{PQ} = \frac{2}{3}$ and $BC = 8$ cm, then QR is **[1 mark]**
- (A) $\frac{16}{3}$ cm
(B) 12 cm
(C) 6 cm
(D) 24 cm
- Q4.** If $\triangle ABC \sim \triangle DEF$, $\angle A = 50^\circ$ and $\angle E = 70^\circ$, then $\angle C$ is **[1 mark]**
- (A) 70°
(B) 50°
(C) 60°
(D) 120°

- Q5.** D and E are points on sides AB and AC of $\triangle ABC$ such that $AD = 3$ cm, $DB = 6$ cm, $AE = 4$ cm and $EC = 8$ cm. Then DE is [1 mark]
 (A) parallel to BC (B) perpendicular to BC
 (C) equal to BC (D) equal to half of BC
- Q6.** A vertical pole 6 m high casts a shadow 4 m long on the ground. At the same time, a tower casts a shadow 28 m long. The height of the tower is [1 mark]
 (A) 18 m (B) 21 m
 (C) 42 m (D) 36 m
- Q7.** In $\triangle ABC$, $DE \parallel BC$ with D on AB and E on AC. If $AD = 3$ cm, $DB = 2$ cm and $BC = 10$ cm, then DE is [1 mark]
 (A) 4 cm (B) $\frac{15}{2}$ cm
 (C) 5 cm (D) 6 cm
- Q8.** D is a point on side BC of $\triangle ABC$ such that $\angle ADC = \angle BAC$. If $BC = 9$ cm and $CD = 4$ cm, then CA is [1 mark]
 (A) 36 cm (B) $\frac{13}{2}$ cm
 (C) 6 cm (D) 5 cm

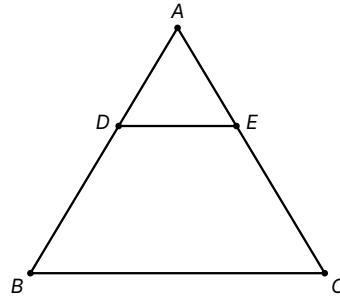
In Q9 and Q10, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

- Q9. Assertion (A):** If two angles of one triangle are respectively equal to two angles of another triangle, then the two triangles are similar. [1 mark]
Reason (R): The sum of the angles of a triangle is 180° , so the third angles of the two triangles are also equal.
 (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.
- Q10. Assertion (A):** Any two quadrilaterals whose corresponding angles are equal are similar. [1 mark]
Reason (R): Two polygons with the same number of sides are similar if their corresponding angles are equal and their corresponding sides are in the same ratio.
 (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

Very Short Answer Questions — Q11 to Q15 carry 2 marks each.

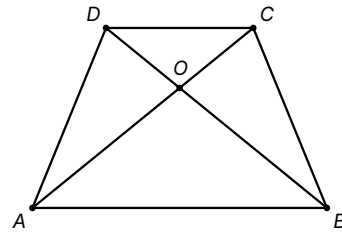
- Q11.** In the figure, $DE \parallel BC$. If $AD = (x + 1)$ cm, $DB = (3x - 1)$ cm, $AE = (x + 3)$ cm and $EC = (3x + 4)$ cm, find the value of x . **[2 marks]**



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- Q12.** D and E are points on the sides AB and AC of $\triangle ABC$ such that $AD = 5.7$ cm, $DB = 9.5$ cm, $AE = 4.8$ cm and $EC = 8$ cm. State whether $DE \parallel BC$. Give a reason. **[2 marks]**

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- Q13.** $\triangle ABC \sim \triangle PQR$. The perimeters of $\triangle ABC$ and $\triangle PQR$ are 36 cm and 24 cm respectively. If $PQ = 10$ cm, find AB. **[2 marks]**
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- Q14.** ABCD is a trapezium with $AB \parallel DC$ and $AB = 2 DC$. Its diagonals AC and BD intersect at O. If $OC = 3$ cm, find AC. **[2 marks]**

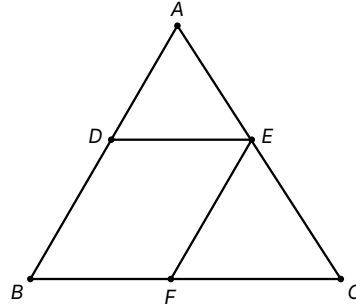


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- Q15.** The sides of $\triangle ABC$ are $AB = 4$ cm, $BC = 6$ cm, $CA = 8$ cm, and the sides of $\triangle PQR$ are $PQ = 6$ cm, $QR = 9$ cm, $RP = 12$ cm. Are the two triangles similar? If yes, name the similarity criterion and write the similarity statement. **[2 marks]**
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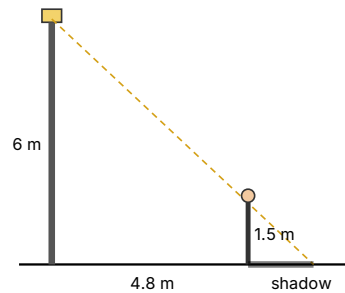
SECTION C

Short Answer Questions — Q16 to Q19 carry 3 marks each.

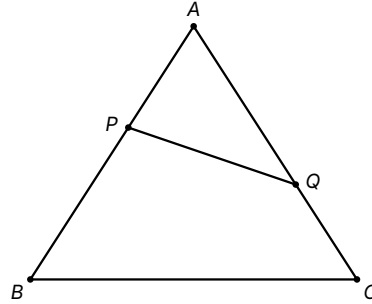
- Q16.** In $\triangle ABC$, D is a point on AB and E is a point on AC such that $DE \parallel BC$. F is a point on BC such that $EF \parallel AB$. Prove that $\frac{AD}{DB} = \frac{BF}{FC}$. **[3 marks]**



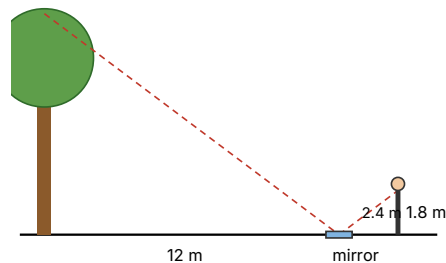
- Q17.** A lamp is fixed at the top of a pole 6 m high. A boy 1.5 m tall walks away from the base of the pole at a speed of 1.2 m/s. Find the length of his shadow after 4 seconds. **[3 marks]**



- Q18.** In $\triangle ABC$, P and Q are points on AB and AC respectively such that $AP = 4$ cm, $AB = 10$ cm, $AQ = 5$ cm and $AC = 8$ cm. Prove that $\triangle APQ \sim \triangle ACB$. Hence, if $BC = 12$ cm, find PQ. **[3 marks]**



- Q19.** A girl whose eyes are 1.8 m above the ground places a small mirror flat on level ground, 12 m from the foot of a tree. She stands 2.4 m from the mirror, on the side away from the tree, and sees the top of the tree in the mirror. Assuming the angle at which light falls on the mirror equals the angle at which it is reflected, find the height of the tree. **[3 marks]**



SECTION D

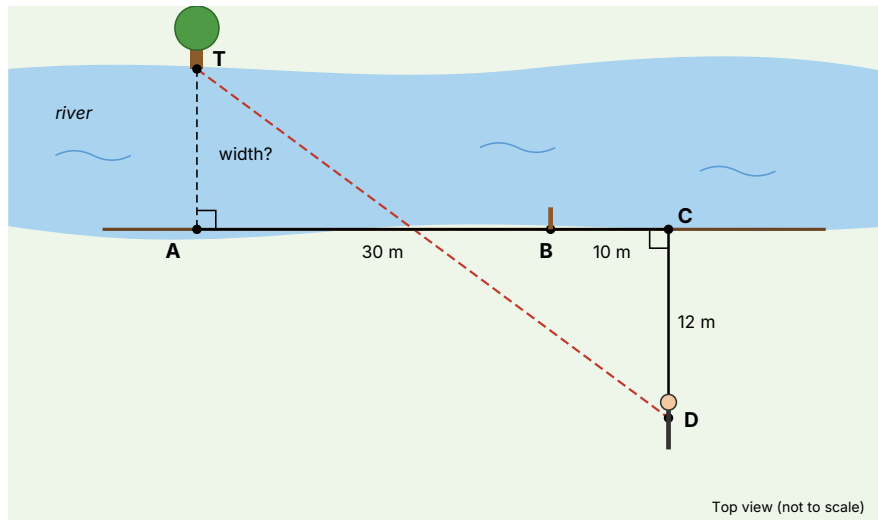
Long Answer Question — Q20 carries 4 marks.

- Q20.** (a) State and prove the Basic Proportionality Theorem. **[4 marks]**
(b) In $\triangle ABC$, $DE \parallel BC$ with D on AB and E on AC. If $\frac{AD}{DB} = \frac{3}{4}$ and AC = 14 cm, find AE.
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SECTION E

Case Study Based Question — Q21 carries 4 marks.

- Q21.** Meera wants to find the width of a river without crossing it. She stands at point A on the bank, exactly opposite a tree T on the other bank, so that TA is perpendicular to the bank. She walks 30 m along the bank to B and fixes a stick there. She walks another 10 m to C, then turns at right angles and walks away from the river until the stick B and the tree T appear in a straight line. She stops at D, where $CD = 12$ m. **[4 marks]**



Based on the above information, answer the following questions:

- (i) By which similarity criterion is $\triangle TAB \sim \triangle DCB$? Give a reason. **[1 mark]**
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- (ii) Write the proportion of corresponding sides that relates TA to the measured lengths. **[1 mark]**
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- (iii) Find the width of the river, TA. If CD had been 15 m, with AB and BC unchanged, what would the width of the river be? **[2 marks]**
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— End of Question Paper —