

Chapter 6: Triangles

Top 20 Practice Questions

A. BPT & Similarity Basics

1. In $\triangle ABC$, $DE \parallel BC$. If $AD = 3$ cm, $DB = 4$ cm, and $AE = 6$ cm, find EC .
2. State the **AAA similarity criterion** for two triangles.
3. If $\triangle ABC \sim \triangle PQR$ and $AB : PQ = 1 : 3$, find $\text{Area}(\triangle ABC) : \text{Area}(\triangle PQR)$.
4. D and E are points on AB and AC such that $DE \parallel BC$. If $AD = x$, $DB = x - 2$, $AE = x + 2$, $EC = x - 1$, solve for x .
5. Are all isosceles triangles similar? Justify your answer.
6. In trapezium ABCD with $AB \parallel DC$, diagonals intersect at O. Prove $AO/OC = BO/OD$.
7. If $\triangle ABC \sim \triangle DEF$, $\angle A = 47^\circ$ and $\angle E = 83^\circ$, find $\angle C$.
8. A vertical pole of height 10 m casts a shadow of 8 m. At the same time, a tower casts a shadow of 30 m. Find the height of the tower.

B. Proofs & Geometry

9. Prove that the line joining the midpoints of two sides of a triangle is parallel to the third side.

10. In $\triangle ABC$, AD is the angle bisector of $\angle A$. If $AB = 10$ cm, $AC = 14$ cm, and $BC = 6$ cm, find BD and DC.

11. Prove that two triangles are similar if their corresponding angles are equal.

12. In $\triangle PQR$, $ST \parallel QR$. Prove $PS/PQ = PT/PR$.

13. If O is a point inside rectangle ABCD, prove $OB^2 + OD^2 = OA^2 + OC^2$.

14. $\triangle ABC$ is an isosceles triangle right-angled at C. Prove $AB^2 = 2AC^2$.

15. In $\triangle ABC$, if $DE \parallel BC$, prove $\triangle ADE \sim \triangle ABC$.

C. Applied & Case Study Style

16. A girl of height 90 cm walks away from a lamp post 3.6 m high at a speed of 1.2 m/s. Find the length of her shadow after 4 seconds.

17. In $\triangle ABC$, $AD \perp BC$ and $AD^2 = BD \cdot CD$. Prove $\angle BAC = 90^\circ$.

18. Two poles of height 6 m and 11 m stand on level ground. If the distance between their feet is 12 m, find the distance between their tops.

19. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding medians.

20. In the given figure, if $LM \parallel CB$ and $LN \parallel CD$, prove $AM/AB = AN/AD$.

Chapter 6: Top 20 PYQs (2020–2024)

Q1. (2023) State and prove the **Basic Proportionality Theorem (BPT)**.

Q2. (2020) In $\triangle ABC$, $DE \parallel BC$. If $AD = 2.4$ cm, $AE = 3.2$ cm and $EC = 4.8$ cm, find AB .

Q3. (2022) $ABCD$ is a trapezium in which $AB \parallel DC$ and diagonals intersect at O . Show
 $AO/BO = CO/DO$.

Q4. (2024) In $\triangle PQR$, S and T lie on PQ and PR such that $ST \parallel QR$. If $PS = 3$ cm and $SQ = 4$ cm, find
 $\text{Area}(\triangle PST) : \text{Area}(\triangle PQR)$.

Q5. (2021) If $\triangle ABC \sim \triangle PQR$ and $BC/QR = 1/3$, find
 $\text{Area}(\triangle PQR) : \text{Area}(\triangle ABC)$.

Q6. (2023) In $\triangle ABC$, $AD \perp BC$ such that $AD^2 = BD \cdot CD$. Prove that $\triangle ABC$ is right-angled at A .

Q7. (2020) Prove that the ratio of the perimeters of two similar triangles is equal to the ratio of their corresponding sides.

Q8. (2022) Sides AB , BC and median AD of $\triangle ABC$ are proportional to sides PQ , QR and median PM of $\triangle PQR$. Show that $\triangle ABC \sim \triangle PQR$.

Q9. (2024) A street light is fixed on a pole 6 m high. A woman of height 1.5 m casts a shadow of 3 m. Find her distance from the base of the pole.

Q10. (2021) In $\triangle ABC$, $DE \parallel BC$. If $AD = x$, $DB = x + 1$, $AE = x + 3$, $EC = x + 5$, find x .

Q11. (2023) In the given figure, $QA \perp AB$ and $PB \perp AB$. If $AO = 20$ cm, $BO = 12$ cm and $PB = 18$ cm, find QA .

Q12. (2020) If $\triangle ABC \sim \triangle DEF$, $AB = 4$ cm, $DE = 6$ cm, $EF = 9$ cm and $FD = 12$ cm, find the perimeter of $\triangle ABC$.

Q13. (2022) Prove that the line drawn through the midpoint of one side of a triangle parallel to another side bisects the third side.

Q14. (2024) In the figure, $\angle ACB = 90^\circ$ and $CD \perp AB$. Prove $BC^2/AC^2 = BD/AD$.

Q15. (2021) Through the midpoint M of side CD of parallelogram $ABCD$, line BM meets AC at L and AD produced at E . Prove that $EL = 2BL$.

Q16. (2023) In $\triangle ABC$, $\angle B = 90^\circ$ and D is the midpoint of BC . Prove $AC^2 = AD^2 + 3CD^2$.

Q17. (2020) D, E, F are midpoints of sides BC, CA and AB of $\triangle ABC$. Find $\text{Area}(\triangle DEF) : \text{Area}(\triangle ABC)$.

Q18. (2022) If a line intersects sides AB and AC of $\triangle ABC$ at D and E respectively and is parallel to BC , prove $AD/AB = AE/AC$.

Q19. (2024) Two triangles ABC and DBC are on the same base BC . If AD meets BC at O , show $\text{Area}(ABC) / \text{Area}(DBC) = AO / DO$.

Q20. (2021) In right $\triangle ABC$ ($\angle C = 90^\circ$), points P and Q divide CA and CB in the ratio $2 : 1$. Prove $9(AQ^2 + BP^2) = 13AB^2$.