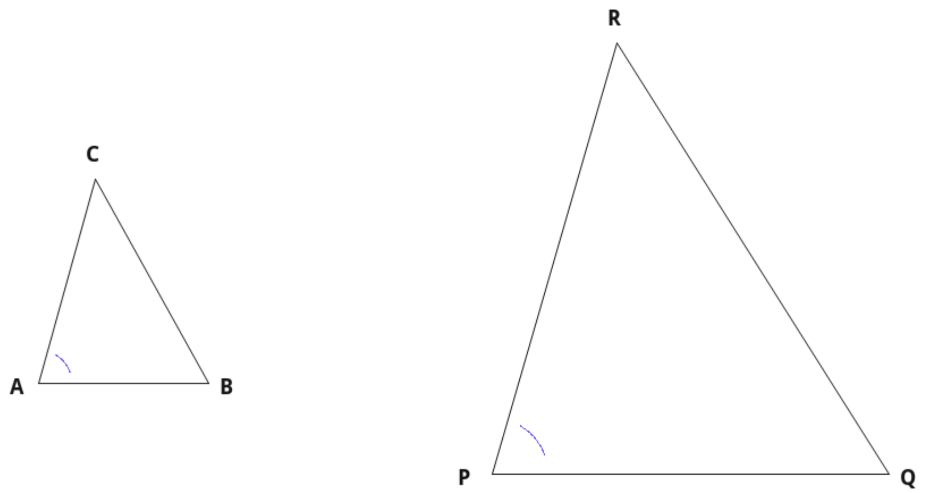
CLASS 10 MATHS EXTRA QUESTIONS

Extra Questions: Class 10 Maths Chapter 6 Triangles

These go beyond Exercises 6.1-6.3 into genuine HOTS (Higher Order Thinking Skills) territory — a general area-ratio proof, a reverse-engineering area problem with fresh numbers, an assertion-reason question, a multi-part height/shadow problem, a two-poles distance problem, and the classical similar-triangles proof...

Contents

These go beyond Exercises 6.1-6.3 into genuine HOTS (Higher Order Thinking Skills) territory — a general area-ratio proof, a reverse-engineering area problem with fresh numbers, an assertion-reason question, a multi-part height/shadow problem, a two-poles distance problem, and the classical similar-triangles proof of the Pythagoras theorem (removed as its own exercise in the 2023 rationalisation, but essential to understand). See the standard-level Chapter 6 Solutions first if you haven't already. These Class 10 Mathematics Chapter 6 important questions are handy for last-minute exam practice.



Triangle ABC ~ Triangle PQR: corresponding angles are equal and corresponding sides are in the same ratio.

Reference figure — similar triangles

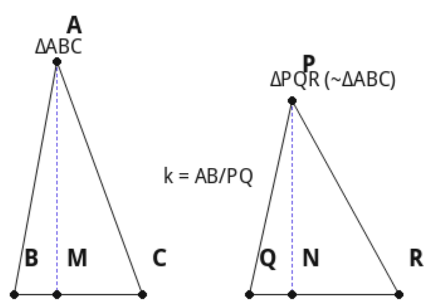
Extra Questions (HOTS Level): Triangles (Class 10 Maths Chapter 6)

Q1. (General proof) Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

Let $\Delta ABC \sim \Delta PQR$ with $AB/PQ = BC/QR = CA/RP = k$. Draw altitudes $AM \perp BC$ and $PN \perp QR$. Since $\angle B = \angle Q$ (similar triangles) and $\angle AMB = \angle PNQ = 90°$, $\Delta ABM \sim \Delta PQN$ (AA) $\Rightarrow AM/PN = AB/PQ = k$.

$\text{Area}(\Delta ABC)/\text{Area}(\Delta PQR) = (\tfrac{1}{2} \cdot BC \cdot AM)/(\tfrac{1}{2} \cdot QR \cdot PN) = (BC/QR) \times (AM/PN) = k \times k =$ $\mathbf{k^2}$**.**

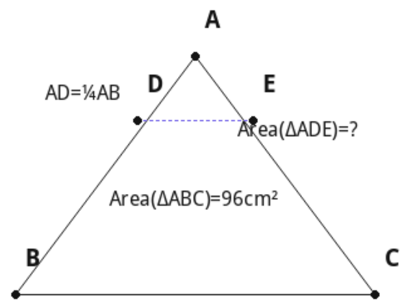
So the ratio of areas equals the square of the ratio of corresponding sides — a general result true for any pair of similar triangles, not tied to specific numbers.



Area(ΔABC)/Area(ΔPQR) = (AM/PN)² = k² (via similar triangles ABM~

Q2. (Reverse-engineering, fresh numbers) In ΔABC, D is on AB with AD = ¼AB, and

DE∥BC meets AC at E. If Area(ΔABC) = 96 cm², find Area(ΔADE).
DE∥BC ⇒ ΔADE~ΔABC (AA), with ratio AD/AB = 1/4. By Q1's result, Area(ΔADE)/Area(ΔABC) = $(1/4)^2$ = 1/16.

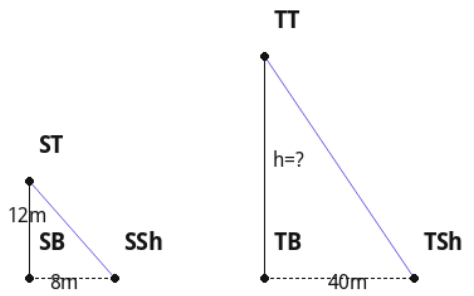


DE||BC, AD=¼AB → ΔADE~ΔABC, ratio ¼ → Area(ΔADE) = 96×(1/4)² = 6 cr

Area(ΔADE) = 96/16 = 6 cm².

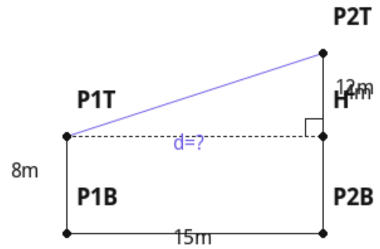
Q3. (Assertion-Reason) Assertion (A): If AB/DE = BC/EF = CA/FD for ΔABC and ΔDEF, then ΔABC~ΔDEF. Reason (R): if the three sides of one triangle are proportional to the three sides of another, the two triangles are similar by the SSS similarity criterion.
The Assertion is precisely a restatement of the SSS similarity criterion, and the Reason states that exact criterion. **Both A and R are true, and R is the correct explanation of A.**

Q4. (Multi-part word problem, fresh numbers) A vertical stick 12 m long casts a shadow 8 m long at the same time a tower casts a shadow 40 m long. Find the tower's height. If the tower's height is later reduced by 25%, find its new shadow length at the same time of day.
Height/shadow ratio is constant at a given time: 12/8 = h/40 ⇒ **h = 60 m.**
After a 25% reduction: new height = 60 × 0.75 = 45 m. New shadow = 45 × (8/12) = **30 m.**



12m, shadow 8m) and tower (shadow 40m) at same time -> tower heigh

Q5. (Applied Pythagoras-via-similar-triangles problem) Two vertical poles of heights 8 m and 12 m stand 15 m apart on level ground. Find the distance between their tops.
Draw a horizontal line from the top of the shorter pole to the taller pole, forming a right triangle with legs equal to the horizontal distance (15 m) and the height difference (12–8 = 4 m).
Distance between tops = $\sqrt{(15^2+4^2)}$ = √(225+16) = √241 ≈ **15.5 m.**



Poles 8m & 12m, 15m apart -> distance between tops = $\sqrt{(15^2+4^2)}$ ≈

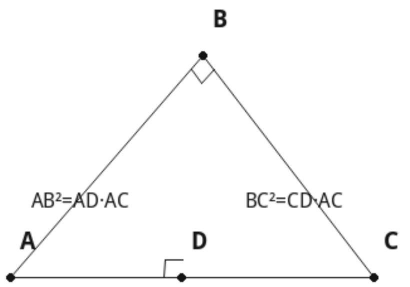
Q6. (Classical proof, beyond the current exercise) Using similar triangles, prove the Pythagoras theorem: in a right triangle, the square of the hypotenuse equals the sum of squares of the other two sides.

Let ΔABC be right-angled at B, with $BD \perp AC$ (D on AC).

In ΔADB and ΔABC: $\angle ADB = \angle ABC = 90°$, $\angle A$ common $\Rightarrow \Delta ADB \sim \Delta ABC \Rightarrow AD/AB = AB/AC \Rightarrow$ $\mathbf{AB^2 = AD \cdot AC}$ ...(1)

In ΔBDC and ΔABC: $\angle BDC = \angle ABC = 90°$, $\angle C$ common $\Rightarrow \Delta BDC \sim \Delta ABC \Rightarrow CD/BC = BC/AC \Rightarrow$ $\mathbf{BC^2 = CD \cdot AC}$ ...(2)

Adding (1) and (2): $AB^2 + BC^2 = AD \cdot AC + CD \cdot AC = AC(AD+CD) = AC \cdot AC =$ $\mathbf{AC^2}$**.** Proved — this similar-triangles method was Exercise 6.5 before the 2023 rationalisation folded it into the chapter's explanatory content.



$BD \perp AC$ (altitude to hypotenuse): $\Delta ADB \sim \Delta ABC \sim \Delta BDC \rightarrow AB^2+BC^2=AC^2$ (Py

See also: Revision Notes / Formulas Handbook

Class 10 Mathematics Chapter 6 – Solutions and Notes

For complete step-by-step answers and a quick summary, check the Class 10 Mathematics Chapter 6 Solutions and Class 10 Mathematics Chapter 6 Revision Notes.