

Geometry - Similar Triangle Theorems - Worksheet

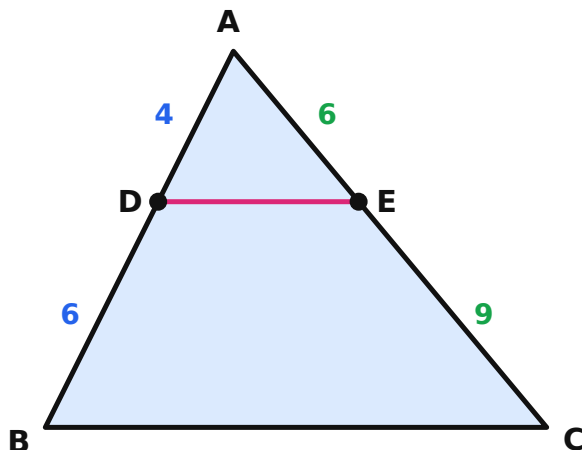
Common Core G-SRT.B.4, G-SRT.B.5 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice the Triangle Proportionality Theorem, similarity tests and geometric means (Common Core G-SRT.B.4, G-SRT.B.5). The first problems are quick one-step checks of the definitions and formulas from the lesson. The middle problems ask for diagrams, equations and careful reasoning in the style of a high school Geometry class. The last six problems are applications with mirrors, ladders, sails and land parcels.

Geometry · Common Core State Standards: **G-SRT.B.4, G-SRT.B.5**

Exercise 1 - Side splitter



A line parallel to BC splits both sides in the same ratio.

DE is parallel to BC. $AD = 4$, $DB = 6$ and $AE = 6$. Find EC.

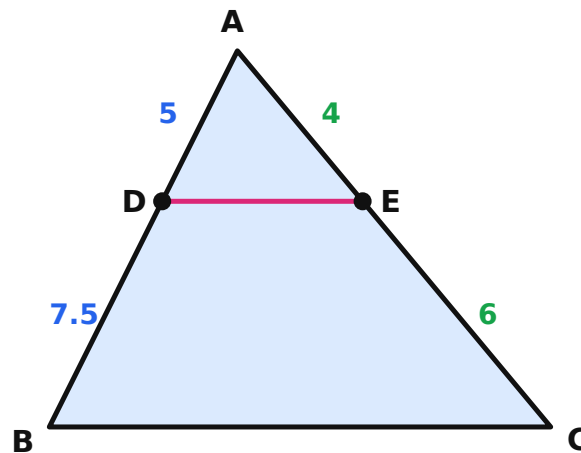
Exercise 2 - Find AD

In triangle ABC, DE is parallel to BC with D on AB and E on AC. $AD = x$, $DB = 10$, $AE = 6$ and $EC = 15$. Find x.

Exercise 3 - Find BC

In triangle ABC, DE is parallel to BC. $AD = 8$, $AB = 20$ and $DE = 6$. Find BC.

Exercise 4 - Parallel? yes



Is DE parallel to BC?

Is DE parallel to BC if $AD = 5$, $DB = 7.5$, $AE = 4$ and $EC = 6$? Explain.

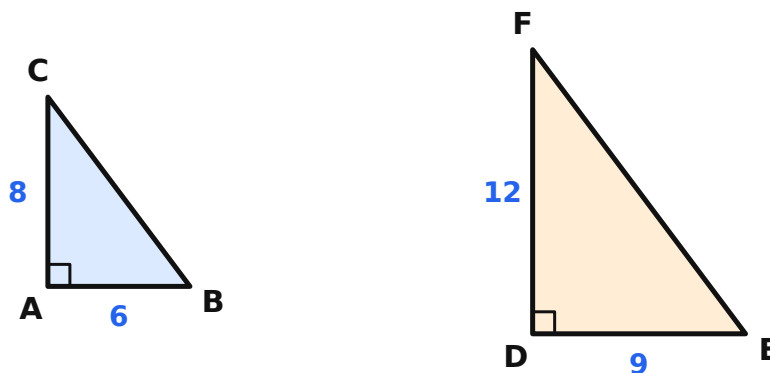
Exercise 5 - Parallel? no

Is DE parallel to BC if $AD = 6$, $DB = 9$, $AE = 5$ and $EC = 8$? Explain.

Exercise 6 - Proportion with x

DE is parallel to BC. $AD = x+1$, $DB = 6$, $AE = x+3$ and $EC = 9$. Find x, AD and AE.

Exercise 7 - SAS similarity



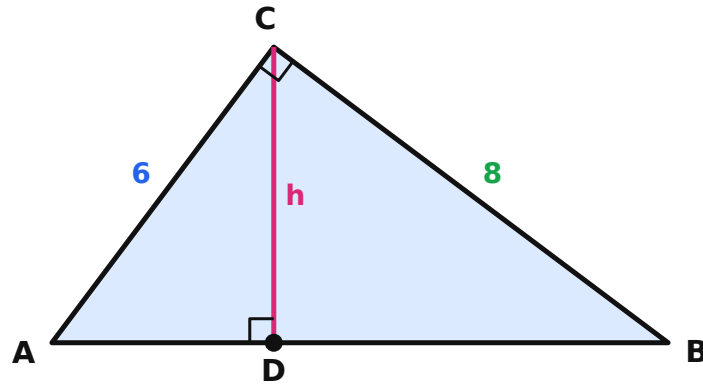
SAS similarity: the included angles are equal and the sides are proportional ($6/9 = 8/12$).

Triangle ABC has legs 6 and 8. Triangle DEF has legs 9 and 12. Both have a right angle between the legs. Are they similar? Name the test and the scale factor.

Exercise 8 - SSS similarity

Triangle 1 has sides 4, 5, 6. Triangle 2 has sides 10, 12.5, 15. Triangle 3 has sides 8, 10, 13. Which triangles are similar to Triangle 1?

Exercise 9 - Altitude to the hypotenuse



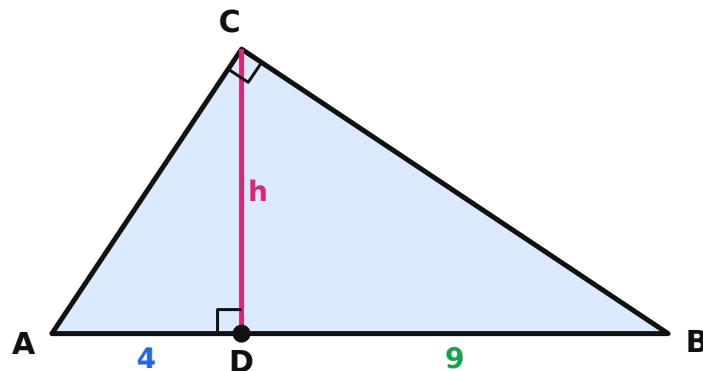
Right triangle with legs 6 and 8.

Right triangle ABC has legs 6 and 8. Find the hypotenuse, the altitude h to the hypotenuse and the two segments AD and DB.

Exercise 10 - Geometric mean

Find the geometric mean of 4 and 9.

Exercise 11 - Altitude from segments



$AD = 4$ and $DB = 9$.

The altitude to the hypotenuse of a right triangle splits the hypotenuse into segments of length 4 and 9. Find the altitude.

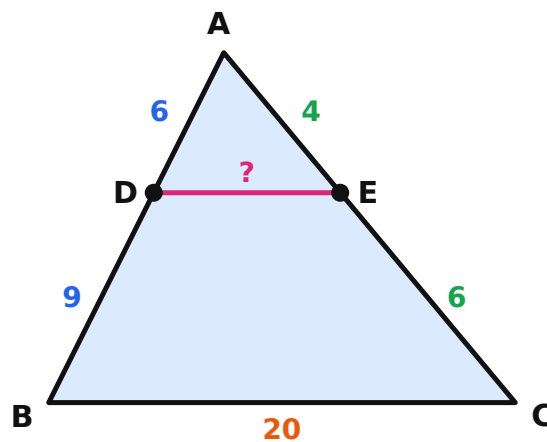
Exercise 12 - Legs from segments

The hypotenuse of a right triangle is 25 and the altitude to it splits the hypotenuse into 9 and 16. Find both legs.

Exercise 13 - Pythagorean check

Use the legs 15 and 20 and hypotenuse 25 from the previous problem to verify $a^2 + b^2 = c^2$ and connect it to $pc + qc$.

Exercise 14 - Overlapping triangles



DE parallel to BC.

DE is parallel to BC, $AD = 6$, $AB = 15$ and $BC = 20$. Find DE.

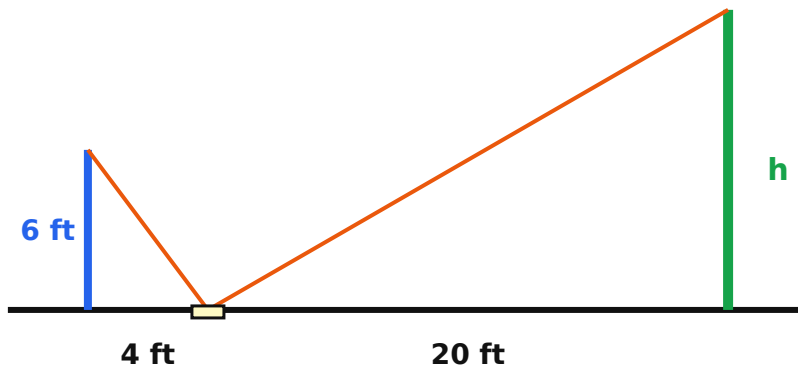
Exercise 15 - Ratio of perimeters

Two similar triangles have corresponding sides 6 and 15. The smaller has perimeter 28. Find the perimeter of the larger and the ratio of their areas.

Exercise 16 - Three parallel lines

Three parallel lines cut two transversals. On one transversal the segments are 3 and 5. On the other the segments are x and 10. Find x .

Exercise 17 - Mirror problem



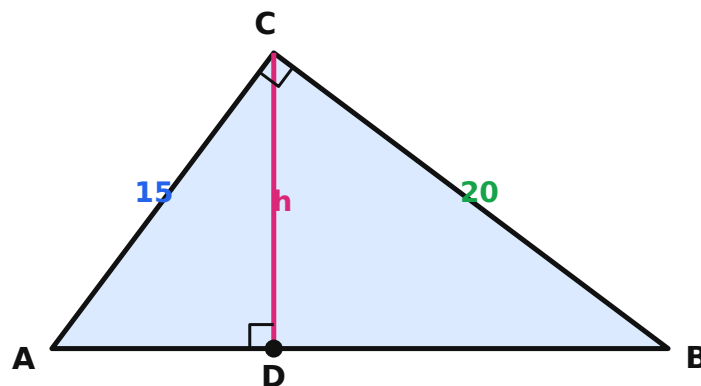
Reflection method: two similar right triangles.

Liam places a mirror on the ground 20 feet from a building and stands 4 feet behind the mirror. His eye is 6 feet above the ground and he sees the top of the building in the mirror. Find the height of the building.

Exercise 18 - A-frame ladder

An A-frame ladder has legs 10 feet long. A crossbar parallel to the floor is attached 4 feet from the top along each leg. The legs are 5 feet apart at the floor. Find the length of the crossbar.

Exercise 19 - Sail altitude



Sail with legs 15 and 20.

A right triangular sail has legs 15 feet and 20 feet. Find the length of the altitude from the right angle to the long edge.

Exercise 20 - Land parcels

Two triangular parcels are similar with scale factor 3 : 5. The smaller parcel has an area of 54 square yards. Find the area of the larger parcel.