

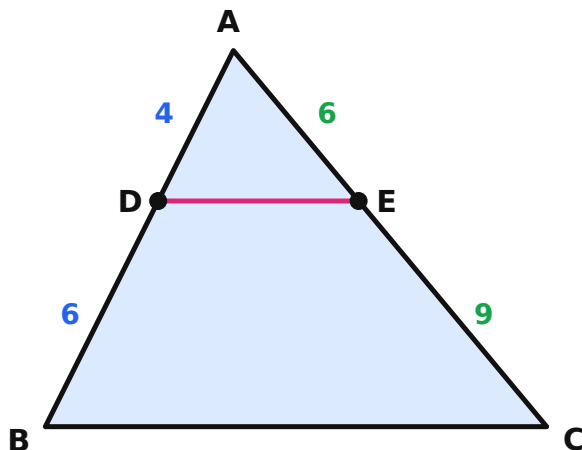
Geometry - Similar Triangle Theorems - Answer Key

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

Use this answer key to check the 20 problems on similar triangles. Every solution shows the formula or theorem used, each step of the work, and the final answer in bold. If an answer differs from yours, compare the steps line by line to find where the work changed.

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

Exercise 1 - Side splitter



$$EC = 9.$$

$$\frac{4}{6} = \frac{6}{EC}$$

$$EC = \frac{6 \cdot 6}{4} = 9$$

$$\mathbf{EC = 9}$$

Exercise 2 - Find AD

$$\frac{x}{10} = \frac{6}{15}$$

$$15x = 60$$

$$x = 4$$

$$\mathbf{x = 4}$$

Exercise 3 - Find BC

Triangle ADE is similar to triangle ABC with ratio $\frac{8}{20} = 0.4$.

$$\frac{6}{BC} = 0.4$$

$$BC = 15$$

$$\mathbf{BC = 15}$$

Exercise 4 - Parallel? yes

$$\frac{5}{7.5} = \frac{2}{3} \text{ and } \frac{4}{6} = \frac{2}{3}.$$

The sides are divided in the same ratio, so DE is parallel to BC.

Yes

Exercise 5 - Parallel? no

$$\frac{6}{9} = \frac{2}{3} = 0.667 \text{ but } \frac{5}{8} = 0.625.$$

The ratios are not equal, so DE is not parallel to BC.

No

Exercise 6 - Proportion with x

$$\frac{x+1}{6} = \frac{x+3}{9}$$

$$9x+9=6x+18$$

$$3x=9$$

$$x=3$$

$$AD=4 \text{ and } AE=6.$$

$$\mathbf{x = 3; AD = 4; AE = 6}$$

Exercise 7 - SAS similarity

$$\frac{9}{6} = 1.5 \text{ and } \frac{12}{8} = 1.5.$$

The included right angles are congruent, so the triangles are similar by SAS~ with scale factor 1.5.

Yes, SAS~, $k = 1.5$

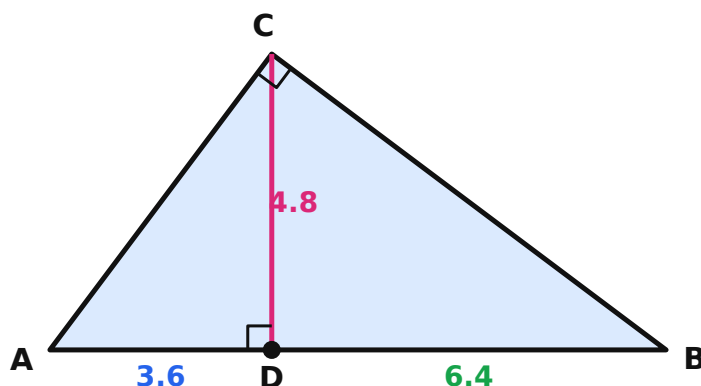
Exercise 8 - SSS similarity

Triangle 2: $\frac{10}{4} = \frac{12.5}{5} = \frac{15}{6} = 2.5$, so it is similar.

Triangle 3: $\frac{8}{4} = \frac{10}{5} = 2$ but $\frac{13}{6} \neq 2$, so it is not.

Only triangle 2

Exercise 9 - Altitude to the hypotenuse



$AD = 3.6$, $DB = 6.4$ and $h = 4.8$.

Hypotenuse: $\sqrt{6^2 + 8^2} = 10$.

Leg relationship: $6^2 = AD \cdot 10$, so $AD = 3.6$, and $8^2 = DB \cdot 10$, so $DB = 6.4$.

Altitude: $h^2 = 3.6 \cdot 6.4 = 23.04$, so $h = 4.8$.

Hypotenuse 10; $h = 4.8$; $AD = 3.6$; $DB = 6.4$

Exercise 10 - Geometric mean

$$\sqrt{4 \cdot 9} = \sqrt{36} = 6$$

Exercise 11 - Altitude from segments

$$h^2 = 4 \cdot 9 = 36$$

$$h = 6$$

$$h = 6$$

Exercise 12 - Legs from segments

$$a^2 = 9 \cdot 25 = 225, \text{ so } a = 15.$$

$$b^2 = 16 \cdot 25 = 400, \text{ so } b = 20.$$

15 and 20

Exercise 13 - Pythagorean check

$$15^2 + 20^2 = 225 + 400 = 625 = 25^2.$$

$$pc + qc = 9 \cdot 25 + 16 \cdot 25 = (9 + 16) \cdot 25 = 625.$$

Both equal 625

Exercise 14 - Overlapping triangles

Triangle ADE is similar to triangle ABC with ratio $\frac{6}{15} = 0.4$.

$$DE = 0.4 \cdot 20 = 8$$

$$DE = 8$$

Exercise 15 - Ratio of perimeters

$$\text{Scale factor } \frac{15}{6} = 2.5.$$

$$\text{Perimeter: } 2.5 \cdot 28 = 70. \text{ Area ratio: } 2.5^2 = 6.25.$$

70; area ratio 6.25

Exercise 16 - Three parallel lines

$$\frac{3}{5} = \frac{x}{10}$$

$$x = 6$$

$$\mathbf{x = 6}$$

Exercise 17 - Mirror problem

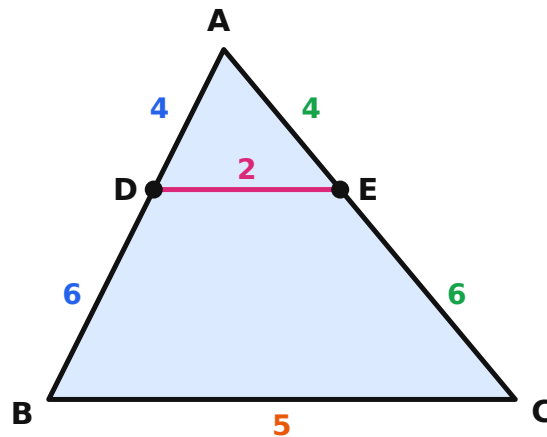
The light ray makes equal angles with the ground, so the two right triangles are similar by AA.

$$\frac{h}{20} = \frac{6}{4}$$

$$h = 30$$

$$\mathbf{30 \text{ feet}}$$

Exercise 18 - A-frame ladder



Crossbar DE = 2 ft.

The crossbar and the floor make similar triangles with ratio $\frac{4}{10} = 0.4$.

$$0.4 \cdot 5 = 2$$

$$\mathbf{2 \text{ feet}}$$

Exercise 19 - Sail altitude

Hypotenuse: $\sqrt{15^2+20^2}=25$.

Segments: $15^2=25p$ gives $p=9$, and $20^2=25q$ gives $q=16$.

$$h=\sqrt{9\cdot 16}=12$$

12 feet

Exercise 20 - Land parcels

Area ratio: $\left(\frac{5}{3}\right)^2=\frac{25}{9}$.

$$54\cdot\frac{25}{9}=150$$

150 square yards