

Geometry · Similar Triangles and Proportions · Quiz

Common Core G-SRT.B.4, G-SRT.B.5 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

Ten multiple-choice questions check the similarity criteria, the side-splitter theorem and its converse, geometric means in right triangles and indirect measurement. Choose the single best answer, then read the explanation to see the common mistake.

GeometryCommon Core: G-SRT.B.4 · G-SRT.B.5

Questions

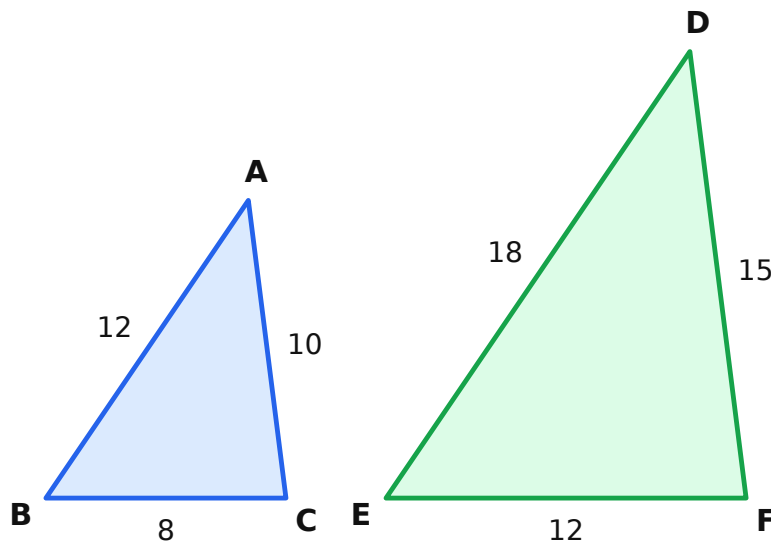
Question 1

Which condition is NOT enough to prove two triangles similar?

- A. Two pairs of congruent angles
- B. Two pairs of sides in proportion and a non-included angle congruent
- C. Two pairs of sides in proportion and the included angles congruent
- D. Three pairs of sides in proportion

Question 2

What is the ratio of corresponding sides, larger triangle to smaller?

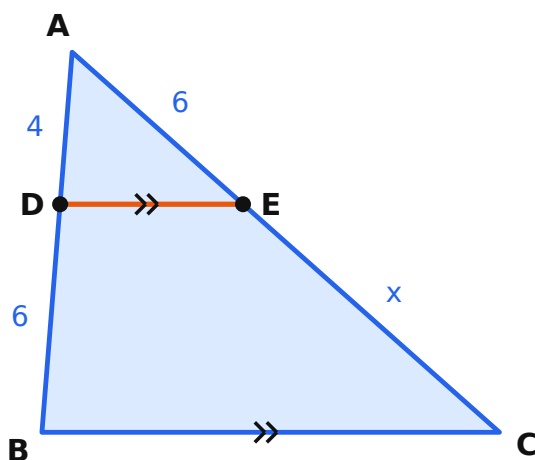


Two triangles with their side lengths.

- A. $\frac{2}{3}$
- B. $\frac{3}{2}$
- C. 3
- D. 5

Question 3

In the figure $DE \parallel BC$. What is x ?



DE is parallel to BC.

- A. 10
- B. 6
- C. 4
- D. 9

Question 4

Points D and E lie on AB and AC with $AD=3$, $DB=6$, $AE=4$, $EC=8$. What can you conclude?

- A. DE is not parallel to BC because AD is not equal to AE
- B. DE is not parallel to BC because DB is not equal to EC
- C. DE is parallel to BC because both ratios equal $\frac{1}{2}$
- D. Nothing, because angle measures are needed

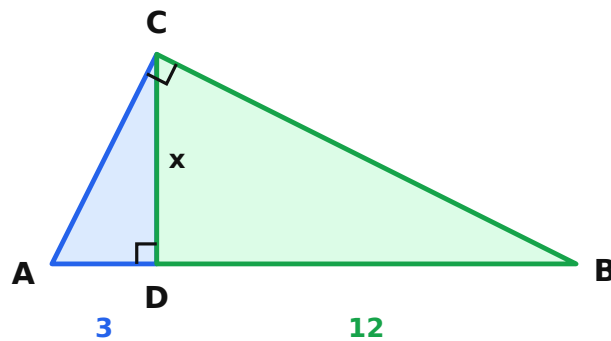
Question 5

What is the geometric mean of 4 and 25?

- A. 12.5
- B. 14.5
- C. 100
- D. 10

Question 6

In the right triangle, CD is the altitude to the hypotenuse. What is CD ?



CD is the altitude to the hypotenuse.

- A. 7.5
- B. 6
- C. 9
- D. 36

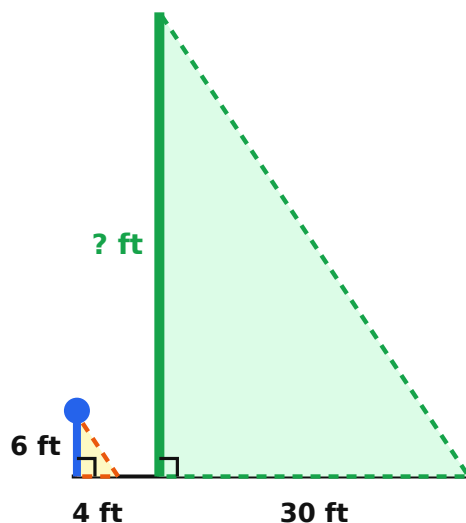
Question 7

One triangle has sides 6 and 8 around a 40° angle. Another has sides 9 and 12 around a 40° angle. What is true?

- A. They are congruent by SAS
- B. They are similar by AA with ratio $3/2$
- C. They are similar by SAS with ratio $3/2$
- D. They are not similar because 6 is not equal to 9

Question 8

A 6 ft person casts a 4 ft shadow while a tree casts a 30 ft shadow. How tall is the tree?



Same time of day.

- A. 45 ft
- B. 20 ft
- C. 34 ft
- D. 36 ft

Question 9

In right triangle ABC with right angle at C and altitude CD, which proportion shows $AC^2 = AB \cdot AD$?

- A. $\frac{AB}{AC} = \frac{AC}{AD}$
- B. $\frac{AB}{AC} = \frac{AD}{AC}$
- C. $\frac{AC}{AD} = \frac{AB}{CD}$
- D. $\frac{AD}{AB} = \frac{CD}{AC}$

Question 10

Triangle ABC is similar to triangle DEF, $AB = 6$, $DE = 15$ and the perimeter of ABC is 21. What is the perimeter of DEF?

- A. 8.4
- B. 30
- C. 52.5
- D. 36

Answer key

1. **B** – SSA (a non-included angle) does not fix the shape of a triangle. AA, SAS and SSS are the three similarity criteria.
2. **B** – Divide each larger side by the matching smaller side: $12/8 = 15/10 = 18/12 = 3/2$. Inverting gives $2/3$, and subtracting $15 - 10$ gives 5.
3. **D** – $AD/DB = AE/EC$ gives $4/6 = 6/x$, so $4x = 36$ and $x = 9$. Adding $4 + 6 = 10$ is a common slip.
4. **C** – $3/6 = 1/2$ and $4/8 = 1/2$, so the sides are divided proportionally and the converse of the side-splitter theorem applies.
5. **D** – The geometric mean is the square root of 4 times 25, which is the square root of 100, or 10. The average 14.5 is the arithmetic mean.
6. **B** – CD squared equals 3 times 12, which is 36, so $CD = 6$. The number 36 is CD squared, and 7.5 is the arithmetic mean of 3 and 12.
7. **C** – $9/6 = 12/8 = 3/2$ and the included angles match, so SAS similarity holds. Congruence would need equal sides.
8. **A** – Set up $h/30 = 6/4$, so $h = 45$. Flipping the ratio gives 20, and adding $30 + 4$ or $30 + 6$ gives the other distractors.
9. **A** – Triangles ABC and ACD are similar, so $AB/AC = AC/AD$, and cross-multiplying gives $AC^2 = AB \times AD$.
10. **C** – The scale factor is $15/6 = 2.5$, and perimeters scale by the same factor: 21 times 2.5 is 52.5. Adding 9 or 15 treats scaling as addition.

Remember:

- AA, SAS and SSS similarity criteria prove triangles similar (G-SRT.B.4, B.5).
- Side-splitter theorem: a line parallel to one side divides the other two sides proportionally, $AD/DB = AE/EC$; its converse proves lines parallel.
- In a right triangle with altitude CD to the hypotenuse, CD squared equals AD times DB.
- Each leg is the geometric mean of the hypotenuse and the segment next to that leg.
- Similar triangles justify indirect measurement with shadows, mirrors and a proof of the Pythagorean theorem.