

Geometry · Law of Sines, Law of Cosines and Triangle Area · Quiz

Common Core G-SRT.D.9, G-SRT.D.10, G-SRT.D.11 · mathovore.fr

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

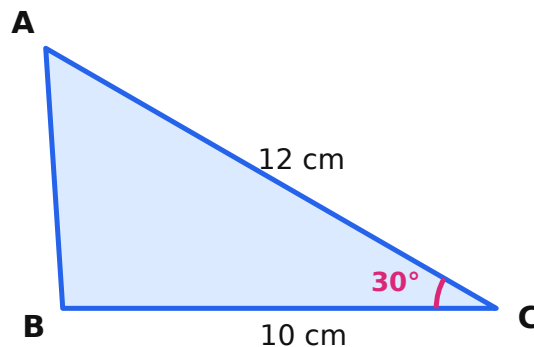
Ten multiple-choice questions check the triangle area formula, the Law of Sines and the Law of Cosines for Common Core standards G-SRT.D.9, G-SRT.D.10 and G-SRT.D.11. Use a calculator in degree mode and choose the single best answer for each question.

GeometryCommon Core: G-SRT.D.9 · G-SRT.D.10 · G-SRT.D.11

Questions

Question 1

What is the area of the triangle?



Sides 10 cm and 12 cm with a 30 degree included angle.

- A. 60 cm^2
- B. 52.0 cm^2
- C. 15 cm^2
- D. 30 cm^2

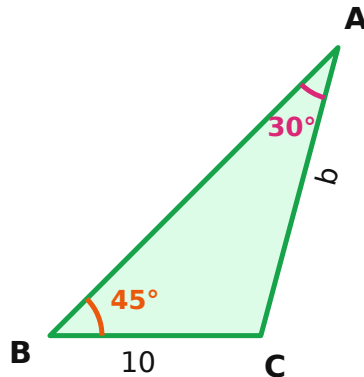
Question 2

Two angles and a side opposite one of them are known. Which law finds another side first?

- A. Law of Cosines
- B. Pythagorean theorem
- C. Law of Sines
- D. Area formula only

Question 3

Find side b to the nearest tenth.



Triangle with A 30 degrees, B 45 degrees and a 10.

- A. 14.1
- B. 7.1
- C. 7.3
- D. 3.5

Question 4

Sides 5 and 8 meet at a 60° angle. What is the third side?

- A. 9.4
- B. 7
- C. 49
- D. 13

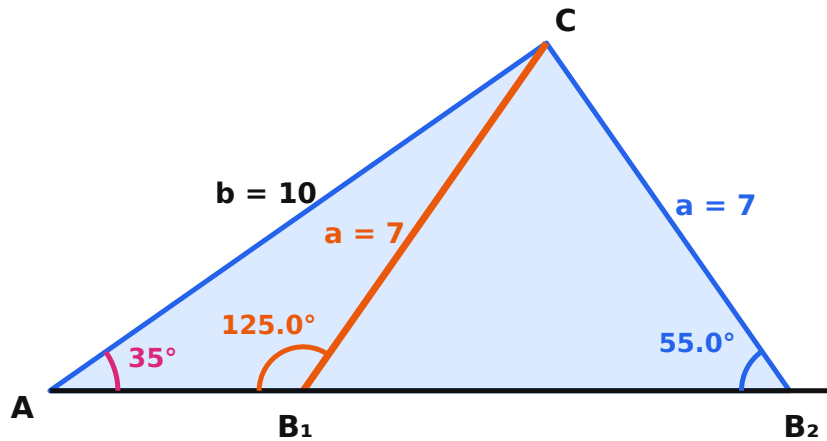
Question 5

A triangle has sides 5, 7 and 8. What is the angle opposite the side of length 7?

- A. 60°
- B. 30°
- C. 90°
- D. 120°

Question 6

In the figure, angle A is 35° , side $b=10$ and side $a=7$. How many triangles are possible?



Angle A 35 degrees, b 10 and a 7 give two triangles.

- A. One triangle
- B. No triangle
- C. Two triangles
- D. Infinitely many triangles

Question 7

In triangle ABC, $C = 90^\circ$. What does the Law of Cosines give for c^2 ?

- A. $a^2 + b^2$
- B. $a^2 + b^2 - 2ab$
- C. $a^2 + b^2 + 2ab$
- D. $a^2 - b^2$

Question 8

A triangle has sides 8 and 9 with an included angle of 150° . What is its area?

- A. 36
- B. 31.2
- C. 62.4
- D. 18

Question 9

Two trails of 6 mi and 9 mi leave a camp at an angle of 80° . How far apart are the trail ends, to the nearest tenth of a mile?

- A. 10.8
- B. 9.9
- C. 11.7
- D. 15.0

Question 10

Points A and B are 100 ft apart. A surveyor at A measures 60° to point C and a surveyor at B measures 75° to C. How far is C from A, to the nearest tenth of a foot?

- A. 122.5
- B. 73.2
- C. 136.6
- D. 141.4

Answer key

1. **D** - Area is $\frac{1}{2}(10)(12)\sin 30^\circ = 30$. Forgetting the one half gives 60, and using cosine gives 52.0.
2. **C** - A known angle and its opposite side form a ratio for the Law of Sines. The Law of Cosines needs SAS or SSS.
3. **A** - $b = \frac{10\sin 45^\circ}{\sin 30^\circ} \approx 14.1$. Inverting the ratio gives 7.1.
4. **B** - $c^2 = 25 + 64 - 2(5)(8)(0.5) = 49$, so $c = 7$. Dropping the cosine term gives $\sqrt{89} \approx 9.4$.
5. **A** - $\cos \theta = \frac{5^2 + 8^2 - 7^2}{2(5)(8)} = \frac{40}{80} = 0.5$, so $\theta = 60^\circ$. A negative cosine would indicate an obtuse angle.
6. **C** - $\sin B = \frac{10\sin 35^\circ}{7} \approx 0.819$ gives $B \approx 55.0^\circ$ or 125.0° , and both leave a positive third angle.
7. **A** - Since $\cos 90^\circ = 0$, the last term disappears and the Pythagorean theorem remains.
8. **D** - $\frac{1}{2}(8)(9)\sin 150^\circ = 36(0.5) = 18$. Using cosine gives 31.2, and skipping the one half gives 36.
9. **B** - $d^2 = 36 + 81 - 108\cos 80^\circ \approx 98.2$, so $d \approx 9.9$. Dropping the cosine term gives 10.8, and adding it gives 11.7.
10. **C** - The angle at C is 45° . Side AC is opposite 75° : $\frac{100\sin 75^\circ}{\sin 45^\circ} \approx 136.6$. Using 60° finds the side opposite 60° instead.

Remember:

- Standards G-SRT.D.9, G-SRT.D.10 and G-SRT.D.11 cover the area formula, the two laws and applying them.
- Area = $(1/2)ab \sin C$, where C is the angle between sides a and b.
- Law of Sines: $\sin A / a = \sin B / b = \sin C / c$, for AAS, ASA and SSA.
- Law of Cosines: $c^2 = a^2 + b^2 - 2ab \cos C$, for SAS and SSS.
- SSA can give two triangles, so check the obtuse angle too.