

Precalculus · Laws of Sines and Cosines and Triangle Area · Quiz

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

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

This precalculus law sines cosines quiz asks 10 multiple-choice questions on laws of sines and cosines and triangle area, and each answer comes with a short explanation.

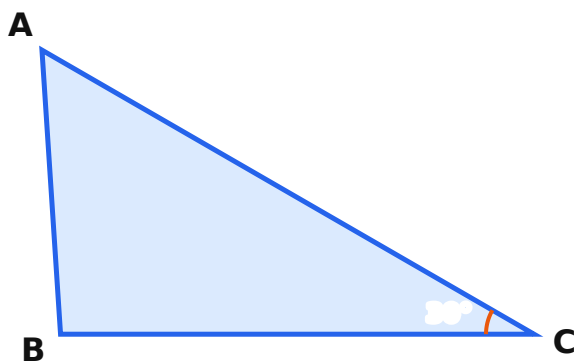
Ten multiple-choice questions on the area formula with sine, the Law of Sines, the ambiguous case, the Law of Cosines, Heron's formula and bearings. Choose the best answer, then read the explanation to see the common mistake.

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

Questions

Question 1

What is the area of the triangle shown?



Sides 10 and 12 with a 30 degree angle between them.

- A. 60
- B. 30
- C. 52.0
- D. 103.9

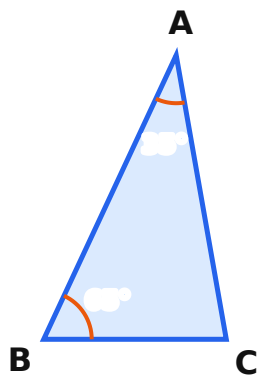
Question 2

A triangle has $a=9$, $b=14$ and $C=38^\circ$. Which tool should you use first to find c ?

- A. Law of Sines
- B. Heron's formula
- C. Pythagorean theorem
- D. Law of Cosines

Question 3

In the triangle shown, what is side b to the nearest hundredth?



Two angles and the side opposite A.

- A. 18.96
- B. 7.59
- C. 11.04
- D. 20.60

Question 4

How many triangles have $A = 30^\circ$, $a = 4$ and $b = 10$?

- A. 1
- B. 0
- C. 2
- D. 3

Question 5

Which equation is the Law of Cosines for side c ?

- A. $c^2 = a^2 + b^2 + 2ab \cos C$
- B. $c^2 = a^2 + b^2 - 2ab \sin C$
- C. $c^2 = a^2 + b^2 - ab \cos C$
- D. $c^2 = a^2 + b^2 - 2ab \cos C$

Question 6

Use Heron's formula to find the area of a triangle with sides 5, 6 and 7.

- A. 216
- B. 735
- C. 29.39
- D. 14.70

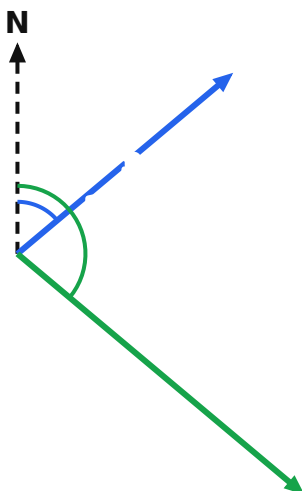
Question 7

A ship sails on a bearing of 135° . In which direction is it heading?

- A. southeast
- B. northeast
- C. southwest
- D. northwest

Question 8

Two paths leave a point on bearings 050° and 130° , as shown. What is the angle between the paths?



Bearings are measured clockwise from north.

- A. 180°
- B. 100°
- C. 80°
- D. 40°

Question 9

A triangle has area 24 square feet and sides of 8 ft and 10 ft. What is the acute angle between those sides?

- A. 53.1°
- B. 143.1°

- C. 36.9°
- D. 30°

Question 10

How many triangles have $A = 40^\circ$, $a = 8$ and $b = 10$?

- A. 2
- B. 0
- C. 1
- D. 3

Answer key

1. **B** - $\frac{1}{2}(10)(12)\sin 30^\circ = 30$. Forgetting the one half gives 60, and using cosine gives 52.0.
2. **D** - Two sides and the included angle (SAS) call for the Law of Cosines. The Law of Sines needs an angle and its opposite side.
3. **A** - $b = \frac{12\sin 65^\circ}{\sin 35^\circ} \approx 18.96$. Inverting the ratio gives the first wrong answer; the last is side c .
4. **B** - $h = 10\sin 30^\circ = 5$ and $4 < 5$, so side a is too short to reach the base.
5. **D** - The product term is $2ab\cos C$ and it is subtracted. At $C = 90^\circ$ it vanishes and the Pythagorean theorem remains.
6. **D** - $s = 9$ and $\sqrt{9(4)(3)(2)} = \sqrt{216} \approx 14.70$. The value 216 forgets the square root.
7. **A** - Bearings are measured clockwise from north: 90° is east and 180° is south, so 135° is halfway between, southeast.
8. **C** - Subtract the bearings: $130^\circ - 50^\circ = 80^\circ$. Adding them gives 180° .
9. **C** - $40\sin\theta = 24$ gives $\sin\theta = 0.6$ and $\theta \approx 36.9^\circ$. The value 53.1° comes from using cosine, and 143.1° is the obtuse solution.
10. **A** - $h = 10\sin 40^\circ \approx 6.43$ and $6.43 < 8 < 10$, so the side swings to two positions.

How does this quiz work?

Read each question, choose one answer among A, B, C and D, then check it: a short explanation appears after every answer. Your score out of 10 is shown at the end, and you can restart the quiz as often as you like.

What should you review before the quiz?

Reread the key facts of the lesson and the worked example. If a question is hard, go back to the matching part of the lesson, then try the quiz again. Write your work on scrap paper: most mistakes come from skipping a step, not from the idea itself.

Remember:

- Standards G-SRT.D.9, G-SRT.D.10 and G-SRT.D.11: triangle area with sine, the Law of Sines and the Law of Cosines in applied problems.
- Area: $\frac{1}{2}ab\sin C$; Heron: $\sqrt{s(s-a)(s-b)(s-c)}$ with $s = \frac{a+b+c}{2}$.
- Law of Sines: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$; use it for AAS, ASA and SSA.
- Law of Cosines: $c^2 = a^2 + b^2 - 2ab\cos C$; use it for SAS and SSS.
- SSA can give 0, 1 or 2 triangles, depending on how a compares with $b\sin A$ and b .

How to use this precalculus law sines cosines quiz

Retake this precalculus law sines cosines quiz until every answer is right, then move on to the

worksheet and the test.

