

# Laws of Sines, Laws of Cosines, and Triangle Models

Non-right-triangle trigonometry, triangle area, and applied angle-side models.

Name \_\_\_\_\_ Date \_\_\_\_\_

32 main 2-up grid 2 pages

## Completion Reward



Shown here as a small pack artifact, not a preview destination.

- 1. When is the Law of Sines usually the natural first tool?**

A. When you know all three sides only  
 B. When you know an angle-side opposite pair  
 C. When you know two sides and the included angle  
 D. When you know only the perimeter
- 2. When is the Law of Cosines usually the natural first tool?**

A. When you know a side-opposite-angle pair  
 B. When the triangle is right  
 C. When you know all three angles  
 D. When you know two sides and the included angle
- 3. Which formula gives the area of a triangle using two sides and the included angle?**

A.  $ab \cos(C)$   
 B.  $1/2 ab \sin(C)$   
 C.  $a^2 + b^2$   
 D.  $ab / 2\cos(C)$
- 4. If side a is longer than side b in the same triangle, what must be true?**

A. Angle A is smaller than angle B  
 B. Angle A equals angle B  
 C. Nothing can be said  
 D. Angle A is larger than angle B
- 5. Which setup can lead to the ambiguous SSA case?**

A. Three sides  
 B. Two angles and the included side  
 C. Two sides and a nonincluded angle  
 D. Two sides and the included angle
- 6. If you know all three sides of a triangle, what can the Law of Cosines help you find?**

A. A missing side directly  
 B. The area with no extra information  
 C. An angle  
 D. Whether the triangle is right by definition
- 7. If two angles of a triangle are 50 degrees and 60 degrees, what is the third angle?**

A. 60 degrees  
 B. 80 degrees  
 C. 70 degrees  
 D. 90 degrees
- 8. If angle C is the largest angle of a triangle, what is true about side c?**

A. It is the shortest side  
 B. It equals side a  
 C. It is the longest side  
 D. It must be a right angle
- 9. If you know sides 7 and 9 with included angle 60 degrees, what is the best next step?**

A. Use the Law of Sines immediately  
 B. Assume the triangle is right  
 C. Use the Law of Cosines to find the third side  
 D. Add the two sides
- 10. If you know angles 40 degrees and 75 degrees and side 12 opposite 40 degrees, what is the best next step?**

A. Use the Law of Cosines  
 B. Use the Law of Sines  
 C. Subtract 12 from 180  
 D. Square the side
- 11. If you know angles 52 degrees and 61 degrees and the included side between them, what is the best first step?**

A. Use the Law of Cosines immediately  
 B. Multiply the two angles  
 C. Find the third angle, then use the Law of Sines  
 D. Assume a right triangle
- 12. A student writes  $a / \sin(B) = b / \sin(A)$ . What is wrong?**

A. The sine should be cosine  
 B. The law only works in right triangles  
 C. Each side must pair with its own opposite angle  
 D. Sides should be squared first
- 13. A student uses  $1/2 ab \sin(C)$  with an angle that is not between sides a and b. What is the issue?**

A. The formula needs a right triangle  
 B. The included angle must be between the two named sides  
 C. You should use cosine instead  
 D. Area never uses trig
- 14. A student knows two angles of a triangle and still tries to use the Law of Cosines first. What is the oversight?**

A. The Law of Cosines is forbidden in any triangle with known angles  
 B. Known angles always mean the triangle is right  
 C. The third angle can be found immediately using the 180-degree sum  
 D. Nothing is wrong
- 15. In a triangle, side a = 10 is opposite angle A = 30 degrees. Find side b if angle B = 45 degrees. Round to the nearest tenth. Answer with a number.**
- 16. In a triangle, side a = 12 is opposite angle A = 40 degrees. Find side b if angle B = 70 degrees. Round to the nearest tenth. Answer with a number.**
- 17. In a triangle, side a = 8 is opposite angle A = 30 degrees. Find angle B if side b = 12. Answer with a number.**
- 18. Find side c if a = 7, b = 9, and angle C = 60 degrees. Round to the nearest tenth. Answer with a number.**
- 19. Find side c if a = 5, b = 8, and angle C = 120 degrees. Round to the nearest tenth. Answer with a number.**
- 20. Find angle C if a = 5, b = 7, and c = 8. Round to the nearest tenth of a degree. Answer with a number.**
- 21. Find the area of a triangle with sides 8 and 11 and included angle 30 degrees. Answer with a number.**

22. Find the area of a triangle with sides 10 and 12 and included angle 60 degrees. Round to the nearest tenth. Answer with a number.
23. If two angles of a triangle are 48 degrees and 67 degrees, find the third angle. Answer with a number.
24. In a triangle, angles A = 35 degrees and B = 85 degrees, and side a = 9. Find side b. Round to the nearest tenth. Answer with a number.
25. In a triangle, angles A = 28 degrees and B = 74 degrees, and side a = 6. Find side b. Round to the nearest tenth. Answer with a number.
26. Find side c if a = 11, b = 13, and angle C = 45 degrees. Round to the nearest tenth. Answer with a number.
27. Write the Law of Sines using sides a, b and opposite angles A, B. Answer as an equation.
28. Write the Law of Cosines for side c. Answer as an equation.
29. Write the triangle area formula using sides a, b and included angle C. Answer as an equation.
30. If a = 6, b = 9, and angle C is the included angle, write the equation for  $c^2$ . Answer with both equations.
31. Which proportion correctly applies the Law of Sines if side a = 10 is opposite angle A = 30 degrees and side b is opposite angle B = 45 degrees?
- A.  $10 / \sin(45 \text{ degrees}) = b / \sin(30 \text{ degrees})$   
B.  $10 / \cos(30 \text{ degrees}) = b / \cos(45 \text{ degrees})$   
C.  $10 / 30 = b / 45$   
D.  $10 / \sin(30 \text{ degrees}) = b / \sin(45 \text{ degrees})$
32. Which setup correctly finds the area of a triangle with sides 9 and 12 and included angle 40 degrees?
- A.  $1 / 2(9)(12)\cos(40 \text{ degrees})$   
B.  $9 + 12 + 40$   
C.  $1 / 2(9)(12)\sin(40 \text{ degrees})$   
D.  $(9)(12)\sin(40 \text{ degrees})$