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 | 11 pages | visible side quests

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

1.1. Which situation points most naturally to the Law of Cosines?

A. SAS
B. AAS
C. ASA
D. an opposite side-angle pair

1.2. Which situation points most naturally to the Law of Sines?

A. SSS
B. SAS
C. an angle and its opposite side
D. three sides only

1.3. If you know all three sides of a triangle, what can the Law of Cosines help you find first?

A. an angle
B. the area
C. the perimeter
D. the midline

1.4. If angle C is the largest angle in a triangle, what is true about side c?

A. it is the smallest side
B. it is the largest side
C. it must equal 1
D. it is always opposite angle A

1.5. If you know angles 40 degrees and 75 degrees and side 12 opposite 40 degrees, the best next step is to:

A. use the Law of Sines after finding the third angle
B. use the Law of Cosines immediately
C. square all sides
D. take an inverse tangent

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

2.1. Which situation points most naturally to the Law of Cosines?

A. SAS
B. AAS
C. ASA
D. an opposite side-angle pair

2.2. Which situation points most naturally to the Law of Sines?

A. SSS
B. SAS
C. an angle and its opposite side
D. three sides only

2.3. If you know all three sides of a triangle, what can the Law of Cosines help you find first?

A. an angle
B. the area
C. the perimeter
D. the midline

2.4. If angle C is the largest angle in a triangle, what is true about side c?

A. it is the smallest side
B. it is the largest side
C. it must equal 1
D. it is always opposite angle A

2.5. If you know angles 40 degrees and 75 degrees and side 12 opposite 40 degrees, the best next step is to:

A. use the Law of Sines after finding the third angle
B. use the Law of Cosines immediately
C. square all sides
D. take an inverse tangent

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 / 2cos(C)

3.1. Which formula gives the area of a triangle using two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. 1 / 2 ab cos(C)
D. a^2 + b^2

3.2. Why must the angle in 1 / 2 ab sin(C) be the included angle between a and b?

A. otherwise the two sides do not determine the same height
B. because sine only works for right triangles
C. because the formula becomes a perimeter formula
D. because cosine should always be used instead

3.3. If sides a and b are known along with angle C between them, the best area setup is:

A. 1 / 2 ab sin(C)
B. a^2 + b^2 = c^2
C. a / sin(A) = b / sin(B)
D. c^2 = a^2 + b^2 - 2ab

3.4. If the included angle stays the same and one side doubles, the area will:

A. halve
B. stay the same
C. double
D. become impossible to find

3.5. In the formula 1 / 2 ab sin(C), angle C is opposite:

A. side a
B. side b
C. side c
D. no side

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

4.1. Which tool is natural when you know two sides and the included angle?

A. Law of Sines
B. Law of Cosines
C. Pythagorean Theorem
D. Slope formula

4.2. Which tool is natural when you know an angle and its opposite side?

A. Law of Sines
B. Law of Cosines
C. Distance formula
D. Quadratic formula

4.3. Which formula gives the area from two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. a^2 + b^2
D. 1 / 2 ab cos(C)

4.4. In the same triangle, the longest side is opposite the:

A. smallest angle
B. middle angle
C. largest angle
D. right angle only

4.5. Which setup can create the ambiguous SSA case?

A. two sides and a nonincluded angle
B. three sides
C. two angles and the included side
D. a right triangle only

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

5.1. Which setup can create the ambiguous SSA case?

A. two sides and a nonincluded angle
B. three sides
C. two angles and the included side
D. an isosceles triangle only

5.2. Why can SSA be ambiguous?

A. the given information can allow two different heights
B. the Law of Cosines never works
C. every triangle has two largest angles
D. sine has no inverse

5.3. Which setup does not create the SSA ambiguous case?

A. SAS
B. SSA
C. one side and one angle
D. two sides only

5.4. When given SSA information, what should you remember?

A. there may be 0, 1, or 2 triangles
B. there is always exactly 1 triangle
C. use only the Pythagorean theorem
D. ignore the side-angle matching

5.5. Why is SSA especially tied to the Law of Sines?

A. the Law of Sines uses opposite side-angle pairs
B. the Law of Sines only works for right triangles
C. the Law of Sines removes every angle
D. the Law of Sines gives area directly

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

6.1. Which tool is natural when you know two sides and the included angle?

A. Law of Sines
B. Law of Cosines
C. Pythagorean Theorem
D. Slope formula

6.2. Which tool is natural when you know an angle and its opposite side?

A. Law of Sines
B. Law of Cosines
C. Distance formula
D. Quadratic formula

6.3. Which formula gives the area from two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. a^2 + b^2
D. 1 / 2 ab cos(C)

6.4. In the same triangle, the longest side is opposite the:

A. smallest angle
B. middle angle
C. largest angle
D. right angle only

6.5. Which setup can create the ambiguous SSA case?

A. two sides and a nonincluded angle
B. three sides
C. two angles and the included side
D. a right triangle only

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

7.1. If two angles of a triangle are 50 degrees and 60 degrees, what is the third angle?

A. 60
B. 70
C. 80
D. 90

7.2. If side a = 10 is opposite angle A = 30 degrees and angle B = 90 degrees, then side b should be:

A. less than 10
B. equal to 10
C. greater than 10
D. negative

7.3. To find side b when a = 12, A = 40 degrees, and B = 70 degrees, which setup is correct?

A. 12 / sin(70 degrees) = b / sin(40 degrees)
B. 12 / sin(40 degrees) = b / sin(70 degrees)
C. 12 / 70 = b / 40
D. 12 / cos(40 degrees) = b / cos(70 degrees)

7.4. If you know sides 7 and 9 with included angle 60 degrees, the first quantity you can find directly is:

A. the third side using the Law of Cosines
B. the area only
C. all three angles at once
D. the inradius

7.5. Which ratio is correctly matched for the Law of Sines?

A. a / sin(B) = b / sin(A)
B. a / sin(A) = b / sin(B)
C. a / cos(A) = b / cos(B)
D. a / tan(A) = b / tan(B)

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

8.1. Which situation points most naturally to the Law of Cosines?

A. SAS
B. AAS
C. ASA
D. an opposite side-angle pair

8.2. Which situation points most naturally to the Law of Sines?

A. SSS
B. SAS
C. an angle and its opposite side
D. three sides only

8.3. If you know all three sides of a triangle, what can the Law of Cosines help you find first?

A. an angle
B. the area
C. the perimeter
D. the midline

8.4. If angle C is the largest angle in a triangle, what is true about side c?

A. it is the smallest side
B. it is the largest side
C. it must equal 1
D. it is always opposite angle A

8.5. If you know angles 40 degrees and 75 degrees and side 12 opposite 40 degrees, the best next step is to:

A. use the Law of Sines after finding the third angle
B. use the Law of Cosines immediately
C. square all sides
D. take an inverse tangent

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

9.1. Which formula gives the area of a triangle using two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. 1 / 2 ab cos(C)
D. a^2 + b^2

9.2. Why must the angle in 1 / 2 ab sin(C) be the included angle between a and b?

A. otherwise the two sides do not determine the same height
B. because sine only works for right triangles
C. because the formula becomes a perimeter formula
D. because cosine should always be used instead

9.3. If sides a and b are known along with angle C between them, the best area setup is:

A. 1 / 2 ab sin(C)
B. a^2 + b^2 = c^2
C. a / sin(A) = b / sin(B)
D. c^2 = a^2 + b^2 - 2ab

9.4. If the included angle stays the same and one side doubles, the area will:

A. halve
B. stay the same
C. double
D. become impossible to find

9.5. In the formula 1 / 2 ab sin(C), angle C is opposite:

A. side a
B. side b
C. side c
D. no side

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

10.1. Which situation points most naturally to the Law of Cosines?

A. SAS
B. AAS
C. ASA
D. an opposite side-angle pair

10.2. Which situation points most naturally to the Law of Sines?

A. SSS
B. SAS
C. an angle and its opposite side
D. three sides only

10.3. If you know all three sides of a triangle, what can the Law of Cosines help you find first?

A. an angle
B. the area
C. the perimeter
D. the midline

10.4. If angle C is the largest angle in a triangle, what is true about side c?

A. it is the smallest side
B. it is the largest side
C. it must equal 1
D. it is always opposite angle A

10.5. If you know angles 40 degrees and 75 degrees and side 12 opposite 40 degrees, the best next step is to:

A. use the Law of Sines after finding the third angle
B. use the Law of Cosines immediately
C. square all sides
D. take an inverse tangent

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

11.1. Which tool is natural when you know two sides and the included angle?

A. Law of Sines
B. Law of Cosines
C. Pythagorean Theorem
D. Slope formula

11.2. Which tool is natural when you know an angle and its opposite side?

A. Law of Sines
B. Law of Cosines
C. Distance formula
D. Quadratic formula

11.3. Which formula gives the area from two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. a^2 + b^2
D. 1 / 2 ab cos(C)

11.4. In the same triangle, the longest side is opposite the:

A. smallest angle
B. middle angle
C. largest angle
D. right angle only

11.5. Which setup can create the ambiguous SSA case?

A. two sides and a nonincluded angle
B. three sides
C. two angles and the included side
D. a right triangle only

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

12.1. Which tool is natural when you know two sides and the included angle?

A. Law of Sines
B. Law of Cosines
C. Pythagorean Theorem
D. Slope formula

12.2. Which tool is natural when you know an angle and its opposite side?

A. Law of Sines
B. Law of Cosines
C. Distance formula
D. Quadratic formula

12.3. Which formula gives the area from two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. a^2 + b^2
D. 1 / 2 ab cos(C)

12.4. In the same triangle, the longest side is opposite the:

A. smallest angle
B. middle angle
C. largest angle
D. right angle only

12.5. Which setup can create the ambiguous SSA case?

A. two sides and a nonincluded angle
B. three sides
C. two angles and the included side
D. a right triangle only

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

13.1. Which formula gives the area of a triangle using two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. 1 / 2 ab cos(C)
D. a^2 + b^2

13.2. Why must the angle in 1 / 2 ab sin(C) be the included angle between a and b?

A. otherwise the two sides do not determine the same height
B. because sine only works for right triangles
C. because the formula becomes a perimeter formula
D. because cosine should always be used instead

13.3. If sides a and b are known along with angle C between them, the best area setup is:

A. 1 / 2 ab sin(C)
B. a^2 + b^2 = c^2
C. a / sin(A) = b / sin(B)
D. c^2 = a^2 + b^2 - 2ab

13.4. If the included angle stays the same and one side doubles, the area will:

A. halve
B. stay the same
C. double
D. become impossible to find

13.5. In the formula 1 / 2 ab sin(C), angle C is opposite:

A. side a
B. side b
C. side c
D. no side

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

14.1. Which tool is natural when you know two sides and the included angle?

A. Law of Sines
B. Law of Cosines
C. Pythagorean Theorem
D. Slope formula

14.2. Which tool is natural when you know an angle and its opposite side?

A. Law of Sines
B. Law of Cosines
C. Distance formula
D. Quadratic formula

14.3. Which formula gives the area from two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. a^2 + b^2
D. 1 / 2 ab cos(C)

14.4. In the same triangle, the longest side is opposite the:

A. smallest angle
B. middle angle
C. largest angle
D. right angle only

14.5. Which setup can create the ambiguous SSA case?

A. two sides and a nonincluded angle
B. three sides
C. two angles and the included side
D. a right triangle only

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.

15.1. If two angles of a triangle are 50 degrees and 60 degrees, what is the third angle?

A. 60
B. 70
C. 80
D. 90

15.2. If side a = 10 is opposite angle A = 30 degrees and angle B = 90 degrees, then side b should be:

A. less than 10
B. equal to 10
C. greater than 10
D. negative

15.3. To find side b when a = 12, A = 40 degrees, and B = 70 degrees, which setup is correct?

A. 12 / sin(70 degrees) = b / sin(40 degrees)
B. 12 / sin(40 degrees) = b / sin(70 degrees)
C. 12 / 70 = b / 40
D. 12 / cos(40 degrees) = b / cos(70 degrees)

15.4. If you know sides 7 and 9 with included angle 60 degrees, the first quantity you can find directly is:

A. the third side using the Law of Cosines
B. the area only
C. all three angles at once
D. the inradius

15.5. Which ratio is correctly matched for the Law of Sines?

A. a / sin(B) = b / sin(A)
B. a / sin(A) = b / sin(B)
C. a / cos(A) = b / cos(B)
D. a / tan(A) = b / tan(B)

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.

16.1. If two angles of a triangle are 50 degrees and 60 degrees, what is the third angle?

A. 60
B. 70
C. 80
D. 90

16.2. If side a = 10 is opposite angle A = 30 degrees and angle B = 90 degrees, then side b should be:

A. less than 10
B. equal to 10
C. greater than 10
D. negative

16.3. To find side b when a = 12, A = 40 degrees, and B = 70 degrees, which setup is correct?

A. 12 / sin(70 degrees) = b / sin(40 degrees)
B. 12 / sin(40 degrees) = b / sin(70 degrees)
C. 12 / 70 = b / 40
D. 12 / cos(40 degrees) = b / cos(70 degrees)

16.4. If you know sides 7 and 9 with included angle 60 degrees, the first quantity you can find directly is:

A. the third side using the Law of Cosines
B. the area only
C. all three angles at once
D. the inradius

16.5. Which ratio is correctly matched for the Law of Sines?

A. a / sin(B) = b / sin(A)
B. a / sin(A) = b / sin(B)
C. a / cos(A) = b / cos(B)
D. a / tan(A) = b / tan(B)

17. In a triangle, side a = 8 is opposite angle A = 30 degrees. Find angle B if side b = 12. Answer with a number.

17.1. Which tool is natural when you know two sides and the included angle?

A. Law of Sines
B. Law of Cosines
C. Pythagorean Theorem
D. Slope formula

17.2. Which tool is natural when you know an angle and its opposite side?

A. Law of Sines
B. Law of Cosines
C. Distance formula
D. Quadratic formula

17.3. Which formula gives the area from two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. a^2 + b^2
D. 1 / 2 ab cos(C)

17.4. In the same triangle, the longest side is opposite the:

A. smallest angle
B. middle angle
C. largest angle
D. right angle only

17.5. Which setup can create the ambiguous SSA case?

A. two sides and a nonincluded angle
B. three sides
C. two angles and the included side
D. a right triangle only

18. Find side c if a = 7, b = 9, and angle C = 60 degrees. Round to the nearest tenth. Answer with a number.

18.1. If two angles of a triangle are 50 degrees and 60 degrees, what is the third angle?

A. 60
B. 70
C. 80
D. 90

18.2. If side a = 10 is opposite angle A = 30 degrees and angle B = 90 degrees, then side b should be:

A. less than 10
B. equal to 10
C. greater than 10
D. negative

18.3. To find side b when a = 12, A = 40 degrees, and B = 70 degrees, which setup is correct?

A. 12 / sin(70 degrees) = b / sin(40 degrees)
B. 12 / sin(40 degrees) = b / sin(70 degrees)
C. 12 / 70 = b / 40
D. 12 / cos(40 degrees) = b / cos(70 degrees)

18.4. If you know sides 7 and 9 with included angle 60 degrees, the first quantity you can find directly is:

A. the third side using the Law of Cosines
B. the area only
C. all three angles at once
D. the inradius

18.5. Which ratio is correctly matched for the Law of Sines?

A. a / sin(B) = b / sin(A)
B. a / sin(A) = b / sin(B)
C. a / cos(A) = b / cos(B)
D. a / tan(A) = b / tan(B)

19. Find side c if a = 5, b = 8, and angle C = 120 degrees. Round to the nearest tenth. Answer with a number.

19.1. If two angles of a triangle are 50 degrees and 60 degrees, what is the third angle?

A. 60
B. 70
C. 80
D. 90

19.2. If side a = 10 is opposite angle A = 30 degrees and angle B = 90 degrees, then side b should be:

A. less than 10
B. equal to 10
C. greater than 10
D. negative

19.3. To find side b when a = 12, A = 40 degrees, and B = 70 degrees, which setup is correct?

A. 12 / sin(70 degrees) = b / sin(40 degrees)
B. 12 / sin(40 degrees) = b / sin(70 degrees)
C. 12 / 70 = b / 40
D. 12 / cos(40 degrees) = b / cos(70 degrees)

19.4. If you know sides 7 and 9 with included angle 60 degrees, the first quantity you can find directly is:

A. the third side using the Law of Cosines
B. the area only
C. all three angles at once
D. the inradius

19.5. Which ratio is correctly matched for the Law of Sines?

A. a / sin(B) = b / sin(A)
B. a / sin(A) = b / sin(B)
C. a / cos(A) = b / cos(B)
D. a / tan(A) = b / tan(B)

20. Find angle C if a = 5, b = 7, and c = 8. Round to the nearest tenth of a degree. Answer with a number.

20.1. Which tool is natural when you know two sides and the included angle?

A. Law of Sines
B. Law of Cosines
C. Pythagorean Theorem
D. Slope formula

20.2. Which tool is natural when you know an angle and its opposite side?

A. Law of Sines
B. Law of Cosines
C. Distance formula
D. Quadratic formula

20.3. Which formula gives the area from two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. a^2 + b^2
D. 1 / 2 ab cos(C)

20.4. In the same triangle, the longest side is opposite the:

A. smallest angle
B. middle angle
C. largest angle
D. right angle only

20.5. Which setup can create the ambiguous SSA case?

A. two sides and a nonincluded angle
B. three sides
C. two angles and the included side
D. a right triangle only

21. Find the area of a triangle with sides 8 and 11 and included angle 30 degrees. Answer with a number.

21.1. Which formula gives the area of a triangle using two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. 1 / 2 ab cos(C)
D. a^2 + b^2

21.2. Why must the angle in 1 / 2 ab sin(C) be the included angle between a and b?

A. otherwise the two sides do not determine the same height
B. because sine only works for right triangles
C. because the formula becomes a perimeter formula
D. because cosine should always be used instead

21.3. If sides a and b are known along with angle C between them, the best area setup is:

A. 1 / 2 ab sin(C)
B. a^2 + b^2 = c^2
C. a / sin(A) = b / sin(B)
D. c^2 = a^2 + b^2 - 2ab

21.4. If the included angle stays the same and one side doubles, the area will:

A. halve
B. stay the same
C. double
D. become impossible to find

21.5. In the formula 1 / 2 ab sin(C), angle C is opposite:

A. side a
B. side b
C. side c
D. no side

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.**

22.1. Which formula gives the area of a triangle using two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. 1 / 2 ab cos(C)
D. a^2 + b^2

22.2. Why must the angle in 1 / 2 ab sin(C) be the included angle between a and b?

A. otherwise the two sides do not determine the same height
B. because sine only works for right triangles
C. because the formula becomes a perimeter formula
D. because cosine should always be used instead

22.3. If sides a and b are known along with angle C between them, the best area setup is:

A. 1 / 2 ab sin(C)
B. a^2 + b^2 = c^2
C. a / sin(A) = b / sin(B)
D. c^2 = a^2 + b^2 - 2ab

22.4. If the included angle stays the same and one side doubles, the area will:

A. halve
B. stay the same
C. double
D. become impossible to find

22.5. In the formula 1 / 2 ab sin(C), angle C is opposite:

A. side a
B. side b
C. side c
D. no side

23. **If two angles of a triangle are 48 degrees and 67 degrees, find the third angle. Answer with a number.**

23.1. If two angles of a triangle are 50 degrees and 60 degrees, what is the third angle?

A. 60
B. 70
C. 80
D. 90

23.2. If side a = 10 is opposite angle A = 30 degrees and angle B = 90 degrees, then side b should be:

A. less than 10
B. equal to 10
C. greater than 10
D. negative

23.3. To find side b when a = 12, A = 40 degrees, and B = 70 degrees, which setup is correct?

A. 12 / sin(70 degrees) = b / sin(40 degrees)
B. 12 / sin(40 degrees) = b / sin(70 degrees)
C. 12 / 70 = b / 40
D. 12 / cos(40 degrees) = b / cos(70 degrees)

23.4. If you know sides 7 and 9 with included angle 60 degrees, the first quantity you can find directly is:

A. the third side using the Law of Cosines
B. the area only
C. all three angles at once
D. the inradius

23.5. Which ratio is correctly matched for the Law of Sines?

A. a / sin(B) = b / sin(A)
B. a / sin(A) = b / sin(B)
C. a / cos(A) = b / cos(B)
D. a / tan(A) = b / tan(B)

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.**

24.1. If two angles of a triangle are 50 degrees and 60 degrees, what is the third angle?

A. 60
B. 70
C. 80
D. 90

24.2. If side a = 10 is opposite angle A = 30 degrees and angle B = 90 degrees, then side b should be:

A. less than 10
B. equal to 10
C. greater than 10
D. negative

24.3. To find side b when a = 12, A = 40 degrees, and B = 70 degrees, which setup is correct?

A. 12 / sin(70 degrees) = b / sin(40 degrees)
B. 12 / sin(40 degrees) = b / sin(70 degrees)
C. 12 / 70 = b / 40
D. 12 / cos(40 degrees) = b / cos(70 degrees)

24.4. If you know sides 7 and 9 with included angle 60 degrees, the first quantity you can find directly is:

A. the third side using the Law of Cosines
B. the area only
C. all three angles at once
D. the inradius

24.5. Which ratio is correctly matched for the Law of Sines?

A. a / sin(B) = b / sin(A)
B. a / sin(A) = b / sin(B)
C. a / cos(A) = b / cos(B)
D. a / tan(A) = b / tan(B)

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.

25.1. If two angles of a triangle are 50 degrees and 60 degrees, what is the third angle?

A. 60
B. 70
C. 80
D. 90

25.2. If side a = 10 is opposite angle A = 30 degrees and angle B = 90 degrees, then side b should be:

A. less than 10
B. equal to 10
C. greater than 10
D. negative

25.3. To find side b when a = 12, A = 40 degrees, and B = 70 degrees, which setup is correct?

A. 12 / sin(70 degrees) = b / sin(40 degrees)
B. 12 / sin(40 degrees) = b / sin(70 degrees)
C. 12 / 70 = b / 40
D. 12 / cos(40 degrees) = b / cos(70 degrees)

25.4. If you know sides 7 and 9 with included angle 60 degrees, the first quantity you can find directly is:

A. the third side using the Law of Cosines
B. the area only
C. all three angles at once
D. the inradius

25.5. Which ratio is correctly matched for the Law of Sines?

A. a / sin(B) = b / sin(A)
B. a / sin(A) = b / sin(B)
C. a / cos(A) = b / cos(B)
D. a / tan(A) = b / tan(B)

26. Find side c if a = 11, b = 13, and angle C = 45 degrees. Round to the nearest tenth. Answer with a number.

26.1. If two angles of a triangle are 50 degrees and 60 degrees, what is the third angle?

A. 60
B. 70
C. 80
D. 90

26.2. If side a = 10 is opposite angle A = 30 degrees and angle B = 90 degrees, then side b should be:

A. less than 10
B. equal to 10
C. greater than 10
D. negative

26.3. To find side b when a = 12, A = 40 degrees, and B = 70 degrees, which setup is correct?

A. 12 / sin(70 degrees) = b / sin(40 degrees)
B. 12 / sin(40 degrees) = b / sin(70 degrees)
C. 12 / 70 = b / 40
D. 12 / cos(40 degrees) = b / cos(70 degrees)

26.4. If you know sides 7 and 9 with included angle 60 degrees, the first quantity you can find directly is:

A. the third side using the Law of Cosines
B. the area only
C. all three angles at once
D. the inradius

26.5. Which ratio is correctly matched for the Law of Sines?

A. a / sin(B) = b / sin(A)
B. a / sin(A) = b / sin(B)
C. a / cos(A) = b / cos(B)
D. a / tan(A) = b / tan(B)

27. Write the Law of Sines using sides a, b and opposite angles A, B. Answer as an equation.

27.1. Which tool is natural when you know two sides and the included angle?

A. Law of Sines
B. Law of Cosines
C. Pythagorean Theorem
D. Slope formula

27.2. Which tool is natural when you know an angle and its opposite side?

A. Law of Sines
B. Law of Cosines
C. Distance formula
D. Quadratic formula

27.3. Which formula gives the area from two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. a^2 + b^2
D. 1 / 2 ab cos(C)

27.4. In the same triangle, the longest side is opposite the:

A. smallest angle
B. middle angle
C. largest angle
D. right angle only

27.5. Which setup can create the ambiguous SSA case?

A. two sides and a nonincluded angle
B. three sides
C. two angles and the included side
D. a right triangle only

28. Write the Law of Cosines for side c. Answer as an equation.

28.1. Which tool is natural when you know two sides and the included angle?

A. Law of Sines
B. Law of Cosines
C. Pythagorean Theorem
D. Slope formula

28.2. Which tool is natural when you know an angle and its opposite side?

A. Law of Sines
B. Law of Cosines
C. Distance formula
D. Quadratic formula

28.3. Which formula gives the area from two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. a^2 + b^2
D. 1 / 2 ab cos(C)

28.4. In the same triangle, the longest side is opposite the:

A. smallest angle
B. middle angle
C. largest angle
D. right angle only

28.5. Which setup can create the ambiguous SSA case?

A. two sides and a nonincluded angle
B. three sides
C. two angles and the included side
D. a right triangle only

29. Write the triangle area formula using sides a, b and included angle C. Answer as an equation.

29.1. Which formula gives the area of a triangle using two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. 1 / 2 ab cos(C)
D. a^2 + b^2

29.2. Why must the angle in 1 / 2 ab sin(C) be the included angle between a and b?

A. otherwise the two sides do not determine the same height
B. because sine only works for right triangles
C. because the formula becomes a perimeter formula
D. because cosine should always be used instead

29.3. If sides a and b are known along with angle C between them, the best area setup is:

A. 1 / 2 ab sin(C)
B. a^2 + b^2 = c^2
C. a / sin(A) = b / sin(B)
D. c^2 = a^2 + b^2 - 2ab

29.4. If the included angle stays the same and one side doubles, the area will:

A. halve
B. stay the same
C. double
D. become impossible to find

29.5. In the formula 1 / 2 ab sin(C), angle C is opposite:

A. side a
B. side b
C. side c
D. no side

30. If a = 6, b = 9, and angle C is the included angle, write the equation for c^2. Answer with both equations.

30.1. Which formula gives the area of a triangle using two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. 1 / 2 ab cos(C)
D. a^2 + b^2

30.2. Why must the angle in 1 / 2 ab sin(C) be the included angle between a and b?

A. otherwise the two sides do not determine the same height
B. because sine only works for right triangles
C. because the formula becomes a perimeter formula
D. because cosine should always be used instead

30.3. If sides a and b are known along with angle C between them, the best area setup is:

A. 1 / 2 ab sin(C)
B. a^2 + b^2 = c^2
C. a / sin(A) = b / sin(B)
D. c^2 = a^2 + b^2 - 2ab

30.4. If the included angle stays the same and one side doubles, the area will:

A. halve
B. stay the same
C. double
D. become impossible to find

30.5. In the formula 1 / 2 ab sin(C), angle C is opposite:

A. side a
B. side b
C. side c
D. no side

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 degrees) = b / sin(30 degrees)
B. 10 / cos(30 degrees) = b / cos(45 degrees)
C. 10 / 30 = b / 45
D. 10 / sin(30 degrees) = b / sin(45 degrees)

31.1. Which tool is natural when you know two sides and the included angle?

A. Law of Sines
B. Law of Cosines
C. Pythagorean Theorem
D. Slope formula

31.2. Which tool is natural when you know an angle and its opposite side?

A. Law of Sines
B. Law of Cosines
C. Distance formula
D. Quadratic formula

31.3. Which formula gives the area from two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. a^2 + b^2
D. 1 / 2 ab cos(C)

31.4. In the same triangle, the longest side is opposite the:

A. smallest angle
B. middle angle
C. largest angle
D. right angle only

31.5. Which setup can create the ambiguous SSA case?

A. two sides and a nonincluded angle
B. three sides
C. two angles and the included side
D. a right triangle only

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 degrees)
B. 9 + 12 + 40
C. 1 / 2(9)(12)sin(40 degrees)
D. (9)(12)sin(40 degrees)

32.1. Which formula gives the area of a triangle using two sides and the included angle?

A. ab sin(C)
B. 1 / 2 ab sin(C)
C. 1 / 2 ab cos(C)
D. a^2 + b^2

32.2. Why must the angle in 1 / 2 ab sin(C) be the included angle between a and b?

A. otherwise the two sides do not determine the same height
B. because sine only works for right triangles
C. because the formula becomes a perimeter formula
D. because cosine should always be used instead

32.3. If sides a and b are known along with angle C between them, the best area setup is:

A. 1 / 2 ab sin(C)
B. a^2 + b^2 = c^2
C. a / sin(A) = b / sin(B)
D. c^2 = a^2 + b^2 - 2ab

32.4. If the included angle stays the same and one side doubles, the area will:

A. halve
B. stay the same
C. double
D. become impossible to find

32.5. In the formula 1 / 2 ab sin(C), angle C is opposite:

A. side a
B. side b
C. side c
D. no side