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Law Of Sines And Cosines Worksheet Questions and Answers PDF

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Part 1: Foundational Knowledge

What is the formula for the Law of Sines?

Hint: Think about the relationship between the sides and angles of a triangle.

- ◯ A) $a^2 + b^2 = c^2$
- ◯ **B) $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$** ✓
- ◯ C) $a^2 = b^2 + c^2 - 2bc \cdot \cos A$
- ◯ D) $\sin A + \sin B + \sin C = 1$

> The formula for the Law of Sines is $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$.

Which of the following are formulas for the Law of Cosines?

Hint: Recall the formulas that relate the sides of a triangle to its angles.

- ☐ **A) $c^2 = a^2 + b^2 - 2ab \cdot \cos C$** ✓
- ☐ **B) $b^2 = a^2 + c^2 - 2ac \cdot \cos B$** ✓
- ☐ C) $a^2 + b^2 = c^2$
- ☐ **D) $a^2 = b^2 + c^2 - 2bc \cdot \cos A$** ✓

> The formulas for the Law of Cosines include $c^2 = a^2 + b^2 - 2ab \cdot \cos C$, $b^2 = a^2 + c^2 - 2ac \cdot \cos B$, and $a^2 = b^2 + c^2 - 2bc \cdot \cos A$.

Explain in your own words what the Law of Sines is used for in solving triangles.

Hint: Consider how the Law of Sines relates angles and sides.

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> **The Law of Sines is used to find unknown angles or sides in a triangle when certain angles and sides are known.**

List the types of triangles based on their angles.

Hint: Think about the classifications of triangles.

1. What is an acute triangle?

> A triangle with all angles less than 90 degrees.

2. What is a right triangle?

> A triangle with one angle equal to 90 degrees.

3. What is an obtuse triangle?

> A triangle with one angle greater than 90 degrees.

> The types of triangles based on their angles are acute, right, and obtuse.

Part 2: Comprehension

In which type of triangle can the Law of Sines be applied?

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Hint: Consider the types of triangles that can be solved using this law.

○ A) Only right triangles
○ B) Only acute triangles
○ C) Only obtuse triangles
○ **D) Any triangle** ✓

> The Law of Sines can be applied to any triangle.

Which of the following statements about the Law of Cosines are true?

Hint: Think about the properties and applications of the Law of Cosines.

☐ **A) It can be used to find an angle when all three sides are known.** ✓
☐ B) It is only applicable to right triangles.
☐ **C) It relates the sides of a triangle to the cosine of one of its angles.** ✓
☐ **D) It can be used to find a side when two sides and the included angle are known.** ✓

> The true statements about the Law of Cosines include that it can be used to find an angle when all three sides are known, it relates the sides of a triangle to the cosine of one of its angles, and it can be used to find a side when two sides and the included angle are known.

Describe a real-world scenario where the Law of Sines might be useful.

Hint: Think about situations involving triangles in real life.

> **The Law of Sines can be useful in navigation, architecture, and various fields of engineering where triangle measurements are needed.**

Part 3: Application and Analysis

Given a triangle with sides $a = 7$, $b = 10$, and angle $C = 45^\circ$, which law would you use to find side c?

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Hint: Consider which law relates sides and angles in this scenario.

⚪ A) Law of Sines
⚪ **B) Law of Cosines ✓**
⚪ C) Pythagorean Theorem
⚪ D) None of the above

> You would use the Law of Cosines to find side c in this triangle.

If you know two angles and one side of a triangle, which methods can you use to find the remaining sides?

Hint: Think about the laws that apply to triangles with known angles.

☐ **A) Law of Sines ✓**
☐ B) Law of Cosines
☐ **C) Trigonometric Ratios ✓**
☐ D) Pythagorean Theorem

> You can use the Law of Sines and Trigonometric Ratios to find the remaining sides.

Solve for the unknown side c in a triangle where $a = 5$, $b = 8$, and $C = 60^\circ$ using the Law of Cosines.

Hint: Use the Law of Cosines formula to find the value of c.

> **Using the Law of Cosines, you can calculate c by substituting the known values into the formula.**

Which law would be more efficient to use when given two sides and the included angle of a triangle?

Hint: Consider which law is best suited for this type of information.

⚪ A) Law of Sines
⚪ **B) Law of Cosines ✓**
⚪ C) Both are equally efficient

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⭘ D) Neither

| The Law of Cosines would be more efficient to use in this scenario.

Compare and contrast the Law of Sines and the Law of Cosines in terms of their application and usefulness.

Hint: Think about the scenarios where each law is most applicable.

The Law of Sines is useful for finding unknown angles or sides when two angles and one side are known, while the Law of Cosines is more applicable when two sides and the included angle are known.

Part 4: Evaluation and Creation

Which of the following best describes the advantage of using the Law of Cosines over the Law of Sines?

Hint: Consider the scenarios where one law may be more beneficial than the other.

⭘ A) It is simpler to calculate.
⭘ **B) It can be used in any triangle without angle restrictions.** ✓
⭘ C) It requires fewer known values.
⭘ D) It is only applicable to right triangles.

| The Law of Cosines can be used in any triangle without angle restrictions, which is a significant advantage.

Evaluate the following statements and identify which are true regarding the application of the Law of Sines and Cosines:

Hint: Think critically about the statements and their validity.

☐ **A) Both laws can be used to solve any triangle.** ✓

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☑ **B) The Law of Sines is preferred when two angles are known. ✓**

☑ **C) The Law of Cosines is necessary when all sides are known. ✓**

☐ D) The Law of Sines is only applicable to right triangles.

> The true statements include that both laws can be used to solve any triangle, the Law of Sines is preferred when two angles are known, and the Law of Cosines is necessary when all sides are known.

Create a real-world problem that involves using both the Law of Sines and the Law of Cosines to find missing measurements in a triangle. Describe the scenario and outline the steps to solve it.

Hint: Think about a practical application of these laws in a real-world context.

> **A real-world problem could involve navigation or construction, where both laws are needed to find unknown measurements.**

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