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Unit Circle Worksheet

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Part 1: Foundational Knowledge

What is the radius of the unit circle?

Hint: Think about the definition of the unit circle.

◯ A) 0
◯ A) 0.5
◯ C) 1
◯ D) 2

Which of the following angles are commonly used in the unit circle? (Select all that apply)

Hint: Consider the special angles in trigonometry.

☐ A) 30°
☐ A) 45°
☐ C) 75°
☐ D) 90°

Define the unit circle and explain its significance in trigonometry.

Hint: Consider its definition and applications.

List the sine and cosine values for the angle 0° on the unit circle.

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Hint: Recall the coordinates of points on the unit circle.

1. Sine value for 0°

[   ]

2. Cosine value for 0°

[   ]

Part 2: Understanding Concepts

What is the sine of 90° on the unit circle?

Hint: Think about the coordinates at this angle.

○ A) 0
○ A) 0.5
○ C) 1
○ D) -1

Which of the following statements about the unit circle are true? (Select all that apply)

Hint: Consider the definitions of sine and cosine.

☐ A) The x-coordinate represents the sine of the angle.
☐ A) The y-coordinate represents the cosine of the angle.
☐ C) The radius is always 1.
☐ D) The circle is centered at the origin.

Explain how the unit circle helps in converting degrees to radians.

Hint: Think about the relationship between angles and their measures.

[   ]

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Part 3: Applying Knowledge

If the cosine of an angle is 0.5, what is the angle in degrees?

Hint: Recall the angles associated with common cosine values.

○ A) 30°
○ A) 45°
○ C) 60°
○ D) 90°

Which angles in the unit circle have a tangent value of 1? (Select all that apply)

Hint: Consider the angles where sine and cosine are equal.

☐ A) 45°
☐ A) 135°
☐ C) 225°
☐ D) 315°

Calculate the sine and cosine values for 60° and explain the process.

Hint: Use the unit circle to find these values.

Part 4: Analyzing Relationships

In which quadrant is the angle 150° located, and what are the signs of its sine and cosine?

Hint: Consider the angle's position relative to the axes.

○ A) Quadrant I, both positive
○ A) Quadrant II, sine positive, cosine negative
○ C) Quadrant III, both negative

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◯ D) Quadrant IV, sine negative, cosine positive

Analyze the symmetry of the unit circle and identify which of the following angles have the same sine value. (Select all that apply)

Hint: Consider the properties of sine in different quadrants.

☐ A) 30°
☐ A) 150°
☐ C) 210°
☐ D) 330°

Discuss how the unit circle can be used to determine the trigonometric values of angles greater than 360°.

Hint: Think about the periodic nature of trigonometric functions.

Part 5: Synthesis and Reflection

Evaluate the following statement: "The unit circle can only be used for angles between 0° and 360°." Is this statement true or false?

Hint: Consider the properties of the unit circle.

◯ A) True
◯ A) False
◯ C) Not applicable
◯ D) Only for positive angles

Consider a real-world scenario where the unit circle is used to model periodic phenomena. Which of the following could be modeled using the unit circle? (Select all that apply)

Hint: Think about phenomena that repeat over time.

☐ A) The motion of a Ferris wheel

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☐ A) The phases of the moon
☐ C) The growth of a plant
☐ D) The sound waves of a musical note

Create a real-world problem that involves using the unit circle to solve a trigonometric equation, and provide a step-by-step solution.

Hint: Think about a scenario involving angles and distances.

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