

## Sine and Cosine Quiz Answer Key PDF

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**Describe a real-world application where sine and cosine functions are used to model periodic phenomena.**

**One real-world application of sine and cosine functions is in modeling sound waves, where the amplitude and frequency of the wave can be represented using these trigonometric functions to describe how sound varies over time.**

**How does the phase shift affect the graph of a cosine function? Provide an example with a sketch.**

**The phase shift affects the graph of a cosine function by shifting it horizontally. For example, the function  $y = \cos(x - \pi/2)$  has a phase shift of  $\pi/2$  to the right, resulting in the graph starting at  $(0, 0)$  instead of  $(0, 1)$ .**

**Explain the significance of the Pythagorean identity in trigonometry.**

**The significance of the Pythagorean identity in trigonometry lies in its role as a foundational relationship that connects the sine and cosine functions, allowing for the derivation of other trigonometric identities and facilitating problem-solving in geometry and calculus.**

**How do you convert an angle from degrees to radians? Provide a formula and an example.**

**To convert an angle from degrees to radians, use the formula:  $\text{radians} = \text{degrees} \times (\pi / 180)$ . For example, 90 degrees is  $\pi/2$  radians.**

**Which transformation affects the amplitude of a sine wave?**

- A.  $y = \sin(x + C)$
- B.  $y = A \cdot \sin(x)$  ✓**
- C.  $y = \sin(Bx)$
- D.  $y = \sin(x) + D$

**Which of the following are properties of the sine function?**

- A. Periodic with period  $2\pi$  ✓**
- B. Range  $[-1, 1]$  ✓**
- C. Symmetric about the y-axis
- D. Maximum value at  $\pi$

**What is the cosine of  $0^\circ$  or 0 radians?**

- A. 0
- B. 1 ✓**
- C. -1
- D.  $\sqrt{2}/2$

**Which angles have a cosine value of 0?**

- A.  $90^\circ$  or  $\pi/2$  ✓**
- B.  $180^\circ$  or  $\pi$
- C.  $270^\circ$  or  $3\pi/2$  ✓**
- D.  $360^\circ$  or  $2\pi$

**What is the period of the cosine function?**

- A.  $\pi$
- B.  $2\pi$  ✓**
- C.  $4\pi$
- D.  $\pi/2$

**What is the sine of  $90^\circ$  or  $\pi/2$  radians?**

- A. 0
- B. 1 ✓**
- C. -1
- D.  $\sqrt{2}/2$

**Which transformations affect the period of a sine wave?**

- A.  $y = \sin(x + C)$
- B.  $y = A \cdot \sin(x)$
- C.  $y = \sin(Bx)$  ✓**
- D.  $y = \sin(x) + D$

Which of the following is the Pythagorean identity?

- A.  $\sin(x) + \cos(x) = 1$
- B.  $\sin^2(x) + \cos^2(x) = 1$  ✓**
- C.  $\sin(x) \cdot \cos(x) = 1$
- D.  $\sin(x) - \cos(x) = 1$

Which of the following are double angle formulas?

- A.  $\sin(2x) = 2\sin(x)\cos(x)$  ✓**
- B.  $\cos(2x) = \cos^2(x) - \sin^2(x)$  ✓**
- C.  $\sin(2x) = \sin^2(x) + \cos^2(x)$
- D.  $\cos(2x) = 1 - 2\sin^2(x)$  ✓**

Explain how the unit circle is used to define the sine and cosine functions for all angles.

The unit circle is a circle with a radius of 1 centered at the origin of a coordinate plane. For any angle  $\theta$ , the coordinates of the point where the terminal side of the angle intersects the unit circle are  $(\cos(\theta), \sin(\theta))$ , thus defining the sine and cosine functions for all angles.

Describe the effect of a vertical shift on the graph of a sine function.

A vertical shift affects the graph of a sine function by translating it vertically; for example, the function  $y = \sin(x) + k$  shifts the graph up by  $k$  units if  $k$  is positive, or down by  $k$  units if  $k$  is negative.

What is the cosine of  $180^\circ$  or  $\pi$  radians?

- A. 0
- B. 1
- C. -1 ✓**

D.  $\sqrt{2}/2$

**In which quadrant is the sine function positive?**

- A. First and second ✓**
- B. Second and third
- C. Third and fourth
- D. First and fourth

**What is the range of the sine function?**

- A.  $[-2, 2]$
- B.  $[-1, 1]$  ✓**
- C.  $[0, 1]$
- D.  $[0, 2]$

**Which of the following are true about the unit circle?**

- A. Radius is 1 ✓**
- B. Centered at the origin ✓**
- C. Used to define sine and cosine for all angles ✓**
- D. Only applicable for angles in the first quadrant

**Which statements about the cosine function are true?**

- A. Cosine is an even function ✓**
- B. Cosine has a period of  $\pi$
- C. Cosine is symmetric about the y-axis ✓**
- D. Cosine equals zero at  $90^\circ$  and  $270^\circ$  ✓**