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**Math\_Questions\_0026**

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1. Convert the angle in degrees to radians. Round to two decimal places.  $-173^\circ$   
A) -3 radians  
B) -3.02 radians  
C) -3.01 radians  
D) -2.99 radians
2. A carousel has a radius of 17 feet and takes 28 seconds to make one complete revolution. What is the linear speed of the carousel at its outside edge? Express the answer in feet per second. If necessary, round the answer to two decimal places.  
A) 106.81 feet per second  
B) 10.35 feet per second  
C) 0.61 feet per second  
D) 3.81 feet per second
3. A straight trail with a uniform inclination of  $13^\circ$  leads from a lodge at an elevation of 900 feet to a mountain lake at an elevation of 7200 feet. What is the length of the trail (to the nearest foot)?  
A) 28,006 feet  
B) 7389 feet  
C) 32,007 feet  
D) 6466 feet
4. Use a calculator to find the value of the expression rounded to two decimal places.  
 $\cos^{-1}\left(-\frac{\sqrt{3}}{3}\right)$   
A) -35.26  
B) 125.26  
C) -0.62  
D) 2.19
5. Find the exact value of the expression, if possible. Do not use a calculator.  
 $\cos(\cos^{-1}0.3)$   
A) 2.8  
B) 3.4  
C) 0.3  
D) 1

6. A building 210 feet tall casts a 70 foot long shadow. If a person looks down from the top of the building, what is the measure of the angle between the end of the shadow and the vertical side of the building (to the nearest degree)? (Assume the person's eyes are level with the top of the building.)

- A)  $18^\circ$
- B)  $19^\circ$
- C)  $72^\circ$
- D)  $71^\circ$

7. A ship is 46 miles west and 19 miles south of a harbor. What bearing should the captain set to sail directly to harbor?

- A) N  $157.6^\circ$  E
- B) N  $67.4^\circ$  E
- C) N  $22.4^\circ$  E
- D) N  $67.6^\circ$  E

8. An object has a frequency of 5 vibrations per second. Write an equation in the form  $d = \sin \omega t$  for the object's simple harmonic motion.

- A)  $d = \sin 10t$
- B)  $d = \sin t$
- C)  $d = \sin \pi t$
- D)  $d = \sin 10\pi t$

Complete the identity.

9.  $\sec^4 x + \sec^2 x \tan^2 x - 2 \tan^4 x = ?$

- A)  $4 \sec^2 x$
- B)  $3 \sec^2 x - 2$
- C)  $\sec^2 x + 2$
- D)  $\tan^2 x - 1$

10.  $\sin\left(x + \frac{3\pi}{2}\right)?$

- A)  $-\sin x$
- B)  $-\cos x$
- C)  $\sin x$
- D)  $\cos x$

11.  $\tan(\pi - \theta) = ?$

- A)  $-\cot \theta$
- B)  $\tan \theta$
- C)  $-\tan \theta$
- D)  $\cot \theta$

Use a calculator to solve the equation on the interval  $[0, 2\pi)$ . Round to the nearest hundredth.

12.  $\sin 3x = -\sin x$

- A) 0, 1.57, 3.14, 4.71
- B) 0, 3.14
- C) 0, 0.79, 2.36, 3.14, 3.93, 5.50
- D) 1.57, 4.71

13. A guy wire to a tower makes a  $67^\circ$  angle with level ground. At a point 32 ft farther from the tower than the wire but on the same side as the base of the wire, the angle of elevation to the top of the tower is  $30^\circ$ . Find the length of the wire (to the nearest foot).

- A) 27 feet
- B) 54 feet
- C) 32 feet
- D) 59 feet

14. A painter needs to cover a triangular region 65 meters by 67 meters by 72 meters. A can of paint covers 70 square meters. How many cans will be needed?

- A) 29 cans
- B) 15 cans
- C) 324 cans
- D) 3 cans

15. Convert the rectangular equation to a polar equation that expresses  $r$  in terms of  $\theta$ .

$$(x - 6)^2 + y^2 = 36$$

- A)  $r = 12 \cos \theta$
- B)  $r = 12 \sin \theta$
- C)  $r = -12 \sin \theta + 36$
- D)  $r^2 = 12 \cos \theta$

16.  $\frac{\cos 4x - \cos 8x}{\cos 4x + \cos 8x} = ?$  Complete the identity.

- A)  $-\tan 6x$
- B) 0
- C)  $\tan 2x \tan 6x$
- D)  $\cot 6x$

17. Use reference angles to find the exact value of the expression.

$$\tan 390^\circ$$

- A)  $\frac{\sqrt{3}}{3}$
- B)  $-\sqrt{3}$
- C)  $\frac{\sqrt{3}}{2}$
- D)  $\sqrt{3}$