

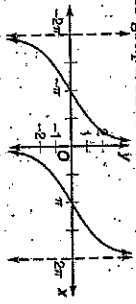
Write the letter for the correct answer in the blank at the right of each problem.

1. Change 1400° to radian measure in terms of π .
 A. $\frac{70\pi}{9}$ B. $\frac{35\pi}{9}$ C. $\frac{140\pi}{9}$ D. None of these
2. Change $\frac{29\pi}{37}$ radians to degree measure.
 A. 5220° B. 141.1° C. 167.6° D. 66.6°
6. Find the degree measure of the central angle associated with an arc that is 16 inches long in a circle with a radius of 12 inches.
 A. 76.4° B. 270.0° C. 238.6° D. 48.0°
7. Find the area of a sector if the central angle measures 105° and the radius of the circle is 4.2 meters.
 A. 7.7 m^2 B. 16.2 m^2 C. 32.3 m^2 D. 926.1 m^2
8. Write an equation of the sine function with amplitude 3, period $\frac{3\pi}{2}$, and phase shift $\frac{\pi}{4}$.
 A. $y = 3 \sin\left(\frac{3x}{2} - \frac{\pi}{4}\right)$ B. $y = -3 \sin\left(\frac{4x}{3} - \frac{\pi}{4}\right)$
 C. $y = -3 \sin\left(\frac{3x}{2} - \frac{3\pi}{8}\right)$ D. $y = 3 \sin\left(\frac{4x}{3} - \frac{\pi}{8}\right)$
9. Write an equation of the tangent function with period $\frac{3\pi}{8}$, phase shift $-\frac{\pi}{5}$, and vertical shift -2 .
 A. $y = \tan\left(\frac{8x}{3} - \frac{8\pi}{15}\right) - 2$ B. $y = \tan\left(\frac{8x}{3} + \frac{8\pi}{15}\right) - 2$
 C. $y = \tan\left(\frac{18x}{3} + \frac{3\pi}{80}\right) - 2$ D. $y = \tan\left(\frac{8x}{3} - \frac{3\pi}{40}\right) - 2$
10. State the amplitude, period, and phase shift of the function $y = -8 \cos\left(3x + \frac{3\pi}{2}\right)$.
 A. 3; 2π ; $-\frac{\pi}{2}$ B. 3; $\frac{2\pi}{3}$; $-\frac{\pi}{2}$ C. -3; 2π ; $\frac{\pi}{2}$ D. 3; $\frac{2\pi}{3}$; $\frac{3\pi}{2}$
11. State the period and phase shift of the function $y = -4 \tan\left(\frac{1}{2}x + \frac{3\pi}{8}\right)$.
 A. 2π , $-\frac{3\pi}{4}$ B. π , $\frac{3\pi}{8}$ C. 2π , $\frac{3\pi}{8}$ D. π , $-\frac{3\pi}{8}$
12. What is the equation for the inverse of $y = \cos x + 3$?
 A. $y = \arccos(x + 3)$ B. $y = \arccos(x - 3)$
 C. $y = \arccos(x + 3)$ D. $y = \arccos(x - 3)$
13. Evaluate $\tan\left(\cos^{-1}\frac{\sqrt{3}}{2} + \tan^{-1}\frac{\sqrt{3}}{3}\right)$.
 A. $\sqrt{3}$ B. $\sqrt{3}$ C. 0 D. undefined

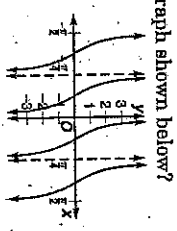
The paddle wheel of a boat measures 16 feet in diameter and is revolving at a rate of 20 rpm. The maximum depth of the paddle wheel under water is 1 foot. Suppose a point is located at the lowest point of the wheel at $t = 0$. Write a cosine function with phase shift 0 for the height of the initial point after t seconds.

14. Write a cosine function with phase shift 0 for the height of the initial point after t seconds.
 A. $h = 8 \cos\left(\frac{2\pi t}{3}\right) + 7$ B. $h = -8 \cos 3t + 7$
 C. $h = -8 \cos\left(\frac{2\pi t}{3}\right) + 7$ D. $h = 8 \cos 3t + 7$

15. Use your function to find the height of the initial point after 55 seconds.
 A. 7.5 ft B. 11 ft C. 10.4 ft D. 6.5 ft
16. Find the values of x for which the equation $\sin x = -1$ is true.
 A. $2\pi n$ B. $\frac{\pi}{2} + 2\pi n$ C. $\pi + 2\pi n$ D. $\frac{3\pi}{2} + 2\pi n$
17. What is the equation of the graph shown below?
 A. $y = \tan \frac{x}{2}$
 B. $y = -\cot \frac{x}{2}$
 C. $y = -\cot \frac{x}{2}$
 D. $y = \tan 2x$



18. What is the equation of the graph shown below?
 A. $y = -2 \sin\left(\frac{2x}{3} - \pi\right)$
 B. $y = 2 \cos\left(\frac{x}{3} - \frac{\pi}{2}\right)$
 C. $y = -2 \sin\left(\frac{2x}{3} - \frac{\pi}{2}\right)$
 D. $y = 2 \cos\left(\frac{2x}{3} - \pi\right)$
19. What is the equation of the graph shown below?
 A. $y = \tan\left(4x - \frac{\pi}{2}\right)$
 B. $y = \tan(4x - \pi)$
 C. $y = \cot\left(4x - \frac{\pi}{2}\right)$
 D. $y = \cot(4x - \pi)$



20. State the domain and range of the relation $y = \arctan x$.
 A. D: [all real numbers]; R: $\left[-\frac{\pi}{2} < y < \frac{\pi}{2}\right]$
 B. D: [all real numbers]; R: $\{0 \leq y \leq \pi\}$
 C. D: $\left[-\frac{\pi}{2} < y < \frac{\pi}{2}\right]$; R: [all real numbers]
 D. D: $\{0 \leq y \leq \pi\}$; R: [all real numbers]

The table shows the average monthly temperatures ($^\circ\text{F}$) for Detroit, Michigan.

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
25.3°	27.1°	35.8°	48.2°	59.5°	69.1°	73.8°	72.1°	64.6°	53.4°	41.4°	30.2°

14. Write a sinusoidal function that models the monthly temperatures in Detroit, using $t = 1$ to represent January.
 14. _____
15. According to your model, what is the average temperature in October?
 15. _____
16. Graph each function.
 16. $y = \sin x$ for $-\frac{13\pi}{8} \leq x \leq -\frac{8\pi}{3}$

