

Find the exact value.

1)  $\cos \frac{16\pi}{3}$

A)  $-\frac{\sqrt{3}}{2}$

B)  $\frac{\sqrt{3}}{2}$

C)  $\frac{1}{2}$

D)  $-\frac{1}{2}$

Find the exact value of the logarithmic expression.

2)  $\log_4 \frac{1}{64}$

A)  $\frac{1}{3}$

B) -3

C) 3

D)  $-\frac{1}{3}$

3)  $\ln e^5$

A) 1

B) e

C)  $\frac{1}{5}$

D) 5

Find the domain of the function.

$$4) f(x) = \ln\left(\frac{1}{x-10}\right)$$

A)  $(0, \infty)$

B)  $(10, \infty)$

C)  $(-10, \infty)$

D)  $(1, \infty)$

Write as the sum and/or difference of logarithms. Express powers as factors.

$$5) \log_{11} \frac{\sqrt[9]{14}}{s^2 r}$$

A)  $\frac{1}{9} \log_{11} 14 - 2 \log_{11} s - \log_{11} r$

B)  $\frac{1}{9} \log_{11} 14 - 2 \log_{11} s - 2 \log_{11} r$

C)  $9 \log_{11} 14 - 2 \log_{11} s - \log_{11} 9$

D)  $\log_{11} 14 - \log_{11} s - \log_{11} r$

Solve the equation.

$$6) \log_3 x^2 - \log_3 (7x + 8) = 0$$

The equation has Two solutions. The SUM of the solutions is:

A) 8

B) 7

C) -3

D)  $\frac{8}{3}$

Solve the problem.

- 7) A tank of fish has an initial population of 500. The population is decreasing at a rate of 2% every 6 months. Find the rule of the function,  $N$ , that gives the number of fish at time  $t$ , in years.

A)  $N(t) = 500 (.02)^t$

B)  $N(t) = 500 (1.98)^{2t}$

C)  $N(t) = 500 (.98)^t$

D)  $N(t) = 500 (.98)^{2t}$

Convert the angle in degrees to radians. Express the answer as multiple of  $\pi$ .

- 8)  $-480^\circ$

A)  $-\frac{9\pi}{4}$

B)  $-\frac{8\pi}{3}$

C)  $-\frac{3\pi}{8}$

D)  $-\frac{7\pi}{2}$

Find the exact value.

9)  $\sin \frac{\pi}{4}$

A)  $\frac{\sqrt{2}}{2}$

B)  $\sqrt{2}$

C)  $-\frac{\sqrt{2}}{2}$

D)  $\frac{1}{2}$

Solve the problem.

10) A gear with a radius of 8 centimeters is turning at  $\frac{\pi}{9}$  radians/sec. What is the linear speed at a point on the outer edge of the gear?

A)  $\frac{9\pi}{8}$  cm/sec

B)  $\frac{8\pi}{9}$  cm/sec

C)  $72\pi$  cm/sec

D)  $\frac{\pi}{72}$  cm/sec

A point on the terminal side of an angle  $\theta$  is given. Find the exact value of the indicated trigonometric function of  $\theta$ .

11)  $(-3, -4)$  Find  $\cos \theta$ .

A)  $-\frac{3}{5}$

B)  $\frac{3}{5}$

C)  $-\frac{4}{5}$

D)  $\frac{4}{5}$

Find the exact value of the indicated trigonometric function of  $\theta$ .

12)  $\sec \theta = \frac{9}{8}$ ,  $\theta$  in quadrant IV Find  $\tan \theta$ .

A)  $-\frac{\sqrt{17}}{9}$

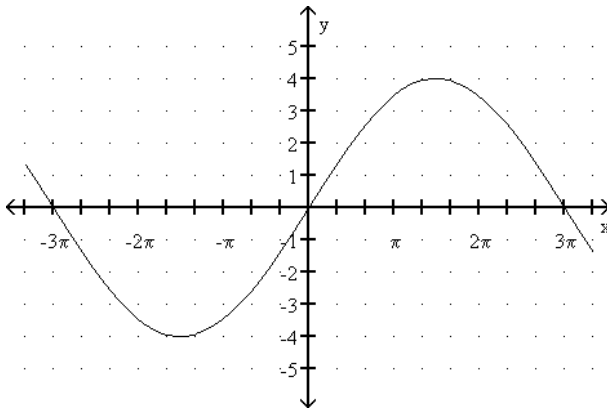
B)  $-\frac{\sqrt{17}}{8}$

C)  $-\frac{9}{8}$

D)  $-\sqrt{17}$

Find an equation for the graph.

13)



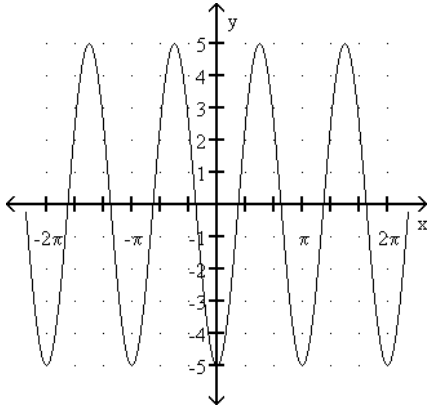
A)  $y = 3 \sin(4x)$

B)  $y = 4 \sin(3x)$

C)  $y = 3 \sin\left(\frac{1}{4}x\right)$

D)  $y = 4 \sin\left(\frac{1}{3}x\right)$

14)



A)  $y = -5 \cos\left(\frac{1}{2}x\right)$

B)  $y = -5 \sin\left(\frac{1}{2}x\right)$

C)  $y = -5 \cos(2x)$

D)  $y = -5 \sin(2x)$

Solve the equation. Give an exact solution.

15)  $9^{3x} = 4.6$

A)  $x = \frac{3 \log 4.6}{\log 9}$

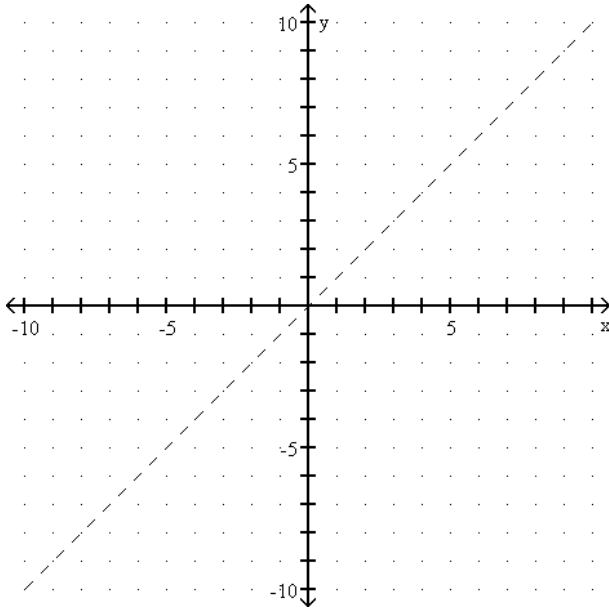
B)  $x = \frac{\log 4.6}{9 \log 3}$

C)  $x = \frac{4.6 \log 3}{\log 9}$

D)  $x = \frac{\log 4.6}{3 \log 9}$

Graph the function and its inverse on the same Cartesian plane.

16)  $f(x) = \log_2 x$

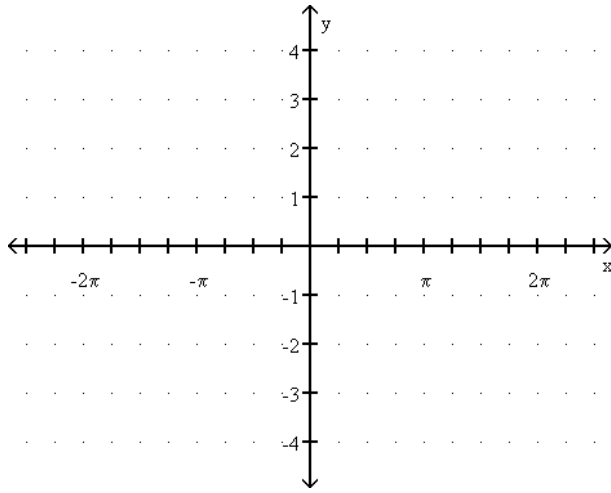


8 pts

Find the amplitude, the period, and the phase shift. Graph the function.

17)  $f(x) = 3 \sin(2x + 3\pi)$

Amplitude: \_\_\_\_\_ 1 pt    Period: \_\_\_\_\_ 2 pts    Phase Shift: \_\_\_\_\_ 2 pts



5 points

Total for Problem: 10 pts