Practice for Calculus #201

Name _____ Date _____

1. Solve the inequality: $8 - x \geq 12$

   a) $x \leq 4$ b) $x \leq -4$ c) $x \geq 4$
   d) $x \leq -20$ e) $x \geq 20$

2. Solve: $x^2 - x > 6$

   a) $x < -2$ or $x > 3$ b) $x < -1$ or $x > 6$
   c) $x < 3$ or $x > 6$ d) $-2 < x < 3$
   e) $-6 < x < 1$

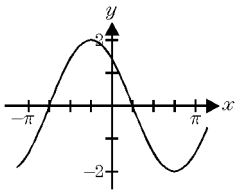
3. The Wonder Widget company sells widgets for \$79.99 each. The cost to manufacture widgets is given by the formula $C = 61n + 1050$, where n is the number of widgets sold. For what values of n will the company realize a profit?

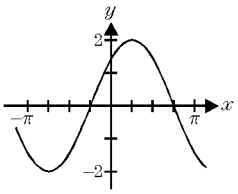
   a) $n \geq 8$ b) $n \geq 18$ c) $n \geq 33$
   d) $n \geq 52$ e) $n \geq 56$

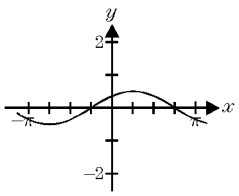
4. $\sin\left[\arccos\dfrac{-3}{\sqrt{10}}\right] =$

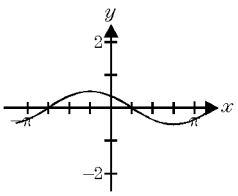
   a) $\sqrt{10}$ b) $\dfrac{1}{\sqrt{10}}$ c) $-\dfrac{\sqrt{10}}{\sqrt{19}}$
   d) $\dfrac{\sqrt{10}}{\sqrt{19}}$ e) $-\dfrac{3\sqrt{30}}{10}$

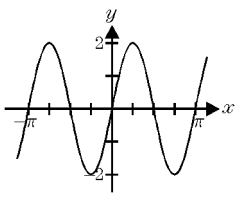
5. Which of the following is the graph of $y = -2\sin(x - \frac{\pi}{4})$?

   a) 

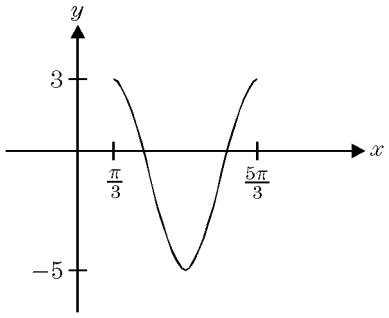
   b) 

   c) 

   d) 

   e) 

6. This graph illustrates a cosine function for one complete cycle. Which of the following is the equation of this graph?



   a) $y = 2\cos(3x - 3\pi) - 1$
   b) $y = 4\cos(\frac{3}{2}x - \frac{\pi}{2}) - 1$
   c) $y = 2\cos(x - \pi) - 1$
   d) $y = 4\cos(x - \pi) - 1$
   e) $y = 3\cos(3x - \pi) - 1$

7. Which of the following is equal to $e^{\ln x + \ln 3}$?

   a) $3x$ b) e^{3x} c) 3^{10x} d) x^{30} e) $\ln\dfrac{x}{3}$

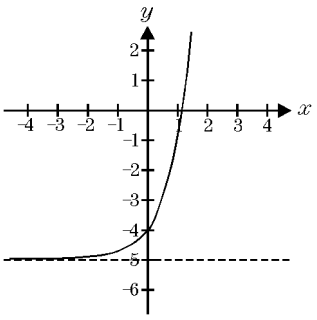
8. Choose the expression equivalent to $\ln\left(\dfrac{3x^2}{7y}\right)$.

   a) $\dfrac{\ln 3 + \ln x^2}{\ln 7 + \ln y}$
   b) $\ln(3x^2) + \ln(7y)$
   c) $\ln 3 - \ln 7 + 2\ln x - \ln y$
   d) $2\ln(3x) - \ln(7y)$
   e) $\ln\left(\dfrac{3}{7}\right) + \ln\left(\dfrac{x}{y}\right)^2$

9. A bacteria culture is increasing at a rate of 8% a minute. How many minutes ago, to the nearest minute, was there only half as much of the bacteria culture?

   a) 90 b) 6 c) 9 d) 4 e) 1

10. Which of the following functions could have the graph sketched here?



a) $f(x) = 4^x - 5$
b) $f(x) = 4^x + 5$
c) $f(x) = 4^{-x} + 5$
d) $f(x) = 4^{-x} - 5$
e) $f(x) = e^{4x} - 5$

11. Find the domain of $f(x) = \sqrt{2x+3}$.

a) $[0, \infty)$ b) $(0, \infty)$ c) $[-\frac{3}{2}, \infty)$
d) $(-\frac{3}{2}, \infty)$ e) $[0, \frac{3}{2})$

12. Find the domain of the function $f(x) = 3 + \ln(x-1)$.

a) $(-\infty, \infty)$ b) $(0, \infty)$ c) $(1, \infty)$
d) $(3, \infty)$ e) $(-\infty, 1)$

13. Let $f(x) = \sin x$ and $g(x) = \ln x$, where $0 < x \leq 2\pi$. Let S be the composition of g with f, $S(x) = g(f(x))$. What is the domain of S?

a) $0 < x \leq 2\pi$ b) $0 < x \leq \pi$ c) $0 < x < \pi$
d) $0 < x \leq \frac{\pi}{2}$ e) $0 < x < 2\pi$

14. If $f(x) = \dfrac{1}{\sqrt{x}}$ and $g(x) = x^2 - 5$, then $g(f(x)) =$

a) $\dfrac{1}{x} - 5$ b) $\dfrac{x-5}{x}$ c) $\dfrac{1}{x} - \dfrac{1}{5}$
d) $\dfrac{1}{\sqrt{x^2-5}}$ e) $\dfrac{1}{x} - \dfrac{1}{\sqrt{5}}$

15. If $f(x) = 2\ln x$, where $x \geq 0$, and $g(x) = \sin x$, then $f(g(x)) =$

a) $\ln(\sin x)$ b) $\ln(\sin x)^2$ c) $2\sin(\ln x)$
d) $(\sin x)(\ln x)$ e) $\ln(2\sin x)$

16. If $f(x) = \dfrac{2x+1}{3}$, then $f^{-1}(x)$ equals

a) $\dfrac{3x-1}{2}$ b) $\dfrac{3}{2x+1}$ c) $1 - \dfrac{3}{3x}$
d) $\dfrac{3-2x}{2}$ e) $\dfrac{2x+1}{3}$

17. Assume $f(x) = \dfrac{e^x}{e^x - 1}$. Which of the following is an expression for $f^{-1}(x)$, where f^{-1} denotes the inverse function of f?

a) $y = \ln\left(\dfrac{x}{x-1}\right)$ b) $y = \ln\left(\dfrac{x}{x+1}\right)$
c) $y = \ln\left(\dfrac{x+1}{x-1}\right)$ d) $y = \ln\left(\dfrac{x+1}{x}\right)$
e) $y = \dfrac{e^x - 1}{e^x}$

18. Which of the following is an approximate root of $\tan x = x$.

a) 4.493 b) 4.616 c) 4.625
d) 4.695 e) 4.765

19. Given $f(x) = x^2 + 1$ and $g(x) = \dfrac{1}{x}$, find the x-value of the point of intersection of the two functions.

a) 0.068 b) 0.084 c) 0.669
d) 0.682 e) 1.682

20. Find the asymptotes of $y = \dfrac{5x - 14}{x^2 - 4x}$.

a) $y = 0$ only
b) $x = 0$ and $x = 4$
c) $x = 0$ and $y = 0$
d) $x = 0$, $x = 4$, and $y = x$
e) $x = 0$, $x = 4$, and $y = 0$

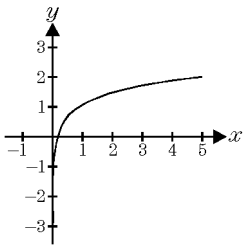
21. With respect to which of the following is the graph of $y = x^4 + 4x^2$ symmetric?

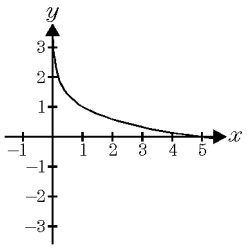
a) x-axis only b) y-axis only
c) origin only d) origin and y-axis
e) x-axis and y-axis

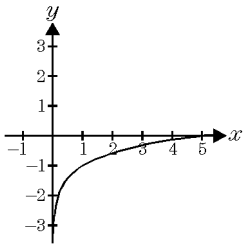
22. Answer using one of: EVEN, ODD, or NEITHER.

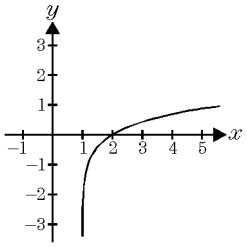
$f(x) = (x^2 + x^5)^3$ is _____.

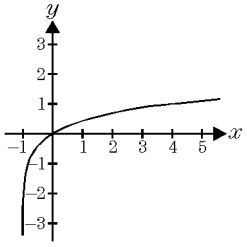
23. Which of the following is the graph of $f(x) = 1 + \log_5 x$?

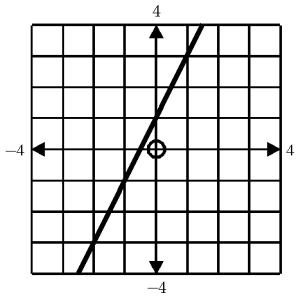
a)


b)


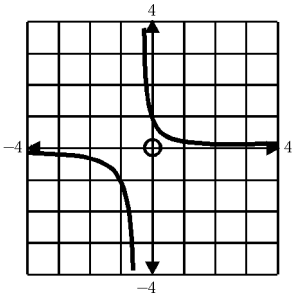
c)


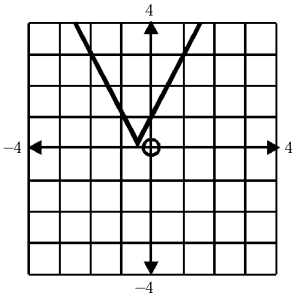
d)


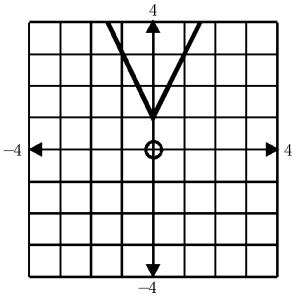
e)


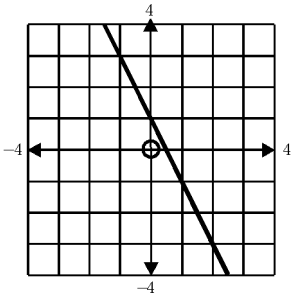
24.


Given the graph of $f(x)$ shown above, which of the following is the graph of $\dfrac{1}{f(x)}$?

a)


b)


c)


d)


e)