Calculus Readiness Activity V1

Name: _____

1. Is the following true or false?

$$\frac{a}{a+b} = \frac{\cancel{a}}{\cancel{a}+b} = \frac{1}{b}$$

   (a) True

   (b) False

2. Find the equation for the line passing through the point $(4, -3)$ and parallel to the line whose equation is $3y - 33 = 9x$.

$$y = \underline{\hspace{2cm}}$$

3. Perform the indicated operations on the three expressions

$$x + \frac{6}{x^2 - 36} - \frac{x^2}{x+6}.$$

Express your answer in simplest form $\frac{A}{B}$.

   Answer: $A = \underline{\hspace{2cm}}$ and $B = \underline{\hspace{2cm}}$.

4. The expression $\left(\frac{x^4 y^4 z^3 x^{-5}}{x^5 y^5 z^3 y^3} \right)^{-3}$ equals $x^r y^s z^t$

   where r, the exponent of x, is: _____

   and s, the exponent of y, is: _____

   and finally t, the exponent of z, is: _____.

   Note: Your answers should be numbers.

5. To say that $\left|\frac{x-6}{3}\right| \leq 7$ is the same as saying x is in the closed interval $[A, B]$

   where A is: _____

   and where B is: _____ .

6. Given that $f(x)$ is a degree 3 polynomial with zeros at -7, 4, and 7, find an equation for $f(x)$ given that the coefficient of x^3 equals 7.

   $f(x) = $ _____ .

   Note: You may insert your answer in factored form or standard form.

7. Consider the function f shown in the following graph.

   Select **all answers** that are intervals on which f is increasing.

   (a) $(7, \infty)$
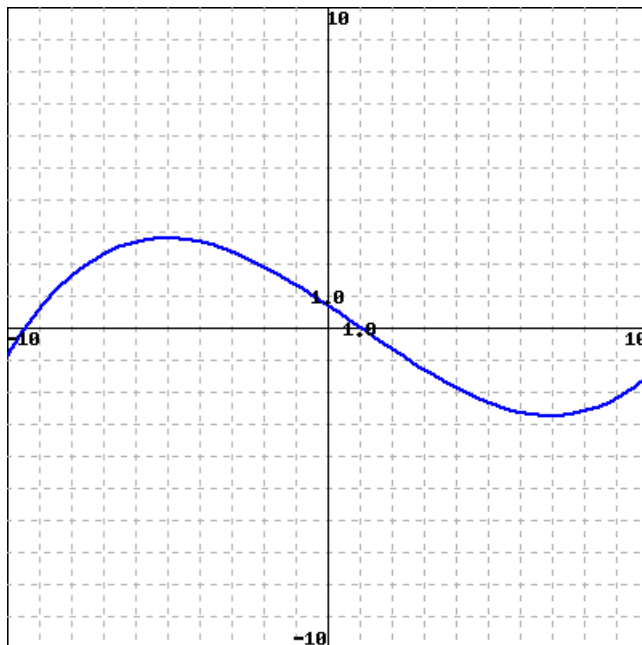
   (b) $(-5, 7)$

   (c) $(-\infty, 7)$

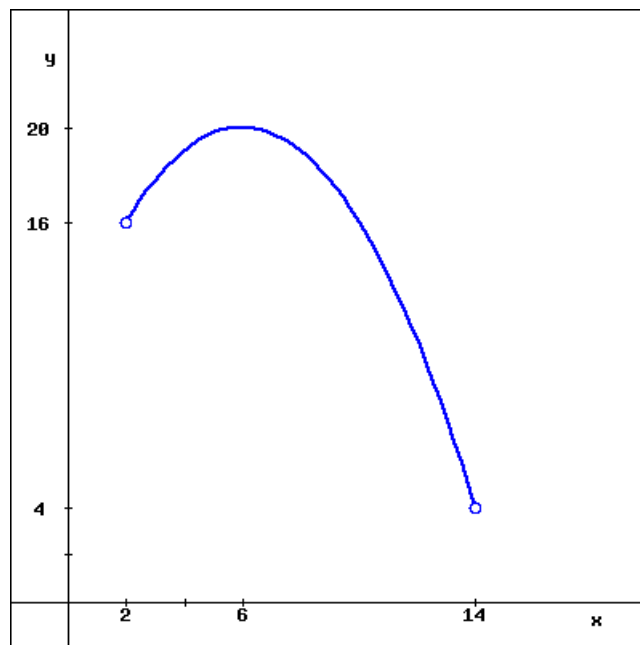   (d) $(-\infty, -5)$

   (e) $(-\infty, 0) \cup (9, \infty)$

   (f) $(-\infty, -5) \cup (7, \infty)$

   (g) $(-5, \infty)$

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8. Estimate the domain and range of the function $y = f(x)$ graphed in the figure. Assume the entire graph is shown.

   (a) What is the domain of $f(x)$?

   _____

   (b) What is the range of $f(x)$?

   _____

9. Let $f(x)$ and $g(x)$ be the piecewise defined functions given below.

$$f(x) = \begin{cases} x^2, & \text{if } x \leq 0, \\ x^2 + 1, & \text{if } 0 < x < 6, \\ -3, & \text{if } x \geq 6. \end{cases} \qquad g(x) = \begin{cases} 10x - 10, & \text{if } x \leq 0, \\ 3x^3, & \text{if } 0 < x < 7, \\ -9x + 7, & \text{if } x \geq 7. \end{cases}$$

   $f(g(3)) = $ _____

10. Let $f(x) = x^2 + 2x + 5$. When evaluated and simplified,

$$\frac{f(x+h) - f(x)}{h} = Ax + Bh + C,$$

   where the constants

   $A = $ _____

   $B = $ _____
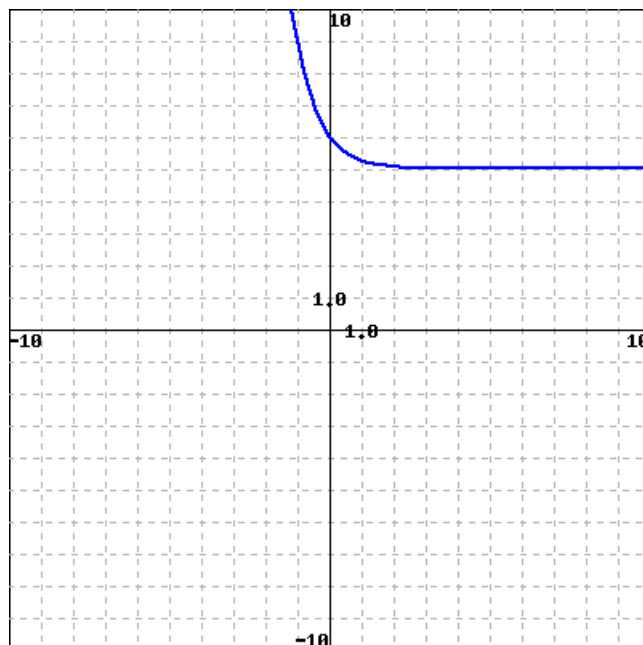
   $C = $ _____.

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11. Which of the following could be an equation for the graph shown to the right?

(a) $4^x + 6$

(b) $\left(\frac{1}{4}\right)^x + 5$

(c) $4^x + 5$

(d) $\left(\frac{1}{4}\right)^x + 6$

12. Using properties of logarithms,

$$\ln\left(\frac{x^{18}\sqrt{x-1}}{3x-16}\right) = A\ln x + B\ln(x-1) + C\ln(3x-16)$$
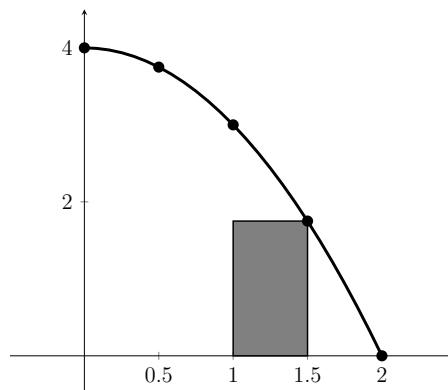
where the constants

$A = $ _____

$B = $ _____

$C = $ _____.

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13. A portion of the graph $f(x) = 4 - x^2$ is shown to the right. What is the area of the shaded rectangle?

Area: _____
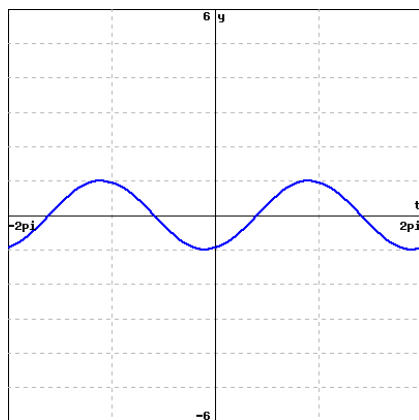
14. Evaluate the following expression.

$$\sin\left(\cos^{-1}\left(\frac{3}{5}\right)\right) = \underline{\hspace{2cm}}$$

15. Match each of the equations below to one of the graphs by placing the corresponding letter of the equation under the appropriate graph.
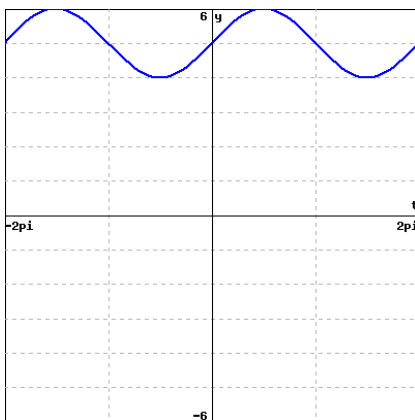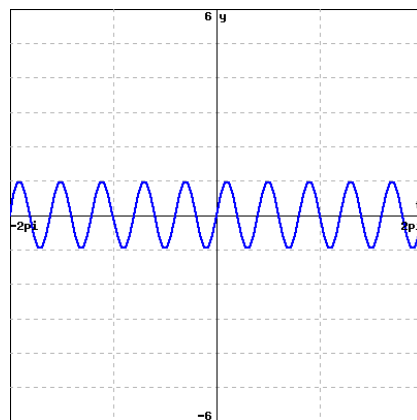
(a) $y = \sin(t + 5)$

(b) $y = \sin(5t)$

(c) $y = \sin(t) + 5$

_____   _____   _____

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