HW 11

1. True or false: If $y = \log_a(x)$ then $x = a^y$.

2. The graph of every logarithmic function $y = \log_a(x), a \neq 1$ passes through three points: __________, __________ and __________.

3. If the graph of a logarithmic function $y = \log_a(x)$ is increasing then its base must be: __________.

4. Determine the domain of the following functions. Is the function defined at $x = -3$? Is the function defined at $x = 3$?

   (a) $f(x) = \log(x^2)$.

   (b) $g(x) = \ln(\frac{x}{2} - 3)$

   (c) $h(x) = \sqrt{\ln(x)}$

   (d) $k(x) = \log_3(\frac{x-3}{x^2})$

5. Determine wether the statement is true or false.

   (a) $\log_6(5x^2) = 2\log_6(5x)$

   (b) $\dfrac{\ln(8)}{\ln(4)} = 2$

   (c) $\ln(x+2) - \ln(5x) = \dfrac{\ln(x+2)}{\ln(5x)}$

   (d) If $\log_9(M) = \dfrac{\log_6(4)}{\log_6(9)}$ then $M = 4$.

6. Use properties of logarithms to simplify and/or find the exact value of the expression.

   (a) $e^{\log_{e^2} 64}$

   (b) $\log_3(3z^3)$

   (c) $7^{\log_7(e)}$

   (d) $\ln(\frac{x}{e})$

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

$$\ln\left[\frac{x^2 - x - 20}{(x+7)^2}\right]^{\frac{1}{4}}$$

8. Write the expression as a single logarithm.

   (a) $2\log_5(\sqrt{3x-8}) - \log_5(\frac{4}{x}) + \log_5(4)$ (b) $\log_4(x^2-4) - 5\log_4(x+2)$

9. Solve the following equations:

(a) $2 \cdot 10^{4-x} = 10$

(b) $e^{6x} = 22$

(c) $\log_2(8x+6) = 2$

(d) $\log_3(x^2+1) = 4$

(e) $\ln(x-1) + \ln(x+2) = 0$

(f) $\log_3(x^2+4) = 4$

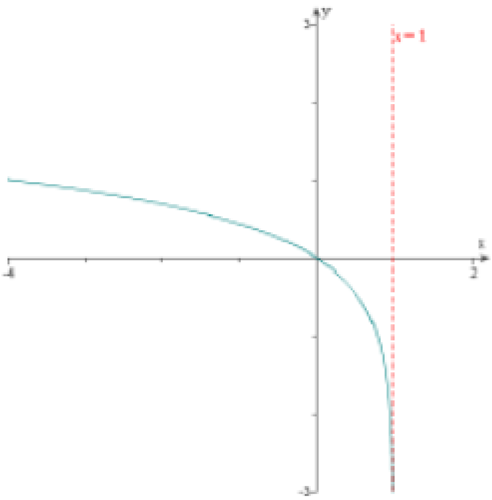
10. Use transformations to match each graph with an equation.

(a) $y = \log_5(1-x)$

(b) $y = -\log_3(x)$

(c) $\log_2(x-1)$

(d) $\log_4(x)$



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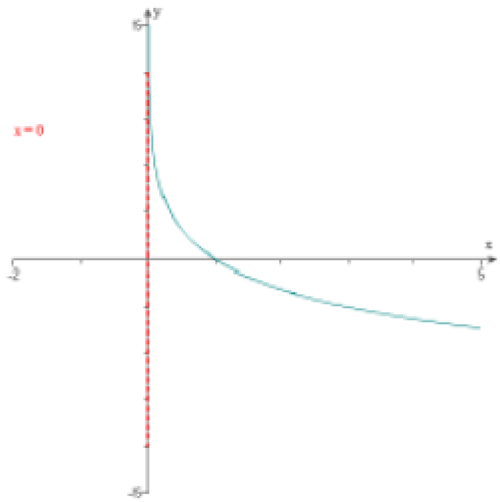

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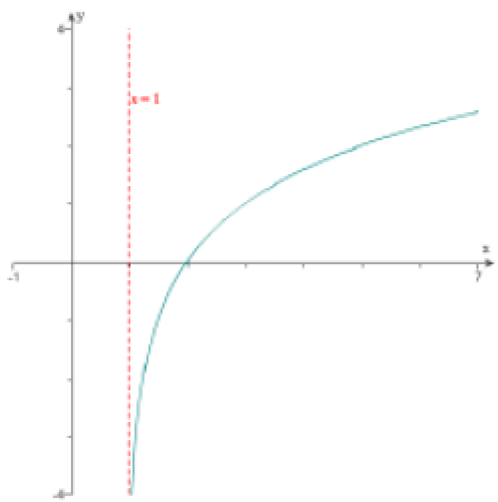

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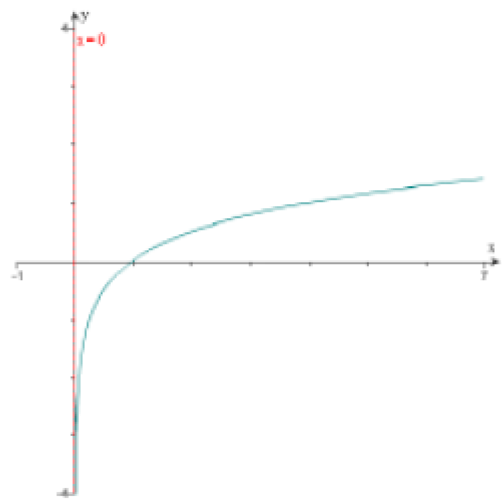

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