

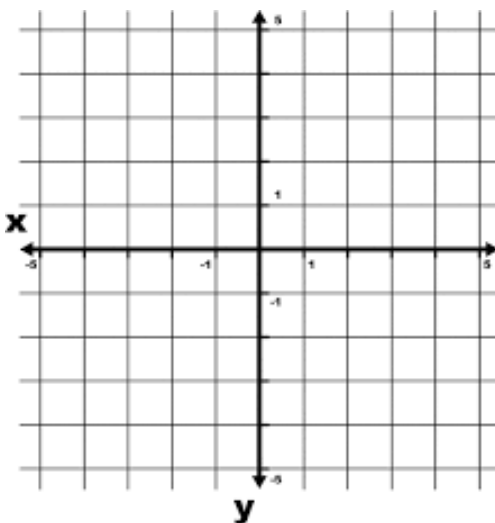
1. For each of the functions below, determine the long-term behavior of the function.

a. $-(5 - x)(20x + 4)$

b. $8x^3 - 2x^2 + 3x + 15$

c. $-x^4 - 7x^3 - 7x^2 + 43x + 43$

2. Use transformations to sketch the graph of $g(x) = (x - 4)^3 + 1$. Then sketch the graph of its inverse.



3. Determine whether each statement below is true or false. If false, correct the statement.

a. $\log(100^x) = x$

b. $\ln(e^x) = x$

4. Solve for x in the logarithmic equations.

a. $\log_8(4x + 1) = -1$

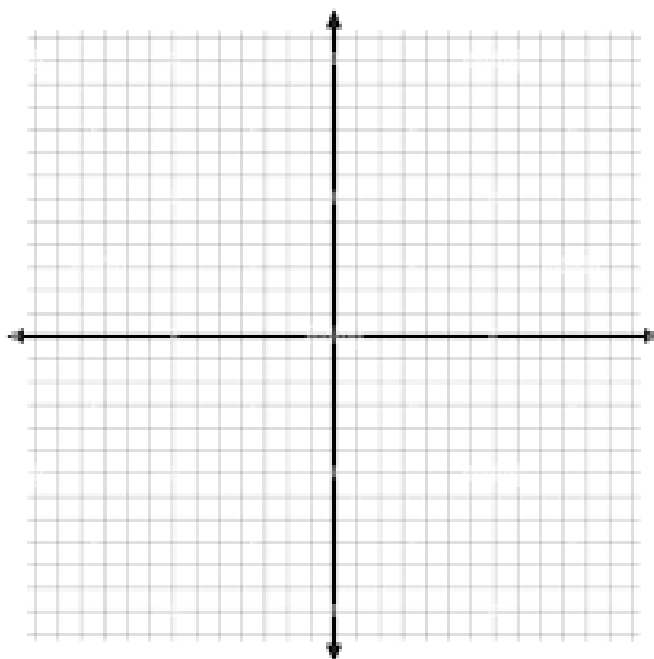
b. $4\ln(2x - 1) + 3 = 11$

c. $\log_3(x^2 + 6x) = 3$

5. Consider the polynomial $f(x) = x^3 - 6x^2 + 3x + 10$.

- a. Write $f(x)$ in factored form by using the Rational Roots Theorem and polynomial long division. Hint: the first step is listing possible rational roots.

- b. Determine the x and y intercepts of $f(x)$.
- c. What is the relationship between the zeros of a polynomial and its factored form?
- d. Using your solutions above, draw a rough sketch of $f(x)$. Label all intercepts.

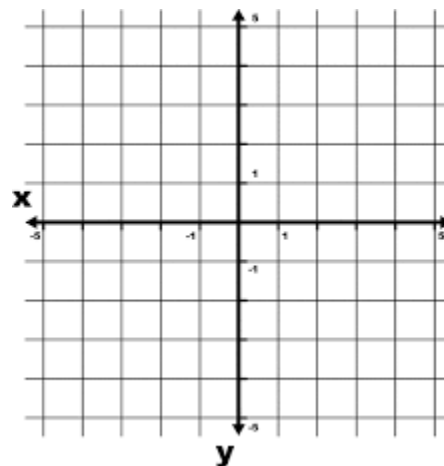


6. Suppose $\log_b a = 4$, $\log_b c = 1$, $\log_b d = 2$ Determine the exact value of the following expression.

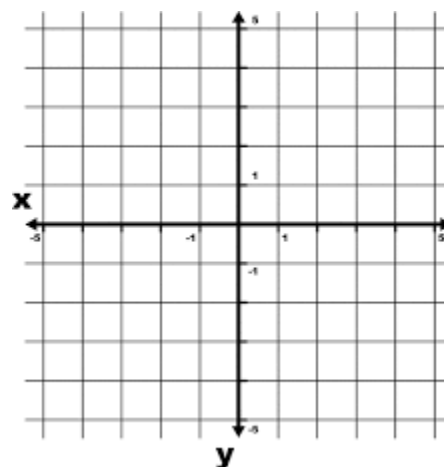
$$\log_b \left(\frac{a^3 d^2}{c^5} \right)$$

7. For each of the following polynomials, determine the long term behavior, intercepts, and where the polynomial is positive and negative. Use this to sketch the graph. Label all intercepts

a. $(3-x)(3x-9)$



b. $(2-x)^2(x+1)$



8. Suppose $f(x) = \frac{3}{2-x}$. What is the range f^{-1} ?

9. Determine the following limits

a. $\lim_{x \rightarrow 2^+} \frac{5}{2-x}$

b. $\lim_{x \rightarrow \infty} \log_3(5 + x)$

c. $\lim_{x \rightarrow -5} \frac{3}{x+5}$

d. $\lim_{x \rightarrow \infty} 250x$

e. $\lim_{x \rightarrow -\infty} (-2 + 3x - 6x^2)$