

Math 111 Exam 2

1. (4pts each) True or False.

(a) If $a > 5$ then $|5 - a| = a - 5$.

(b) The function with rule $f(x) = \begin{cases} x^2 & \text{if } x < 2, \\ x - 1 & \text{if } x \geq 2. \end{cases}$ has $f(2) = 4$.

2. (4pts each) Fill in the blank.

(a) $\log_2(\sqrt[5]{2}) =$ _____.

(b) $27^{-2/3} =$ _____.

(c) Suppose $g(x) = \log(-3x)$. The domain of g is _____.

3. (10pts) Solve for x

$$\log_3(x + 7) - \log_3(x - 1) = 2$$

4. (10pts) Simplify the following expression (assume a and b are positive real numbers).

$$\frac{2(2a)^{-2}(\sqrt[3]{b})^2}{a^2b^{-1/3}}$$

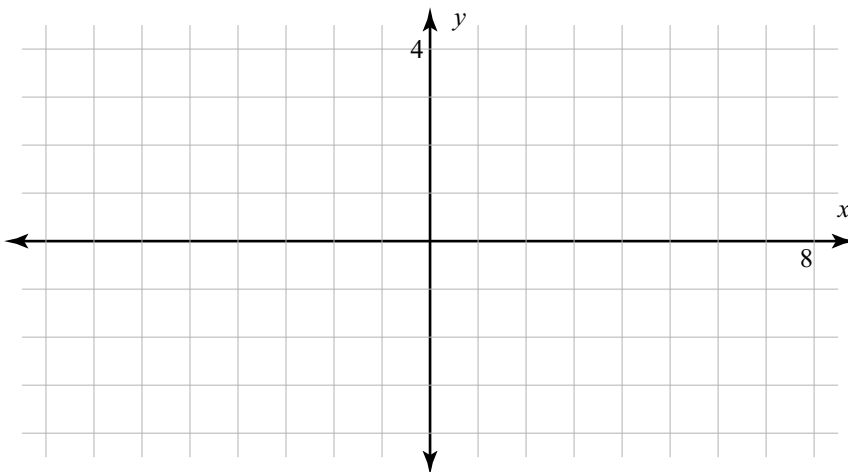
5. Suppose a bank account earns 8% yearly interest compounded quarterly.
- (a) (4pts) Write the rule of a function f where $f(t)$ gives the account balance at time t (in years) where the initial deposit is P dollars.
- (b) (4pts) If the initial deposit is \$50, how much money will be in the account after 2 years?
[You do not need to simplify your answer.]
- (c) (6pts) If the initial deposit is \$100, how long will it take for there to be \$300 in the account?
[Give the exact answer and be sure to include units.]
6. (10pts) Suppose $f(x) = 14 \cdot 5^{x-2} + 3$. Find $f^{-1}(x)$.

8. (10pts) Write the following as a single logarithm.

[assume x, y, z , and w are positive real numbers.]

$$7 \ln(x) - \ln(y) - 4 \ln(z) + \ln(w)$$

9. (10pts) Sketch a graph of the function with rule $h(x) = -|x + 4| + 2$.



10. (10pts) Solve the inequality. Leave your answer in interval notation.

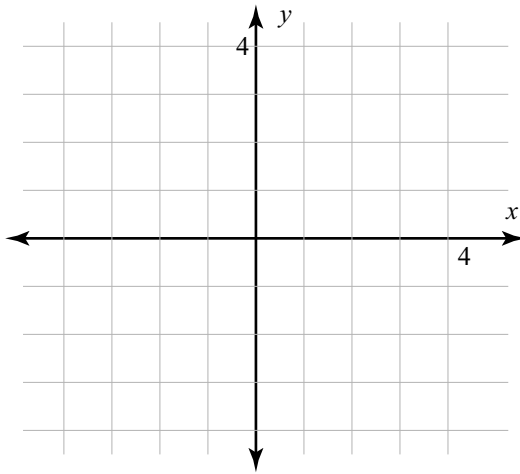
$$|3x + 6| > 9$$

11. Consider the function f with rule

$$f(x) = \begin{cases} 2^x & \text{if } x \leq 0, \\ -x + 1 & \text{if } 0 < x < 2, \\ 1 & \text{if } 3 \leq x < 4. \end{cases}$$

(a) (5pts) Give the domain of f in interval notation.

(b) (10pts) Sketch a graph of f .



(c) (5pts) Give the range of f in interval notation.

12. (10pts) Find $f^{-1}(x)$ where

$$f(x) = \frac{1 - x^3}{2x^3 + 8}$$