

Math 173 – Assignment #3

Name: _____

1. Find the inverse of the following function.

$$f(x) = \sqrt[5]{x} - 7$$

2. Use composition of functions to show that the following functions are inverses.

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

3. Find the inverse of the following function, and state the inverse's domain and range.

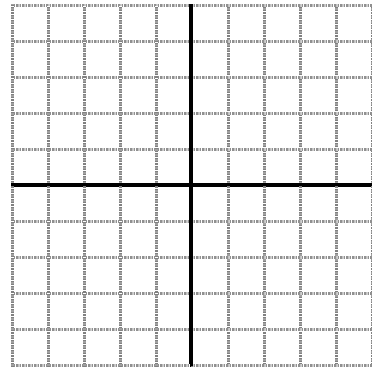
$$f(x) = \frac{x+1}{x-3}$$

domain: _____

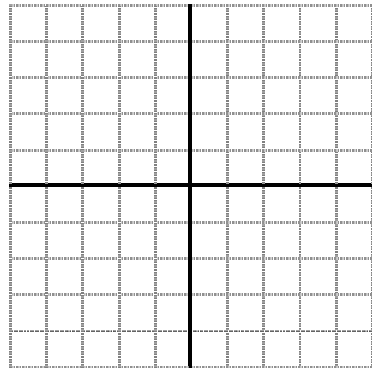
range: _____

4. Sketch the graphs of the following functions. Include at least two accurate points in your sketch and also indicate the location of any asymptotes.

a) $f(x) = 3^{-x} + 1$



b) $f(x) = -\log_2(x)$



5. Simplify each of the following. Give exact answers.

a) $\log_3 \frac{1}{81}$

b) $\ln \sqrt{e}$

c) $\log_{81} 3$

d) $\log_x 1$

e) $\log_x (-1)$

6. Calculate using the base-change formula. Give your answer to two decimal places.

a) $\log_{82} 0.381$

b) $\log_\pi 142$

7. Express in terms of $\ln a$, $\ln b$, and $\ln c$. You should not have any exponents in your answers.

a) $\ln \sqrt{\frac{a^5}{bc^3}}$

b) $\ln \frac{\sqrt{b}}{e^2}$

8. Simplify.

a) $\log_3 \sqrt[m]{3}$

b) $\log_y y^{a-157}$

c) $e^{\ln x + 2 \ln y}$

d) $\log_a \sqrt{ax} - \log_a \frac{a}{\sqrt{x}}$

9. Solve.

a) $3^{1-4x} = \frac{1}{27}$

10. Solve. Give exact answers.

a) $\log_2(x-3) + \log_2(x+3) = 4$

b) $10^{2x} = 7^{x-1}$

c) $\log(x^2) - \log(3-x) = \log 4$

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11. A dish of lasagna baked at 375°F is taken out of the oven at 5 pm into a kitchen that is at 75°F . After 20 minutes, the temperature of the lasagna is 225°F . How long will it take the lasagna to cool down from 375°F to 100°F ?
12. As part of a science experiment, Pat is cryogenically frozen for many years. Once she wakes up, she finds that her bank account, which had a balance of \$1600 when she was frozen, has grown to 5.8 million dollars. The interest rate on her account has remained at 6% per year the entire time. How long has she been asleep if her account was compounded
- a) monthly?
 - b) continuously?