8.6 Log and Exponential Inverses

Practice Tasks

- I. Concepts and Procedures
- 1. Find the inverse of each function.
 - a. $f(x) = 3^x$
 - b. $f(x) = \left(\frac{1}{2}\right)^x$

c.
$$g(x) = \ln(x - 7)$$

- d. $h(x) = \frac{\log_3(x+2)}{\log_3(5)}$
- e. $f(x) = 3(1.8)^{0.2x} + 3$
- f. $g(x) = \log_2(\sqrt[3]{x-4})$
- g. $h(x) = \frac{5^x}{5^x + 1}$
- h. $f(x) = 2^{-x+1}$
- i. $g(x) = \sqrt{\ln(3x)}$
- j. $h(x) = e^{\frac{1}{5}x+3} 4$



II. Reasoning

- 1. Consider the composite function $f \circ g$, composed of invertible functions f and g.
 - a. Either $f^{-1} \circ g^{-1}$ or $g^{-1} \circ f^{-1}$ is the inverse of the composite function. Which one is it? Explain.
 - b. Show via composition of functions that your choice of $(f \circ g)^{-1}$ was the correct choice. (Hint: function composition is associative.)

III. Modeling

- 1. Let $m(x) = \frac{x}{x-1}$.
 - a. Find the inverse of *m*.
 - b. Graph *m*. How does the graph of *m* explain why this function is its own inverse?
 - c. Think of another function that is its own inverse.