### 8.6 Log and Exponential Inverses

Practice Tasks


1. Find the inverse of each function.
a. $f(x)=3^{x}$
b. $\quad f(x)=\left(\frac{1}{2}\right)^{x}$
c. $\quad g(x)=\ln (x-7)$
d. $\quad h(x)=\frac{\log _{3}(x+2)}{\log _{3}(5)}$
e. $f(x)=3(1.8)^{0.2 x}+3$
f. $\quad g(x)=\log _{2}(\sqrt[3]{x-4})$
g. $h(x)=\frac{5^{x}}{5^{x}+1}$
h. $f(x)=2^{-x+1}$
i. $g(x)=\sqrt{\ln (3 x)}$
j. $\quad h(x)=e^{\frac{1}{5} x+3}-4$

## 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.
