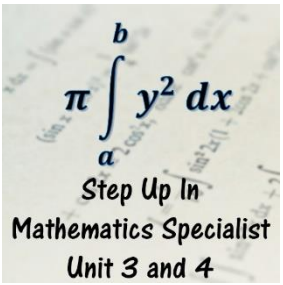
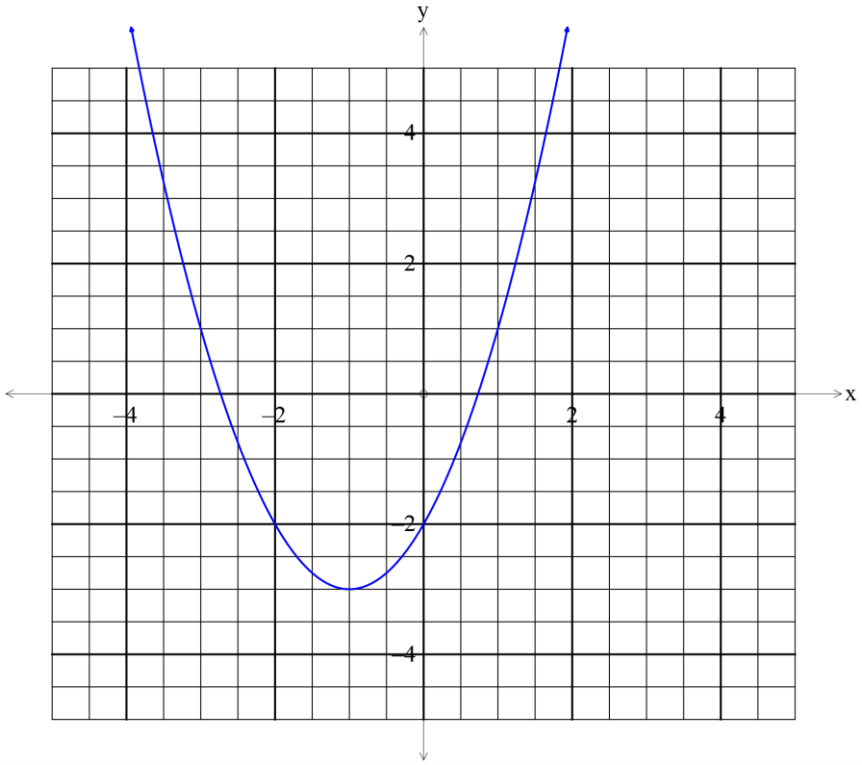
2.2 Inverse Functions

Problems Worksheet



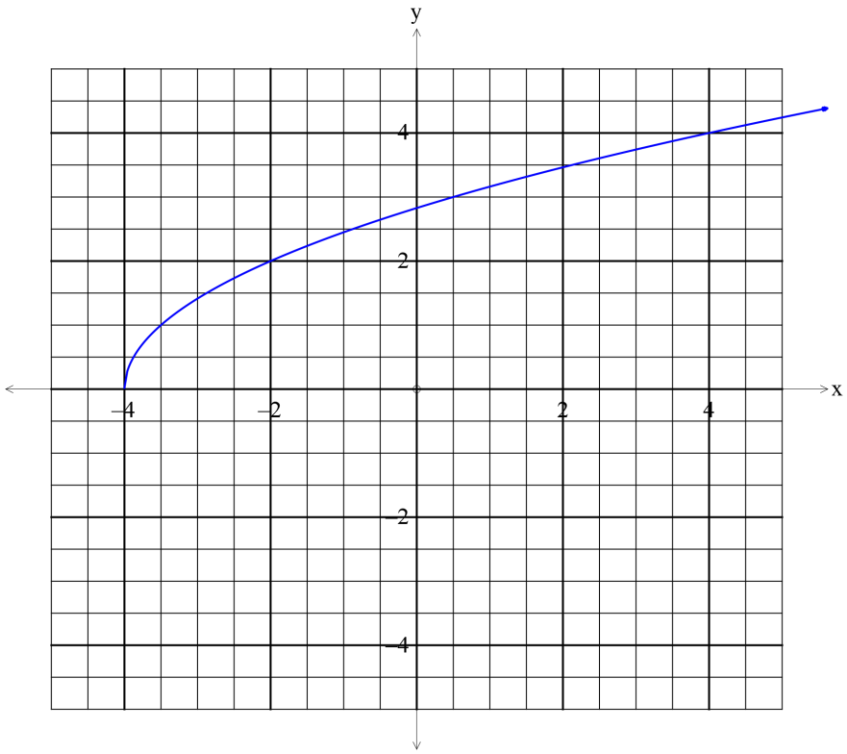
1. The graph of $y = f(x)$ is presented below, where $f(x) = (x+1)^2 - 3$.



a. By restricting its domain so it is as large as possible, determine the inverse of this graph.

b. On the same set of axes as $y = (x+1)^2 - 3$, sketch the inverse that was determined in part (a).

2. The graph of $y = f(x)$ is presented below, where $f(x) = \sqrt{2x + 8}$.



a. Explain why y is a function of x over the natural domain of $f(x)$.

b. Determine a function for the inverse of $f(x)$.

c. On the axes above, sketch the graph of the inverse of $f(x)$ determined in (b).

3. Consider the following functions. For each, state the domain and range of the inverse function without first determining the inverse function algebraically.

   a. $f(x) = \sqrt{2x + 6} - 4$

   b. $g(x) = \frac{2}{x-3} + 4$

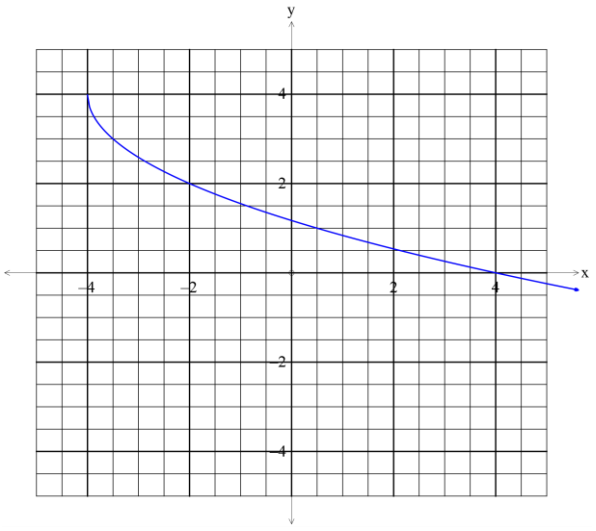
   c. $h(x) = \log_{10}(x + 4)$

   d. $f(x) = \frac{1}{\sqrt{x}+3}$

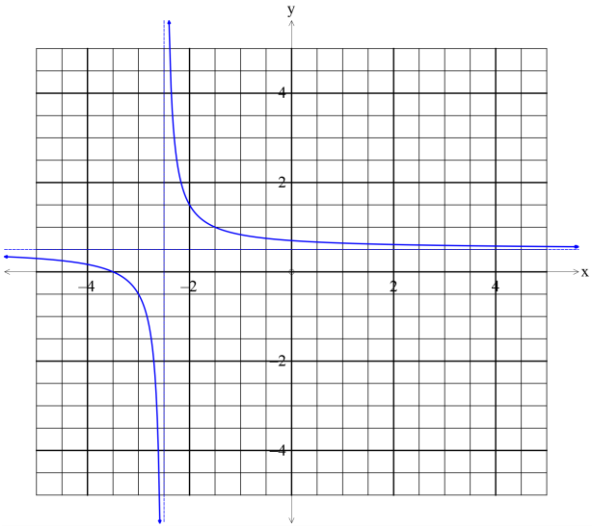
   e. $g(x) = \frac{1}{\sqrt{x}-3}$

4. Presented below are arbitrary graphs in the variable x. For each, sketch the inverse of the graph upon the same axes.

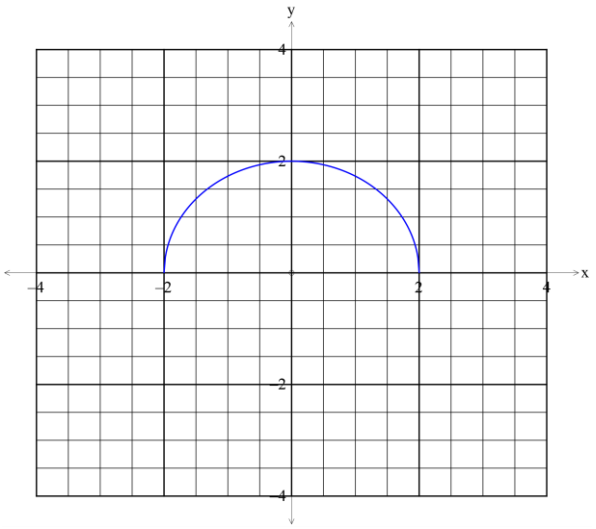
a.



b.



c.



5. With $f(x) = 4x - 2$ and $g(x) = 2x + 1$, demonstrate that $(f \circ g)^{-1}(x) = (g^{-1} \circ f^{-1})(x)$.