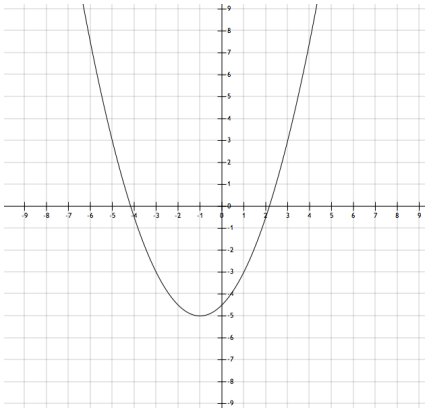
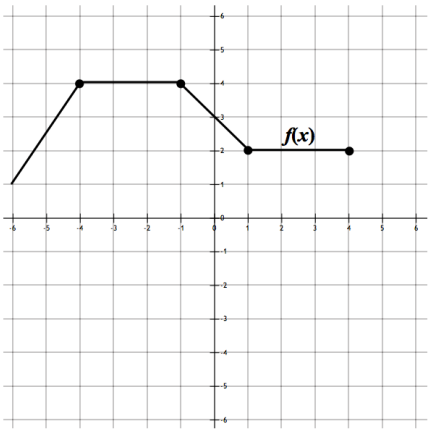
Inverse of a Function – Worksheet

1) Sketch the graph of the inverse of each function. Is the inverse of $f(x)$ a function? Explain.

a)



b)



2) Determine the equation of the inverse of each function.

a) $f(x) = 2x$

b) $f(x) = 6x - 5$

c) $f(x) = \frac{2x+4}{5}$

3) Determine the equation of the inverse of each function

a) $f(x) = x^2 + 6$

b) $f(x) = (x + 8)^2$

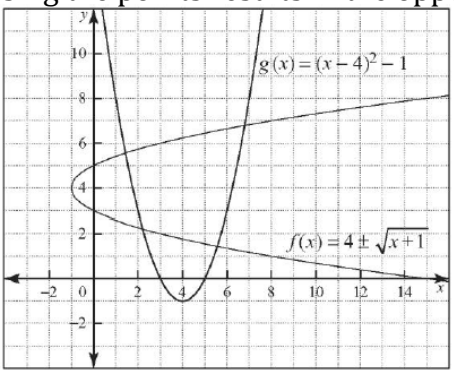
4) For each quadratic function, complete the square and then determine the equation of the inverse.

a) $f(x) = x^2 + 6x + 15$

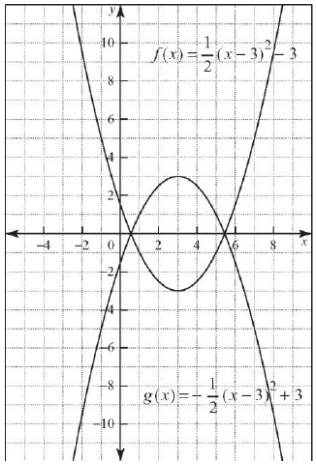
b) $f(x) = 2x^2 + 24x - 3$

5) Determine if the two relations shown are inverses of each other. Justify your conclusion. (Hint: see if reversing the points results in the opposite graph.)

a)



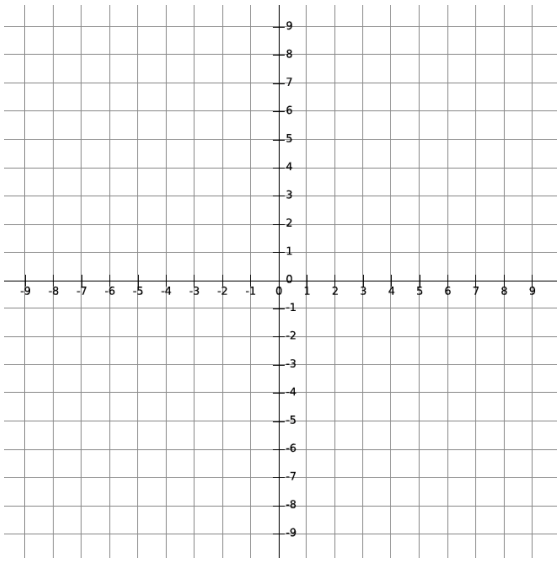
b)



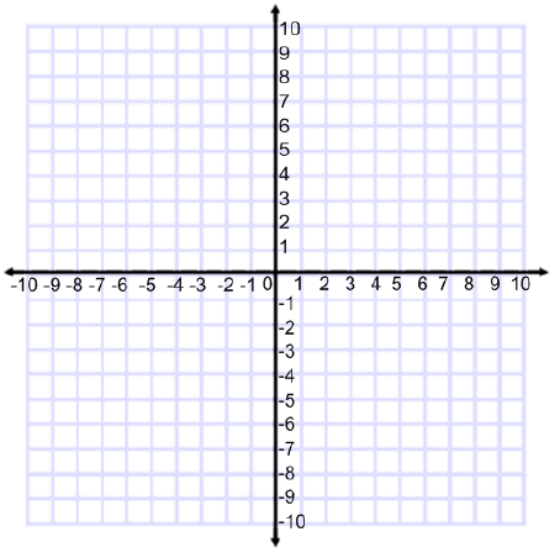
6) For the function $f(x) = -5x + 6$

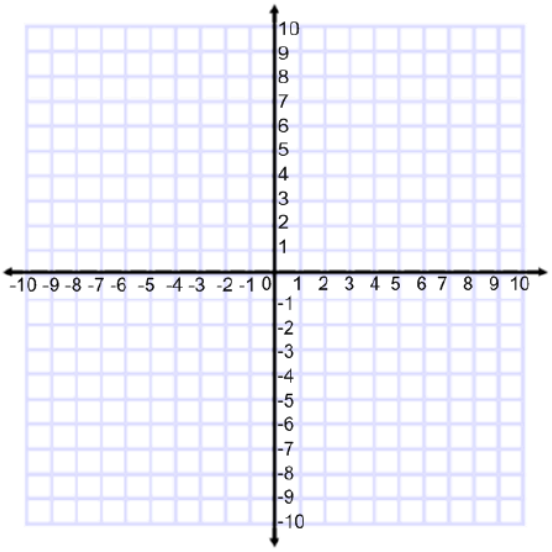
a) determine $f^{-1}(x)$

b) Graph $f(x)$ and its inverse



7) Use transformations to graph the function $f(x) = 2(x-2)^2 + 1$. Find the inverse function $f^{-1}(x)$ and graph it by reflecting $f(x)$ over the line $y = x$ (switch x and y co-ordinates)



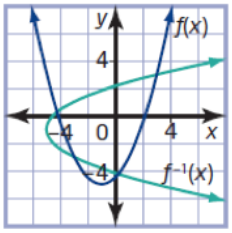


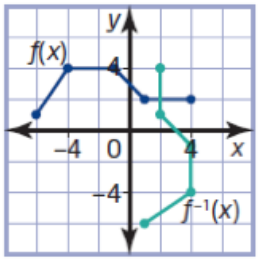
8) Determine the equation of the inverse for the given functions and state the domain and range.

a) $f(x) = \sqrt{x+3}$

b) $f(x) = \frac{3}{x-2} + 2$

Answers

1) a) 

the inverse is NOT a function **b)** 

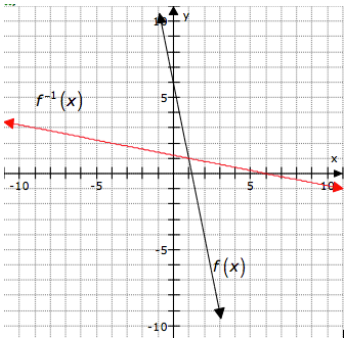
inverse is NOT a function

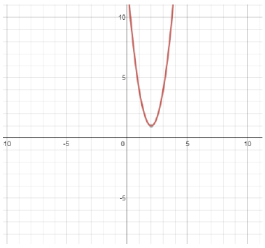
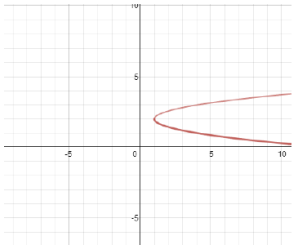
2) a) $f^{-1}(x) = \frac{x}{2}$ **b)** $f^{-1}(x) = \frac{x+5}{6}$ **c)** $f^{-1}(x) = \frac{5x-4}{2}$

3) a) $f^{-1}(x) = \pm\sqrt{x-6}$ **b)** $f^{-1}(x) = \pm\sqrt{x} - 8$

4) a) $f^{-1}(x) = \pm\sqrt{x-6} - 3$ **b)** $f^{-1}(x) = \pm\sqrt{\frac{x+75}{2}} - 6$

5) a) yes **b)** no

6) a) $f^{-1}(x) = \frac{-x+6}{5}$ **b)** 

7) $f^{-1}(x) = 2 \pm \sqrt{\frac{x-1}{3}}$  

8) a) $f^{-1}(x) = x^2 - 3$; Domain for $f(x)$: $\{X \in \mathbb{R} | x \geq -3\}$, Range for $f(x)$: $\{Y \in \mathbb{R} | y \geq 0\}$
Domain for $f^{-1}(x)$: $\{X \in \mathbb{R} | x \geq 0\}$, Range for $f(x)$: $\{Y \in \mathbb{R} | y \geq -3\}$

b) $f^{-1}(x) = \frac{3}{x-2} + 2$; Domain for $f(x)$: $\{X \in \mathbb{R} | x \neq 2\}$, Range for $f(x)$: $\{Y \in \mathbb{R} | y \neq 2\}$
Domain for $f^{-1}(x)$: $\{X \in \mathbb{R} | x \neq 2\}$, Range for $f(x)$: $\{Y \in \mathbb{R} | y \neq 2\}$