Name:_____   Date:_____

M10 Honours: Section 1.5b Inverse of a Quadratic Functions

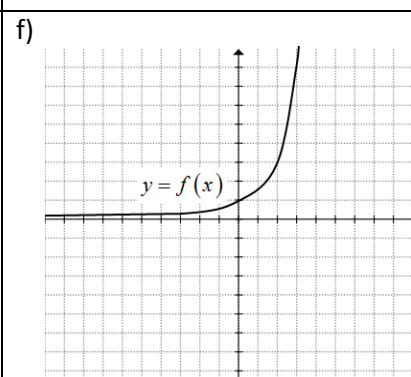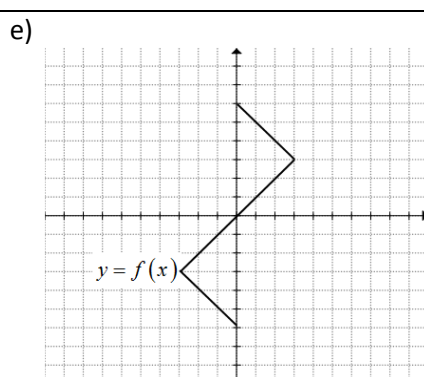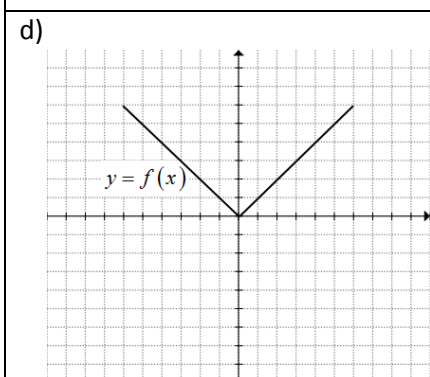1. Given each equation for $y = f(x)$, find the inverse equation $g(x) = f^{-1}(x)$.
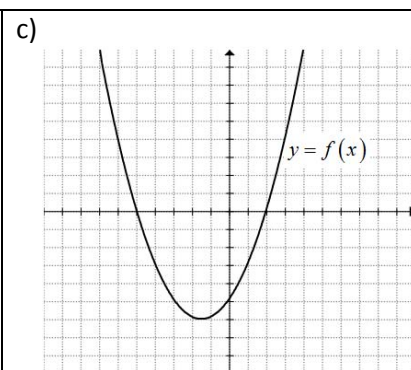
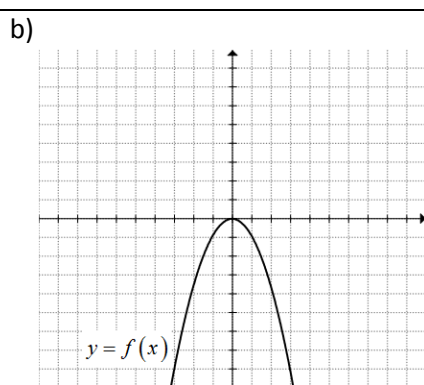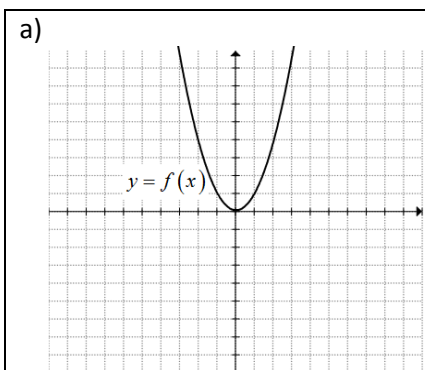|		
a) $y = 3x - 4$	b) $y = \dfrac{-8x + 11}{2}$	c) $y = \dfrac{2 - 3x}{4 + 7x}$
d) $y = \dfrac{2x - 1}{3x + 1}$	e) $y = -2x^2; x \geq 0$	f) $y = 3(x - 5)^2; x \geq 5$
g) $y = (x - 3)^2 + 1; x \geq 3$	h) $y = -(x + 2)^2 - 5; x \geq -2$	i) $y = -3(x + 5)^2 + 6; x < -3$

j) $y = 2x^2 - 8x + 11; \ x \geq 2$	k) $y = 2x^3 + 6x^2 + 6x + 2$	L) $y = 5x^3 - 3x^2 + 6x - 12$

2. Graph $y = f^{-1}(x)$ for each function on the same grid. Restrict the domain if necessary:

a)

$y = f(x)$

b)

$y = f(x)$

c)

$y = f(x)$

d)

$y = f(x)$

e)

$y = f(x)$

f)

$y = f(x)$

3. The following points $(3,5)$, $(-3,-7)$, $(-2,8)$, $(7,-10)$, and $(-3,-9)$ are on the function $y = f(x)$.

What will the coordinates be on the function: $y = \left| f^{-1}(x) \right|$?

4. Under what conditions will both $y = f(x)$ and $y = f^{-1}(x)$ be a function for all values of "x"? Provide examples of such functions:

5. Given the function of the parabola, find the equation, domain, and range of the inverse function.
   Note: The domain is restricted so that the inverse is also a function.

   i) $y = 2(x-3)^2 + 1;\ x \geq 3$

   iv) $y = 0.2x^2 - 2x + 6\ ;\ x \geq 5$

   ii) $y = -3(x+4)^2 - 5;\ x < -4$

   v) $y = \dfrac{2}{3}x^2 + 8x + 14\ ;\ x < -6$

6. If $f(3) = -5$ and $f(-5) = 7$, then what is the value of $\left| f(-5) \right| - f^{-1}(-5)$?

7. At which points on the graph of $y = f(x)$ will it always intersect the inverse function $y = f^{-1}(x)$?

8. Given each of the following functions below, please indicate if both $y = f(x)$ and $y = f^{-1}(x)$ are functions for the domain when $x \in \mathbb{R}$. Justify your anwer:

a) $y = 3x + 2$	b) $y = 3(x-3)^2 + 1$
c) $y = 2^x + 1$	d) $y = \sqrt{3x - 1}$
e) $y = \dfrac{1}{x-3}$	f) $y = x^2 - 3x$

9. A parabola with equation $y = ax^2 + bx + c$ is reflected about the x-axis. The parabola and its reflection are translated horizontally five units in opposite directions to become graphs of $y = f(x)$ and $y = g(x)$ respectively. Which of the following describes the graph of $y = (f + g)(x)$? i.e.: $y = f(x) + g(x)$

   a) A parabola tangent to the x-axis   b) A parabola not tangent to the x-axis

   c) a horizontal line   d) A non-horizontal line   e) the graph of a cubic function

10. Challenge: Find the exact values of the equation: $2\sqrt[3]{2x-1} = x^3 + 1$ [Hint: Use Inverse]Adler 2011