Name:_____ Date:_____

M10 Honours: Section 2.6 Inverse of a Quadratic Functions

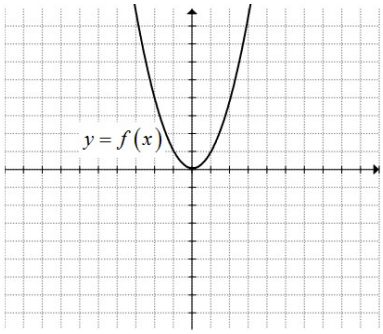
1. Given each equation for $y = f(x)$, find the inverse equation $g(x) = f^{-1}(x)$.

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) $y = -3(x + 5)^2 + 6;\ x < -3$

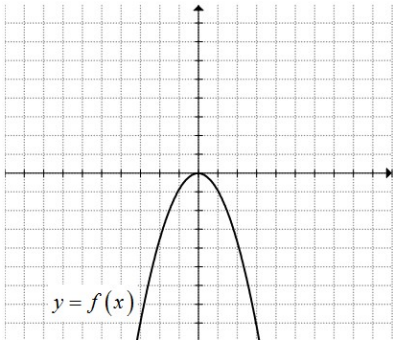
j) $y = 2x^2 - 8x + 11;\ x \geq 2$	k) $y = 2x^3 + 6x^2 + 6x + 2$	L) $y = 5x^3 - 3x^2 + 6x - 12$

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

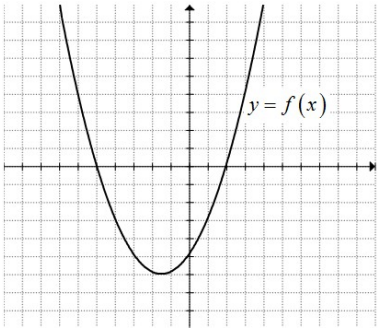
a)



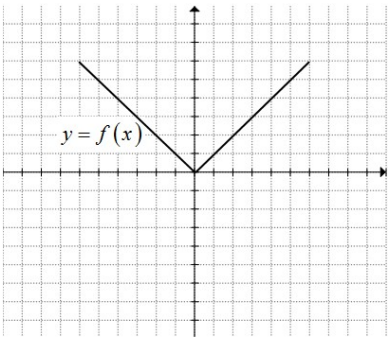
b)



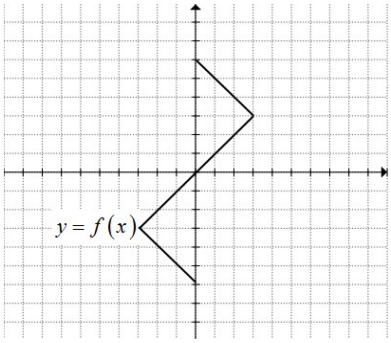
c)



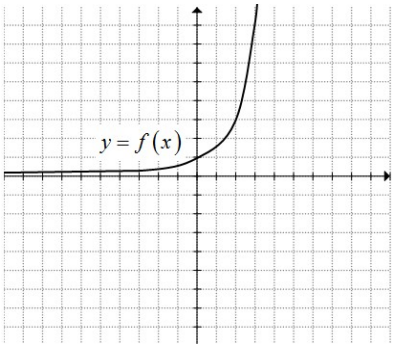
d)



e)



f)



3. When finding the inverse of a parabola, why do we split the domain along the axis of symmetry? Explain?

4. 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: $y=\left|f^{-1}(x)\right|$?

5. 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:

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

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

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

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

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

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

9. 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) $y = x^2 - 3x$

10. Given that the $y = f(x)$ is a function, what is the difference between $f(f^{-1}(x))$ vs $f^{-1}(f(x))$?

11. Suppose $f(x)=(x-3)^2$, what is the value of $f^{-1}(f(4))=?$ What is the value of $f(f^{-1}(4))=?$

12. The parabola with equation $y=ax^2+bx+c$ and vertex (h,k) is reflected about the line $y=k$. This results in the parabola with equation $y=dx^2+cx+f$. What is the value of $a+b+c+d+e+f$?

a) $2b$ $b)$ $2c$ $c)$ $2a+2b$ $d)$ $2h$ $e)$ $2k$

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