Compositions and Inverses of Functions Name McG Key

1. Find the equation of the inverse of each relation or function. Use your knowledge of functions to determine if the function is one-to-one. If yes, use $f^{-1}(x)$ notation for the equation of the inverse.

a) $g(x) = \sqrt[3]{x} - 4$ $g^{-1}(x) = (x+4)^3$, yes

b) $f(x) = \frac{1}{2}x + 2$ $f^{-1}(x) = 2x - 4$, yes

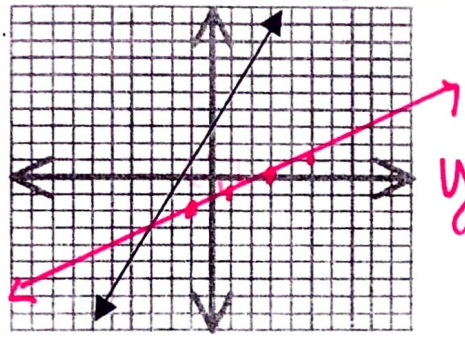
c) $g(x) = \sqrt{3x - 9}$ $g^{-1}(x) = \frac{x^2+9}{3}$, $x \geq 0$; yes

d) $h(x) = 4x^2 - 7$ $h^{-1}(x) = \pm\sqrt{\frac{x+7}{4}}$, no

DON'T FORGET TO GRAPH #1-4!

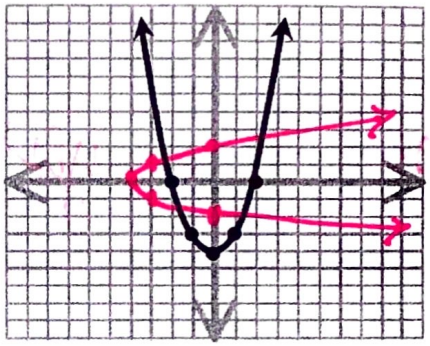
2. Graph the inverse of the given function. Is the inverse a function?

a.



yes

b.



no

3. Use your knowledge of inverses to determine whether the functions are inverses of each other. You must have work to support your answer.

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

yes

b. $g(x) = \frac{1}{2}x + 2$
$h(x) = 2x - 1$

yes

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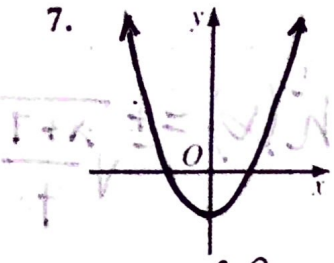
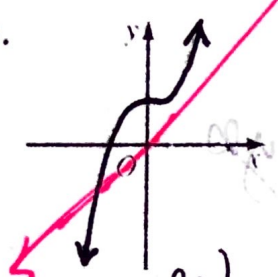
Use the horizontal-line test to determine whether each function f has an inverse function. If so, draw a rough sketch of f^{-1} by reflecting f across $y = x$.

7.



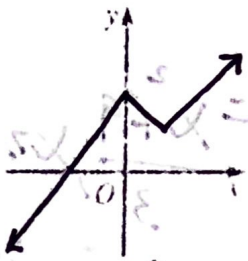
no

8.



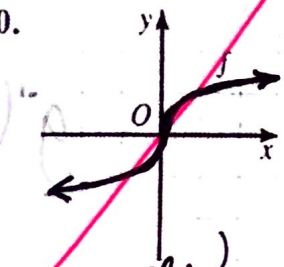
yes

9.



no

10.



yes

In exercises 11 – 14, determine if f(x) is one-to-one. Why or why not? If it is one-to-one, find $f^{-1}(x)$.

11. $f(x) = 3x^2 + 5$

no

12. $f(x) = \frac{x+6}{3}$

yes

$f^{-1}(x) = 3x - 6$

13. $f(x) = x^3$

yes

$f^{-1}(x) = \sqrt[3]{x}$

14. $f(x) = -|3x + 9| - 7$

no