AGS 3: Unit 1 Review

Name: ______________________________

Date: ________________ Per: _____

For each given table, give the table for its inverse and determine if the inverse is a function.

1.

x	$f(x)$
2	5
3	3
4	1
5	−1
6	−3
7	−5

x	$f^{-1}(x)$
5	2
3	3
1	4
−1	5
−3	6
−5	7

Is $f^{-1}(x)$ a function? If not, tell why not.

It is a function because no x values are repeated

2.

x	$g(x)$
−2	−3
−1	−2
0	−1
1	−2
2	−3
4	−5

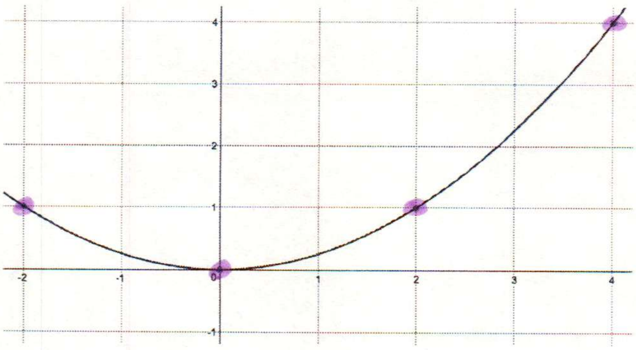
x	$g^{-1}(x)$	
−3	−2	(−3, −2)
−2	−1	(−2, −1)
−1	0	
−2	1	(−2, 1)
−3	2	(−3, 2)
−5	4	

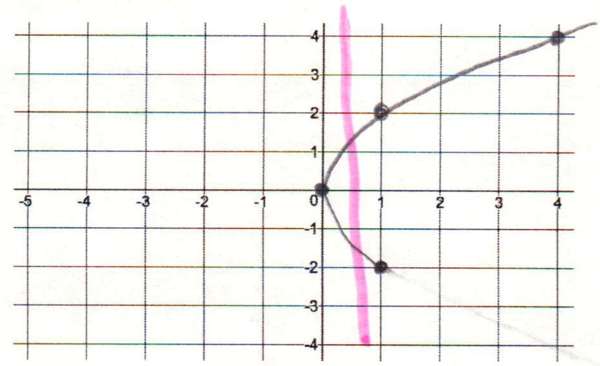
Is $g^{-1}(x)$ a function? If not, tell why not.

It is not a function because x=−2 and x=−3 both go to different output values

For each given graph, give the graph for its inverse and determine if the inverse is a function.

3.

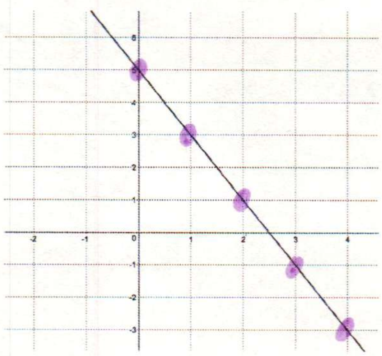


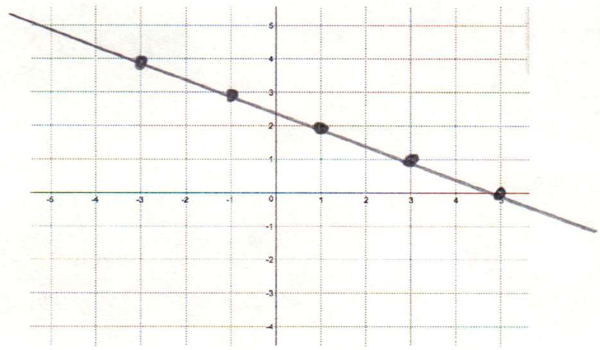


Is the inverse a function? If not, tell why not.

It is not a function because it fails the vertical line test

4.





Is the inverse a function? If not, tell why not.

Yes it creates a straight (non-vertical) line

For each given equation, find the inverse equation and write it in inverse function notation.

5. $f(x) = \frac{1}{2}x + 6$

$y - 6 = \frac{1}{2}x$

$2y - 12 = x$

$f^{-1}(x) = 2x - 12$

6. $g(x) = \frac{x-4}{3}$

$3y = x - 4$

$3y + 4 = x$

$g^{-1}(x) = 3x + 4$

For each given equation, find the inverse equation and write it in inverse function notation.

7. $h(x) = 2x^2 + 6$

$y - 6 = 2x^2$

$\frac{1}{2}y - 3 = x^2$

$\sqrt{\frac{1}{2}y - 3} = x$

$h^{-1}(x) = \sqrt{\frac{1}{2}x - 3}$

8. $k(x) = \sqrt{x} + 3$

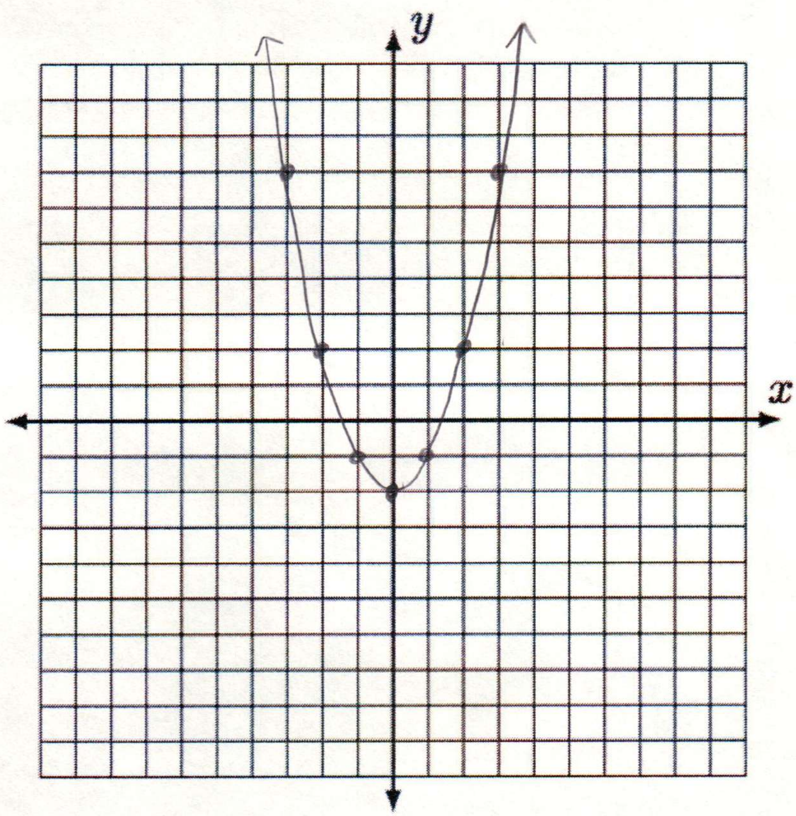
$y - 3 = \sqrt{x}$

$(y-3)^2 = x$

$K^{-1}(x) = (x-3)^2$

9. Given the function $f(x) = x^2 - 2$. Model the function below.

x	f(x)
-3	7
-2	2
-1	-1
0	-2
1	-1
2	2
3	7



Give the features of the function.

domain: $\mathbb{R}$

range: $[-2, \infty)$

y-intercept: $(0, -2)$

x-int: $(\sqrt{2}, 0)$ $(-\sqrt{2}, 0)$

quadratic function

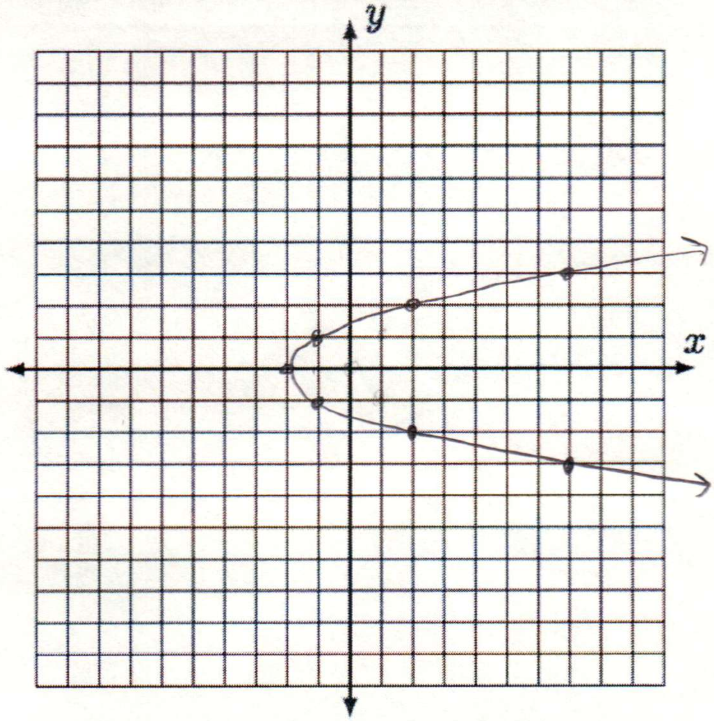
increasing: $(0, \infty)$

decreasing: $(-\infty, 0)$

10. Give the inverse of the function in #9.

x	$f^{-1}(x)$
7	-3
2	-2
-1	-1
-2	0
-1	1
2	2
7	3

$f^{-1}(x) = \pm\sqrt{x+2}$



Is the inverse a function? Explain.

It is not a function because it fails the vertical line test

11. Is an inverse always a function? What can you change so an inverse that is not a function can be a function?

No, an inverse is not always also a function. You can make a function and its inverse both functions if you limit the domain of the original function so it has no repeated outputs.

12. Use composition of functions to determine if the given functions are inverses of each other.

$f(x) = \sqrt{2x+6}$ and $g(x) = \frac{1}{2}x^2 - 3$

$f(g(x)) = \sqrt{2(\frac{1}{2}x^2 - 3) + 6}$

$= \sqrt{x^2 - 6 + 6}$

$= \sqrt{x^2}$

$= x$

$g(f(x)) = \frac{1}{2}(\sqrt{2x+6})^2 - 3$

$= \frac{1}{2}(2x+6) - 3$

$= x + 3 - 3$

$= x$

Proves they are inverses

13. What are the ways you can show that two functions are inverses of each other?

- Tables with x & y values swapped
- Graphs that reflect over the line $y = x$
- Composition of functions equals x