Unit 1: Functions Study Guide

Name: key
Algebra 2

Date:_____
Band:_____

Functions Study Guide

0.1 Functions

Determine whether the relation is a function. Explain.

1.

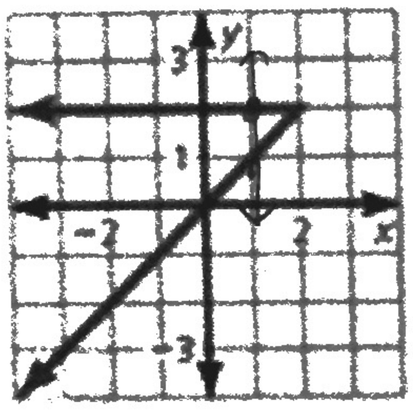
Input, x	2	5	7	9	14
Output, y	5	11	19	12	3

function, each input has exactly one output

2. (0,1), (5,6), (7,9)

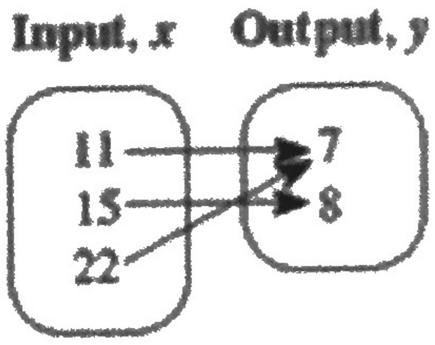
Anctin, exchinpat has exactly one atput

3.



not a function, fails vertical line test | same inputs have two outputs

4.



function, each input has exactly one output

5. The function $y = 10x + 100$ represents the amount y (in dollars) of money in your bank account after you babysit for x hours.

A. Identify the independent and dependent variables.

x hours = independent

y dollars = dependent

B. You babysit for 4 hours. Find the domain and range of the function.

$x = 4$

$f(4) = 10(4) + 100$

$f(4) = 140$

domain: $0 \leq x \leq 4$ hours

range: $100 \leq y \leq 140$ $

0.2 Function Notation

6. Evaluate $f(x) = 3x - 9$ when $x = 2$.

$f(2) = 3(2) - 9$

$f(2) = 6 - 9$

$\boxed{f(2) = -3}$

7. For $f(x) = 4x$, find the value of x for which $f(x) = 12$.

$\frac{12}{4} = \frac{4x}{4}$

$\boxed{3 = x}$

Evaluate the function when $x = -3, 0$, and 5.

8. $f(x) = x + 8$

x	f(x)
-3	5
0	8
5	13

9. $g(x) = 4 - 3x$

x	g(x)
-3	13
0	4
5	-11

Find the value of x so that the function has the given value.

10. $k(x) = 7x; k(x) = 49$

$\frac{49}{7} = \frac{7x}{7}$

$7 = x$

11. $r(x) = -5x - 1; r(x) = 19$

$19 = -5x - 1$

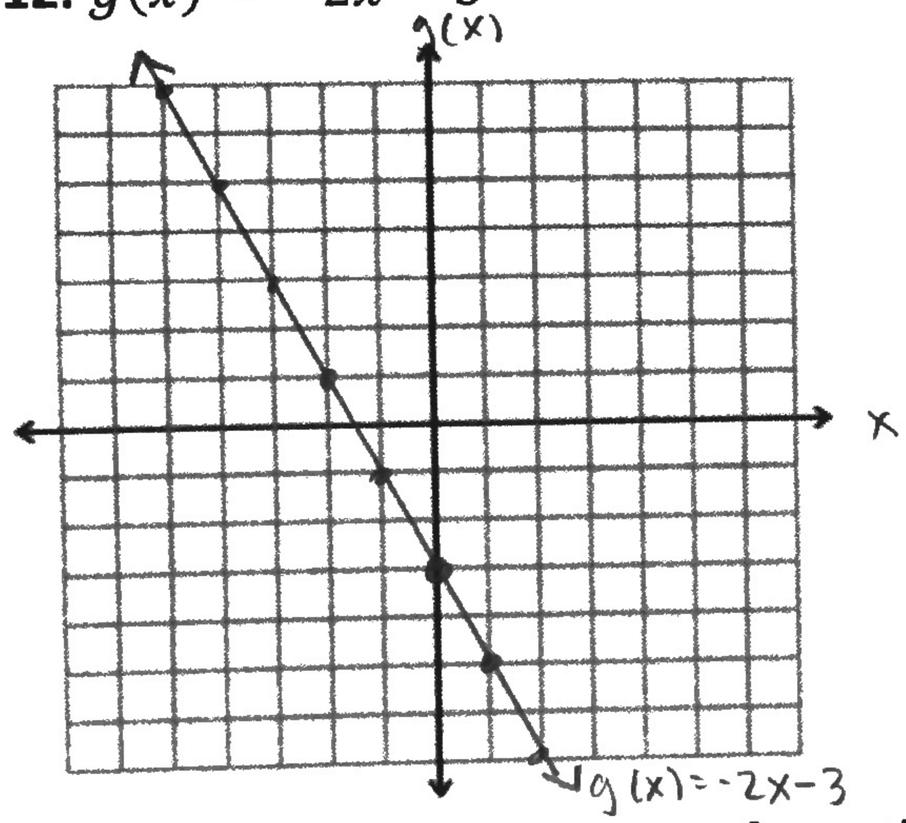
$+1 \quad +1$

$\frac{20}{-5} = \frac{-5x}{-5}$

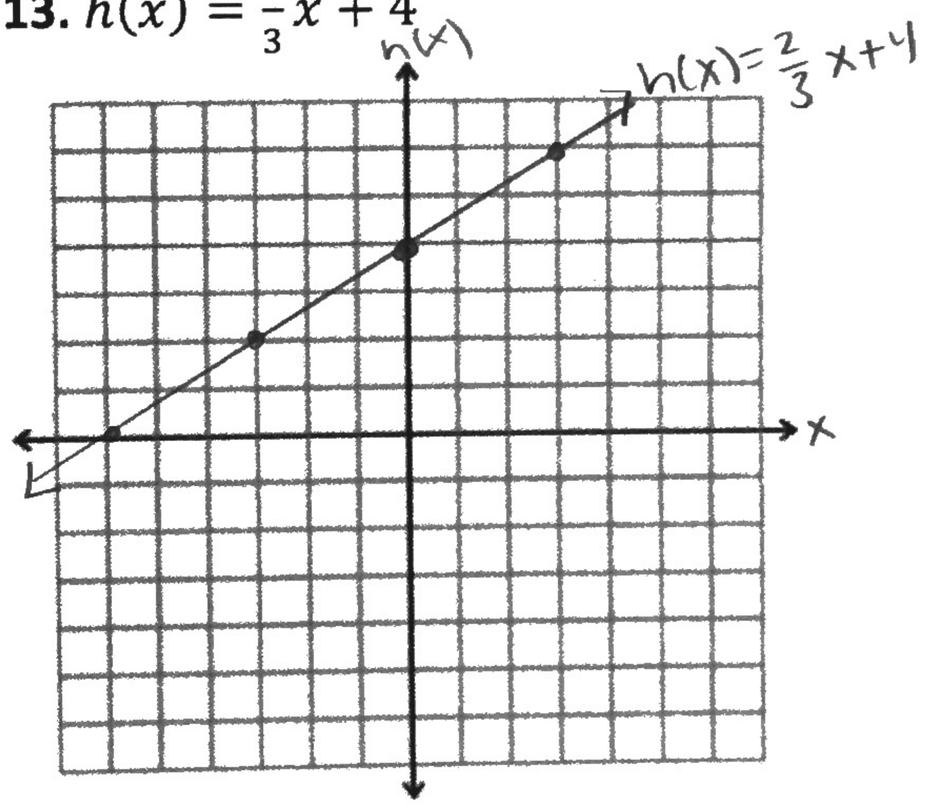
$-4 = x$

Graph the linear function.

12. $g(x) = -2x - 3$

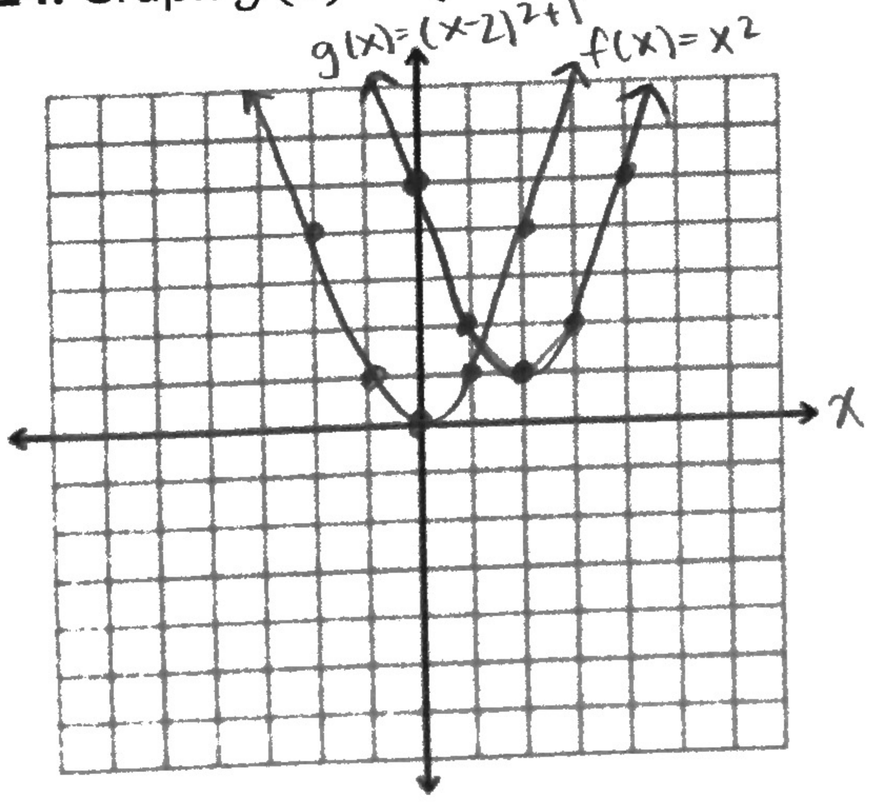


13. $h(x) = \frac{2}{3}x + 4$



1.1 Parent Functions and Transformations

14. Graph $g(x) = (x - 2)^2 + 1$ and its parent function. Then describe the transformation.



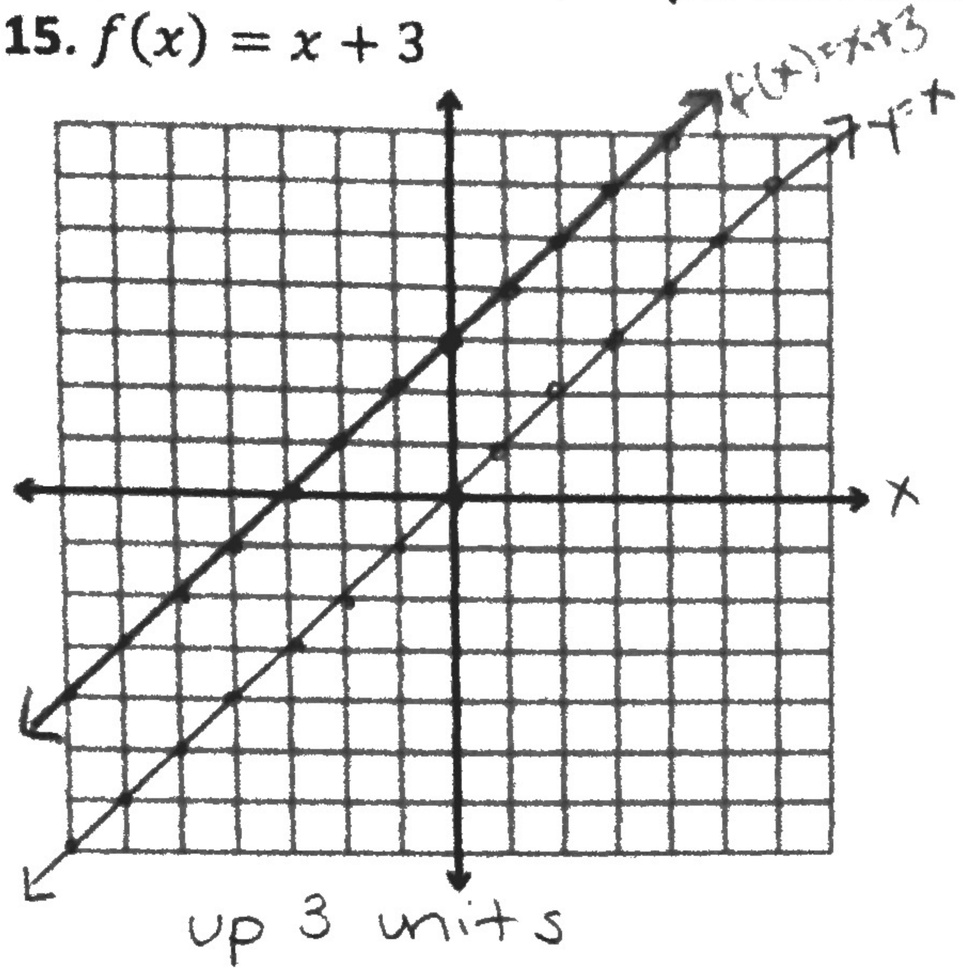
$g(x) = (x-2)^2 + 1$

right 2 units

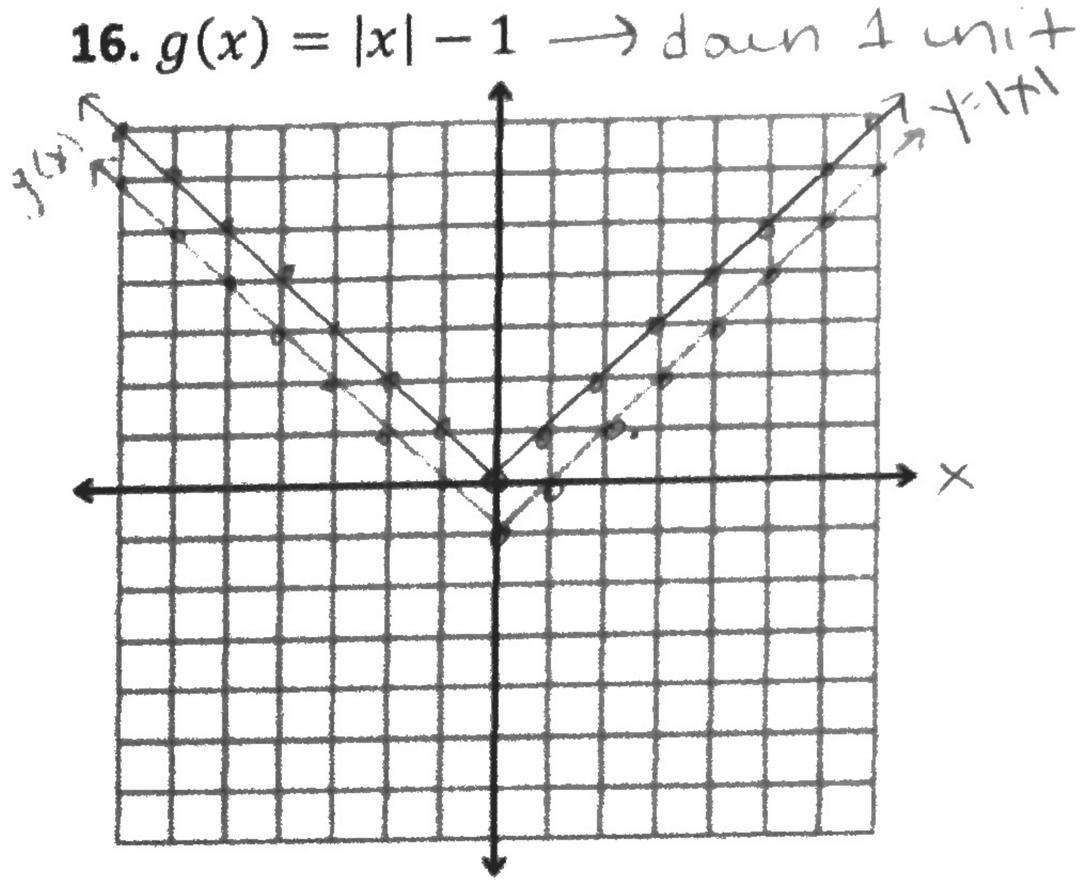
up 1 unit

Graph the function and its parent function. Then describe the transformation.

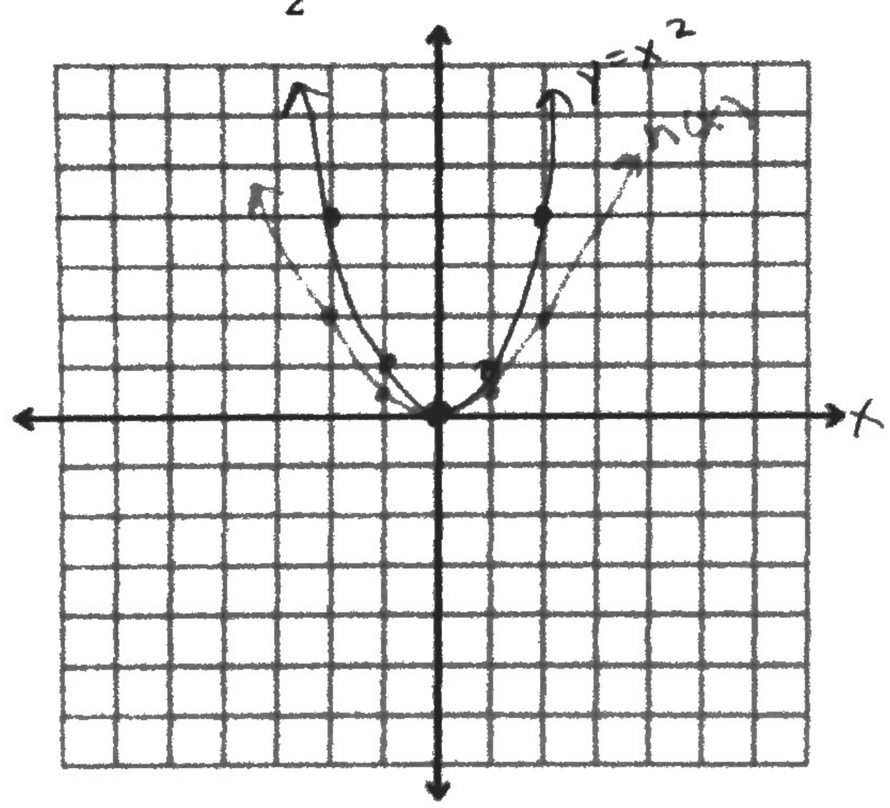
15. $f(x) = x + 3$



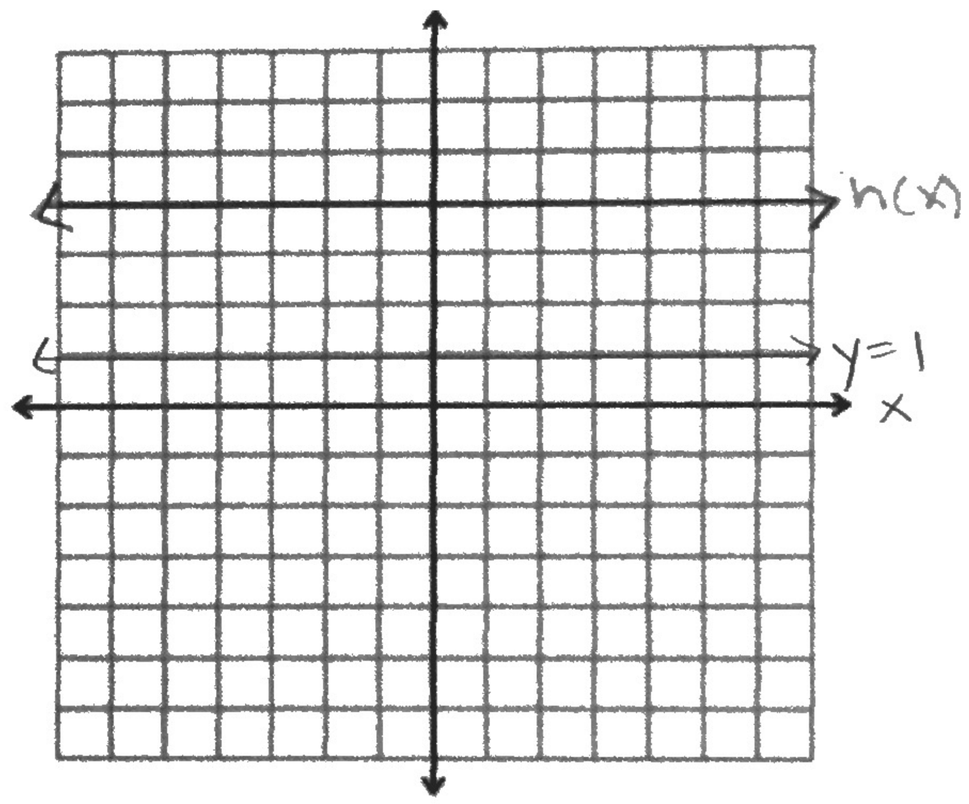
16. $g(x) = |x| - 1$ → down 1 unit



17. $h(x) = \frac{1}{2}x^2$ → wider

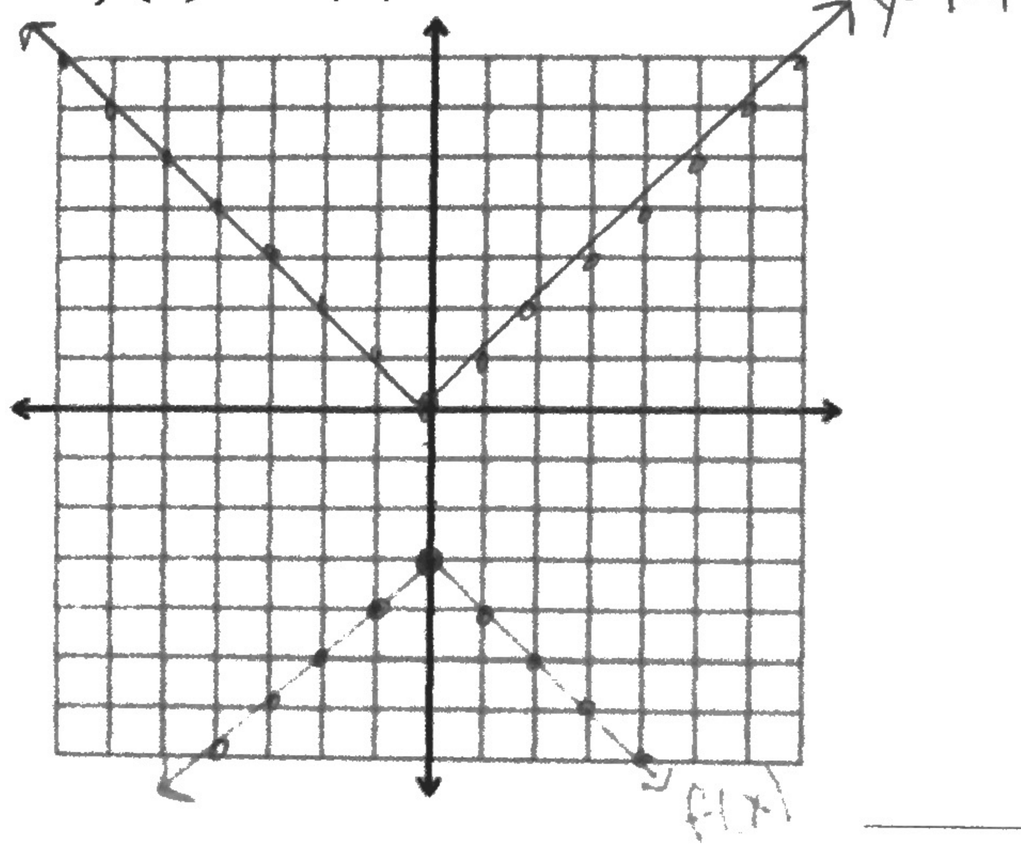


18. $h(x) = 4$ → up 4 units



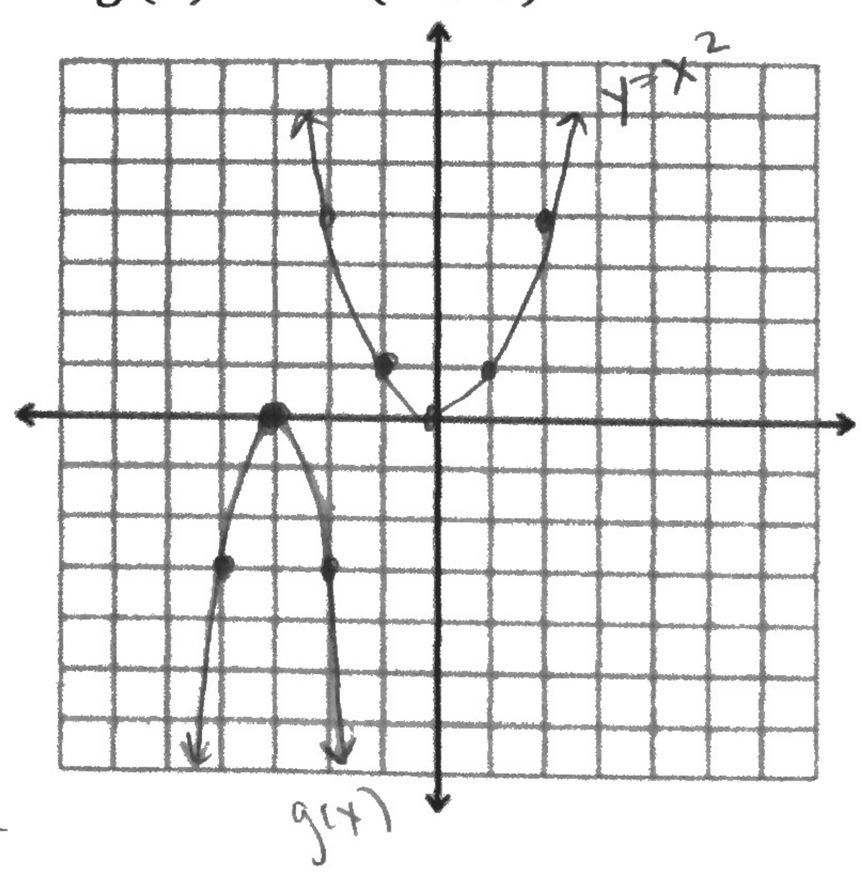
reflected over x-axis

19. $f(x) = -|x| - 3$ → down 3 units



reflected over x-axis, narrower

20. $g(x) = -3(x + 3)^2$ → left 3 units



1.2 Transformations of Linear and Absolute Value Functions

21. Let the graph of g be a translation 2 units to the right followed by a reflection in the y-axis of the graph of $f(x) = |x|$. Write a rule for g.

$g(x) = |-x-2|$

reflection in y-axis

right 2 units

Write a function g whose graph represents the indicated transformation of the graph of f. Use a graphing calculator to check your answer.

22. $f(x) = |x|$; reflection in the x-axis followed by a translation 4 units to the left

$g(x) = -|x+4|$

reflection in x-axis

4 units left

23. $f(x) = |x|$; vertical shrink by a factor of $\frac{1}{2}$ followed by a translation 2 units up

$g(x) = \frac{1}{2}|x| + 2$

vertical shrink

up 2 units

24. $f(x) = x$; translation 3 units down followed by a reflection in the y-axis

$g(x) = -x - 3$

reflection in y-axis

down 3 units