Name: _____

# 3.1 – Vertical & Horizontal Shifts

Past due on: _____ Period: _____

Describe the transformation(s) used on $f(x) = x^2$ to create $g(x)$.

1. $g(x) = x^2 - 3$

2. $g(x) = (x + 4)^2$

3. $g(x) = (x - 1)^2 + 3$

4. $g(x) = (x + 50)^2 - 279$

5. The graph of $f(x)$ contains the point $(3, -4)$. What point must be on the graph of...
   a. $f(x) + 5$?
   b. $f(x + 5)$?
   c. $f(x - 3) - 2$?

6. The domain of the function $g(x)$ is $(-3, 10)$. What is the domain of $g(x + 2)$?

7. The range of the function $h(x)$ is $[-38, 50]$. What is the range of $h(x) + 32$?

8. The graph of $g(x)$ contains the point $(-2, 5)$. Write a formula for a translation of $g$ whose graph contains the point...
   a. $(-2, 8)$
   b. $(0, 5)$
   c. $(3, 4)$

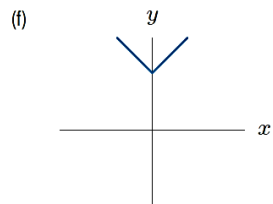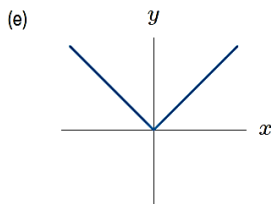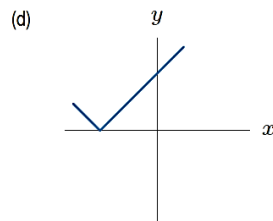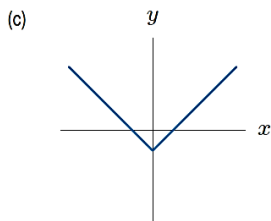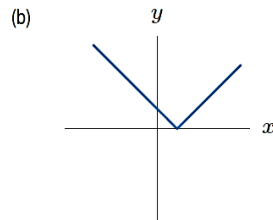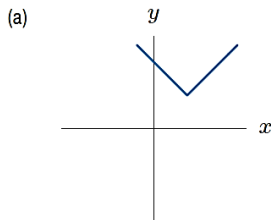9. Match the graphs a – f with the formulas in i – vi.
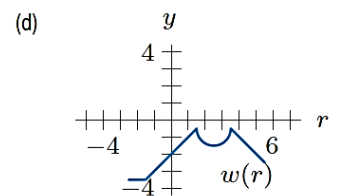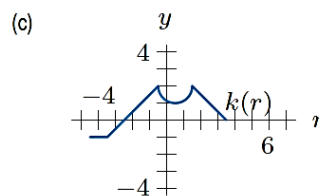   (i)   $y = |x|$
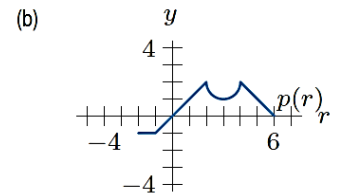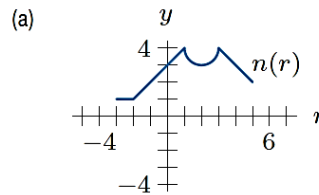   (ii)  $y = |x| - 1.2$
   (iii) $y = |x - 1.2|$
   (iv)  $y = |x| + 2.5$
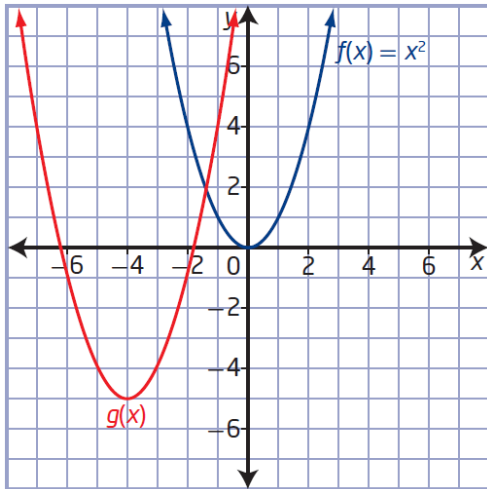   (v)   $y = |x + 3.4|$
   (vi)  $y = |x - 3| + 2.7$

(a)


(b)


(c)


(d)


(e)


(f)


10. The graph of $y = m(r)$ is shown (below). Each of the graphs (a – d) is a translation of $y = m(r)$. Write a formula, in terms of $m(r)$, for each of these graphs.



(a)


(b)


(c)


(d)
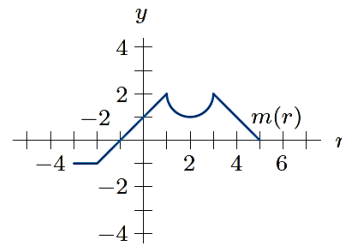
11. Describe the translation that has been applied to the graph of $f(x)$. Give a formula, in terms of $f$, for the graph of the function $g(x)$.

$f(x) = x^2$

$g(x)$

12. Describe the translation that has been applied to the graph of $f(x)$. Give a formula, in terms of $f$, for the graph of the function $g(x)$.

$g(x)$

A'

C'

B'

D'

$f(x)$

A

C

D

B
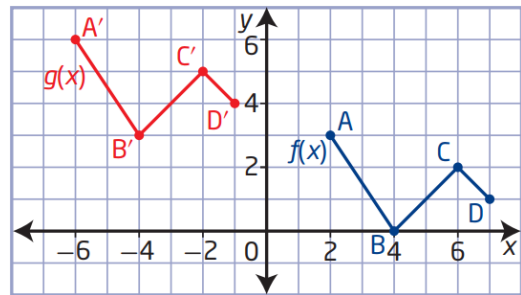
13. Use the graph of $f(x)$ to find a possible formula for the transformation of $f$ shown.

$f(x)$

$y = -8$