Name:_____ Date:_____

HW Pre Calculus 12: Section 1.2 Horizontal and Vertical Translations

1. Suppose you are given a function $f(x)=3(x-4)^2+5$ and you replace the variable "x" in the equation with $x+3$, then answer the following:

i) What does the equation become after the transformation?

ii) Which way if the graph shifted and by how much?

iii) Where is the vertex of the parabola after the transformation?

2. Suppose you are given a function $f(x)=2x^3-8x^2+5$ and you replace the variable "x" in the equation with $x-2$ and the "y" variable with $y+10$, then answer the following:

i) What does the equation become after the transformations? Simplify your equation & isolate the "Y" variable.

ii) Which way if the graph shifted and by how much?

3. Indicate the transformation from the function on the left to the function on the right:

a) $y=x^2+3x+4 \rightarrow y=(x-5)^2+3(x-5)+4$

b) $y=x^2+4x+5 \rightarrow y=x^2+4x+11$

c) $y=\sqrt{3x-4} \rightarrow y=\sqrt{3x-4}+10$

d) $y=\sqrt{3x-4} \rightarrow y=\sqrt{3x-7}$

e) $y=|x| \rightarrow y=|x-2|+4$

f) $y=\sqrt{x} \rightarrow y=\sqrt{x+3}-7$

g) $y=3x+2 \rightarrow y=3x+8$

h) $y=x^2 \rightarrow y=x^2+6x+12$

i) $y=\frac{1}{x} \rightarrow y=\frac{1}{x+5}+3$

4. Given each equation for $y=f(x)$, indicate the new equation after each translation:

a. $f(x)=3x-5$ A horizontal shift of 3 units right and 2 units up

b. $f(x)=2x^2+3$ A horizontal shift of 5 units left and 8 units up

c. $f(x)=\sqrt{x-5}+1$ A horizontal shift of 7 units right and 6 units down

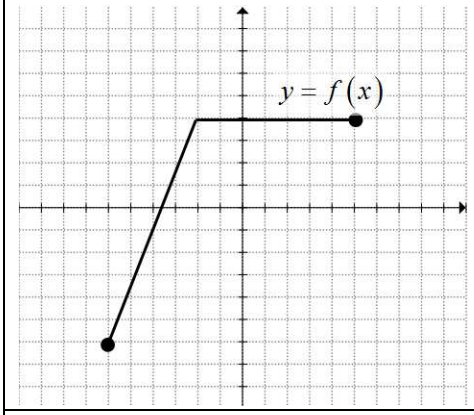
d. $f(x)=3^x+2$ A horizontal shift of 11 units left and 2 units down

e. $x^2+y^2=16$ A horizontal shift of 4 units right and 8 units up

f) $f(x)=\frac{1}{x-3}$ A horizontal shift of 2 units left and 6 units down

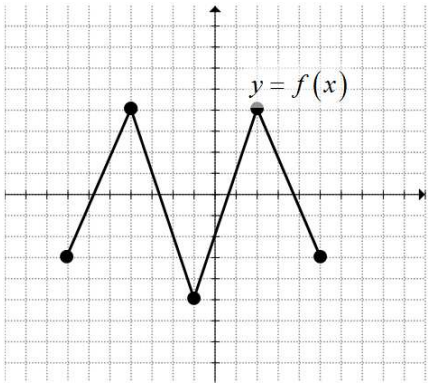
g) $f(x)=x^3+2x^2$ A horizontal shift of 5 units right and 11 units down

5. Given the graph of $y = f(x)$, draw the resulting image after each transformation:



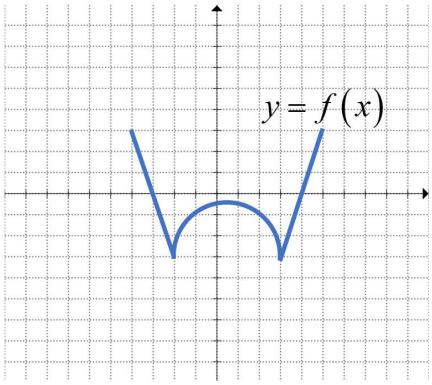
i) $y = f(x-3)+1$

ii) $y-3 = f(x+1)$



i) $y+1 = f(x+2)$

ii) $y = 1+f(x+4)-2$



i) $y-3 = f(x-4)$

ii) $y-2 = f(x+3)-5$

6. Given that the coordinates of (2,3) is transformed to (8,4) from $y = f(x) \rightarrow y = f(x-a)+b$, what is the value of a + b?

7. Given that the coordinates (a,b) are on the function $y=f(x)$, find the new coordinates for each function after the transformation:

i) $y=f(x-3)+2$	ii) $y-5=f(x+1)+2$
iii) $y=f(x+7)-11$	iv) $y-4=f(x-5)+3$

8. Suppose the point (a,b) is on the function from the left. What will the point become after the transformation shown from the function on the right? Indicate all possible answers:

a) $y=|3x-2| \rightarrow f(x)=|3x+12|+4$

b) $y=\frac{4}{3}x+11 \rightarrow f(x)=\frac{4x+10}{3}$

c) $y=2^x+1 \rightarrow f(x)=4(2^x)-3$

d) $y=\frac{1}{x} \rightarrow f(x)=-1-x-x^2-x^3+\ldots \ \{0<x<1\}$

9. The parabola $y=x^2-4x+3$ is translated 5 units right. In this new position, the equation of the parabola is $y=x^2-14x+d$. What is the value of "d"?