Name:_____          Date:_____

## Pre Calculus 12: Section 1.2 Horizontal

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

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

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

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

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

e) $y = x^3 \rightarrow y = x^3 + 3x^2 + 3x + 1$

f) $y = \dfrac{1}{x} \rightarrow y = \dfrac{1}{x+5} + 3$

2. 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) $y - 4 = f(x-5) + 3$ |

3. 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
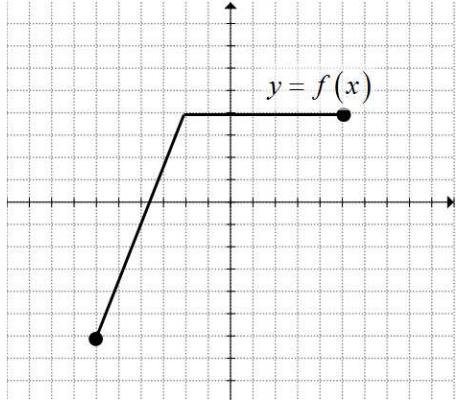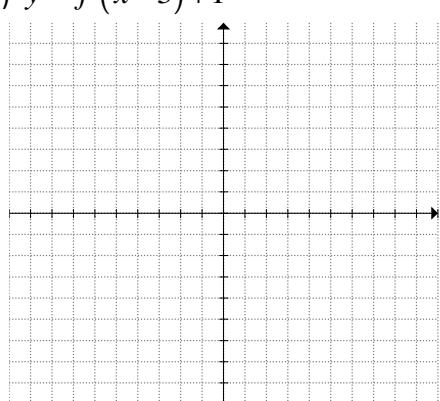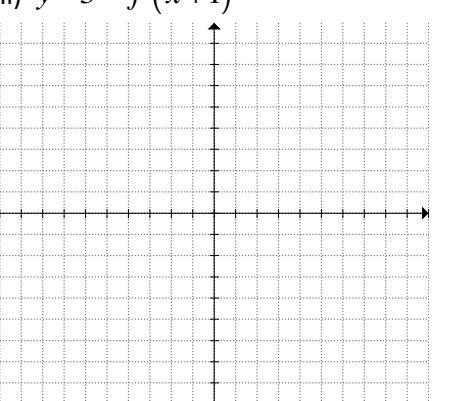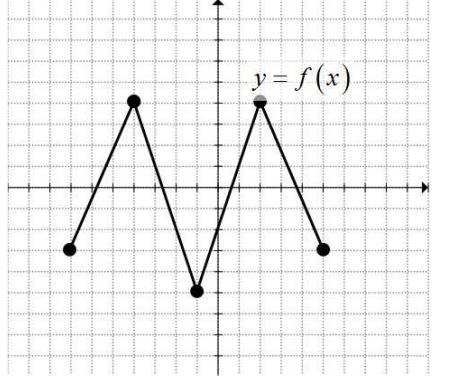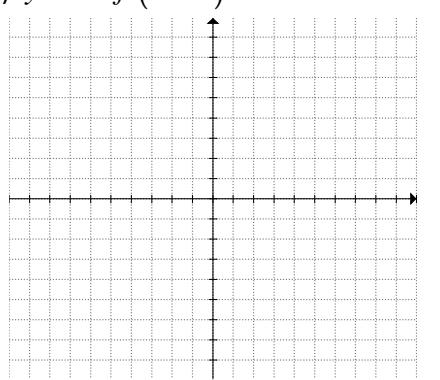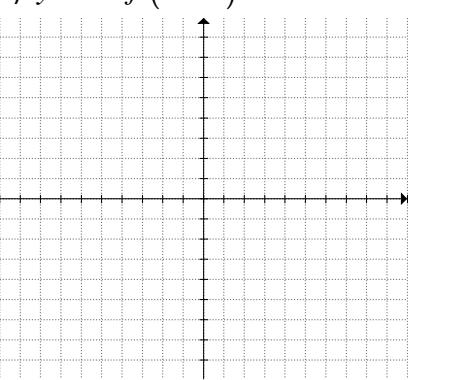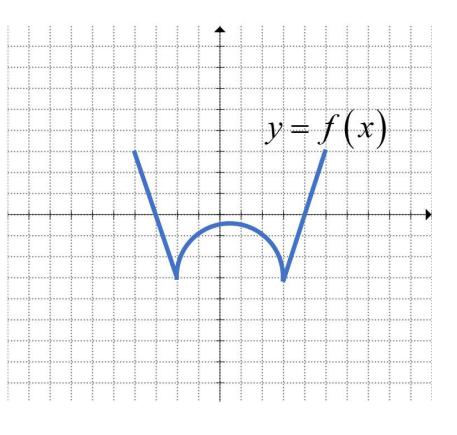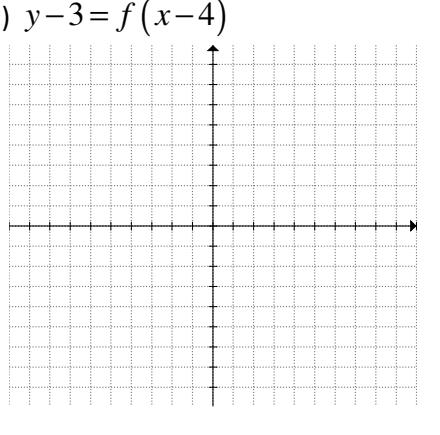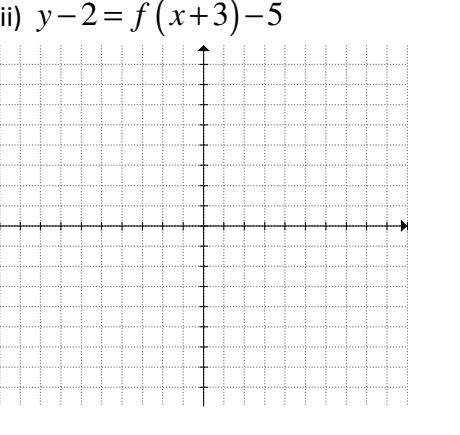
e. $x^2 + y^2 = 16$      A horizontal shift of 4 units right and 8 units up

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

4. 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?
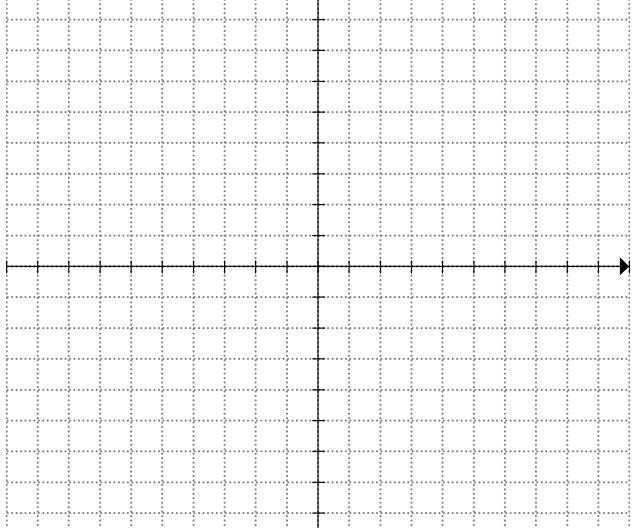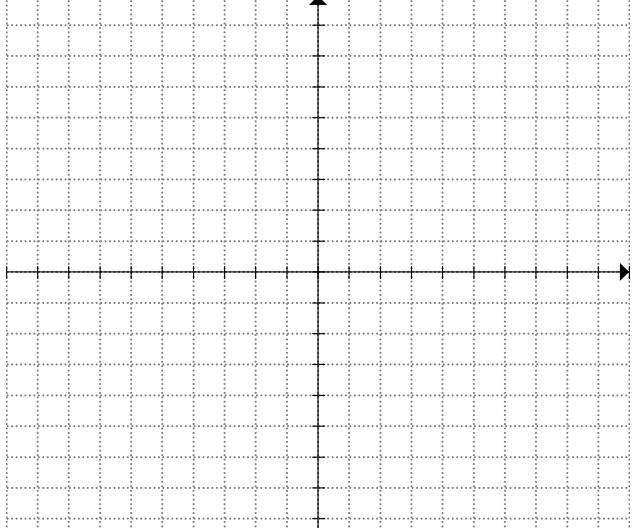
5. Given the graph of $y=f(x)$, draw the resulting image after each transformation:



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 the following transformation, $y = f(x) \rightarrow y = f(-x)$, which equation below will remain the same?

i) $\quad y = x^2$   ii) $y = x^3 + 2x^2$      iii) $y = \sqrt{x^2}$   iv) $y = \dfrac{1}{2x+3}$      vi) $y = \left| 3\left(2^x\right) \right|$

7. Solve the following equations algebraically for "x". Then use the grid on the left to graph each side of the equation. Ie: Y1 is the left side and Y2 is the right side of the equation. Use the graph to find the intersection points: Indicate all the extraneous roots. Only use Graphing Technology to check:

a) $|x-2| + 1 = \dfrac{3x+3}{5}$

b) $\dfrac{1}{x-1} + 2 = 4x - 2$

c) $\sqrt{x-1} = |x-3|$
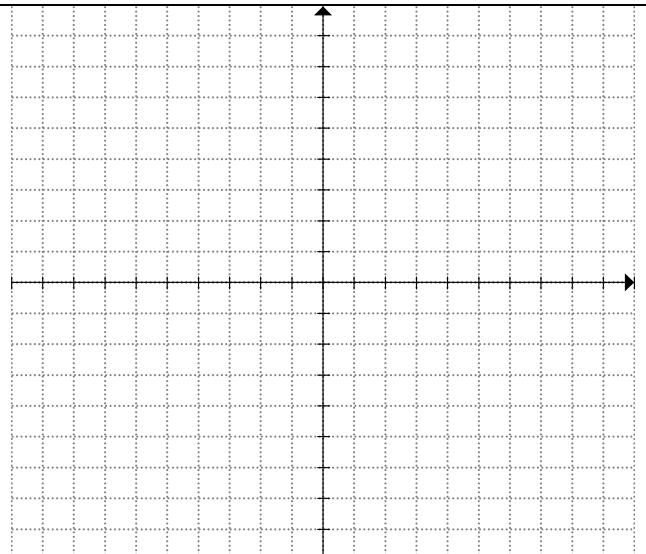
d) $|x^2 - 4| = \sqrt{x+3} + 1$
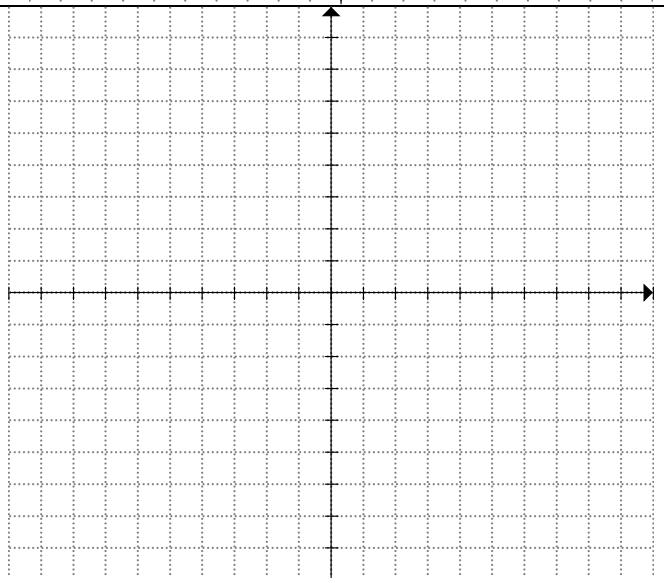
e) $\dfrac{1}{x} + 2 = \left|x + \dfrac{3}{2}\right| + \dfrac{1}{2}$
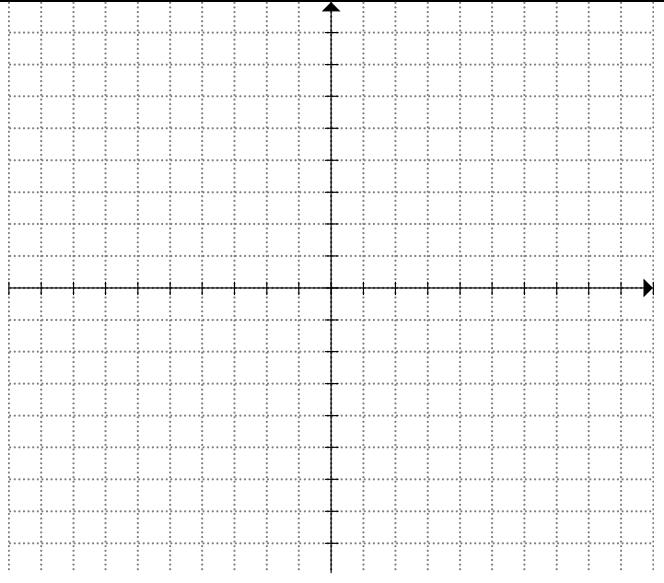
f) $-|0.5x-1|-1=2^{x-1}-3$
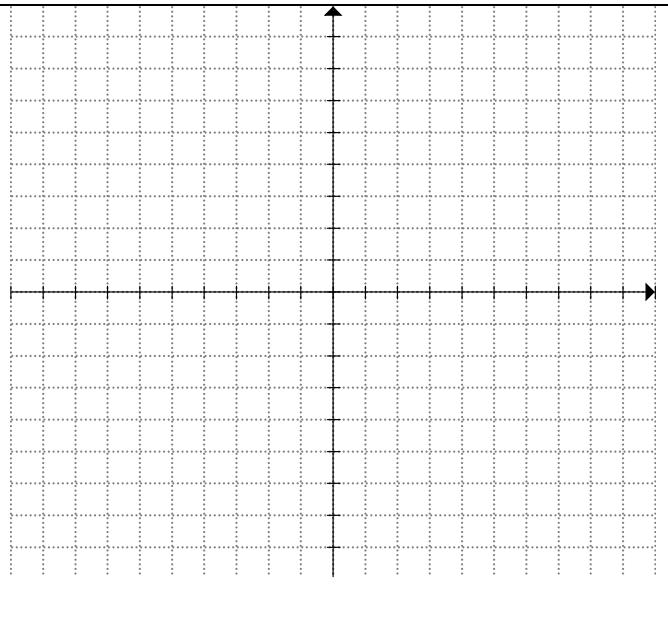
8. Suppose the point (a,b) is on the function from the left. What will the point become after the transformation shown from the function on the right? Indicate all possible answers:

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

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

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

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

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"?

10. If $0<k<360°$ and $\cos(x+k)=\sin x$, what is the smallest value of "k"?

11. The function $f(x)$ has a period of 4. The graph of one period of $y = f(x)$ is shown in the diagram below.

Sketch the graph of $y = \left[ f(x-1) + f(x+3) \right]$ for $-2 \le x \le 2$.