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QUIZ 1.1 - 1.2

1. Identify the values of the parameters a, b, h and k for each of the following functions. Explain what transformation they represent :

a) $y = f(x-2)+3$ a= 1 b= 1 h = 2 k = 3

translations 2 units → and 3 units ↑

b) $y = 5f(2x)$ a= 5 b= 2 h = 0 k = 0

vertical stretch factor 5 and horiz. stretch factor $\frac{1}{2}$

c) $y = 3|x|-4$ a= 3 b= 1 h = 0 k = -4

vertical stretch factor 3 and translate 4 units ↓

d) $y = (x+5)^2+1$ a= 1 b= 1 h = -5 k = 1

translations 5 units ← and 1 unit ↑

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2. Given the equation of f(x) in each case, determine the equation of the transformed function g(x) after a translation of 2 units to the right and 5 units down.

a) $y = f(x)$

$y = f(x-2)-5$

b) $f(x) = x^2$

$y = (x-2)^2-5$ or $y = x^2-4x-1$

5

c) $f(x) = |x|$

$y = |x-2|-5$

d) $f(x) = 3x^2-5x+1$

$y = 3(x-2)^2-5(x-2)+1-5$

$y = 3(x^2-4x+4)-5x+10-4$

$y = 3x^2-17x+18$

3. Determine, in each case, the equation of the function obtained after reflecting $y = f(x)$ around the x-axis and stretched it horizontally by a factor of 3.

a) $y = f(x)$

$y = -f\left(\frac{1}{3}x\right)$

b) $f(x) = x^2$

$y = -\left(\frac{1}{3}x\right)^2$ or $y = -\frac{1}{9}x^2$

c) $f(x) = |x|$

4

$y = -\left|\frac{1}{3}x\right|$

d) $f(x) = 3x^2 - 5x + 1$

$y = -\left(3\left(\frac{1}{3}x\right)^2 - 5\left(\frac{1}{3}x\right) + 1\right)$

$y = -\frac{1}{3}x^2 + \frac{5}{3}x - 1$

4. Determine, in each case, the equation of the function obtained after reflcting $y = f(x)$ around the y-axis and stretched it vertically by a factor of 2.

a) $y = f(x)$

$y = 2f(-x)$

b) $f(x) = x^2$

$y = 2(-x)^2$ or $y = 2x^2$

4

c) $f(x) = |x|$

$y = 2|-x|$ or $y = 2|x|$

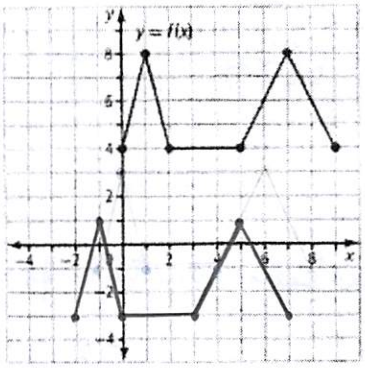
d) $f(x) = 3x^2 - 5x + 1$

$y = 2\left(3(-x)^2 - 5(-x) + 1\right)$

$y = 6x^2 + 10x + 2$

5. Given the graph of $f(x)$, graph the transformed function : $y = f(x+2) - 7$ on the same set of axes and fill the table.

(x, y)	$\rightarrow$	$(x+h, y+k)$
$(0, 4)$	$\rightarrow$	$(-2, -3)$
$(1, 8)$		$(-1, 1)$
$(2, 4)$		$(0, -3)$
$(5, 4)$		$(3, -3)$
$(7, 8)$		$(5, 1)$
$(9, 4)$		$(7, -3)$



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6. The graph of the function $f(x) = \frac{1}{x}$ is translated 5 units to the left and 2 units up to form the transformed function $y = g(x)$. Determine the equation of $y = g(x)$:

1

$$y = \frac{1}{x+5} + 2$$

7. a) If $f(x) = \sqrt{x}$ and you want to stretch its graph vertically so it's twice taller, what is the equation of the function you want to graph ?

1

$$y = 2\sqrt{x}$$

b) If you compare the graphs of $f(x) = \sqrt{x}$ and $g(x) = \sqrt{3x}$, what can you say about the graph of g compared to the graph of f ?

1

The graph of g is going to look taller (because the points are 3 times closer to the y-axis...)

c) If $f(x) = x^2 + 2x - 3$, and you want $g(x)$ to have a graph similar but twice wider (horizontal), what equation would be appropriate for $g(x)$? What are the invariant points ?

1

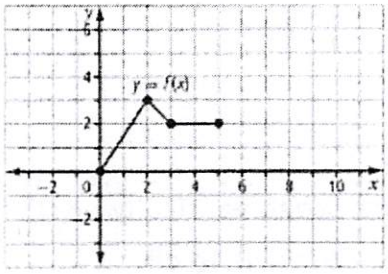
$y = f(\frac{1}{2}x)$ $\quad y = \frac{1}{4}x^2 + x - 3$

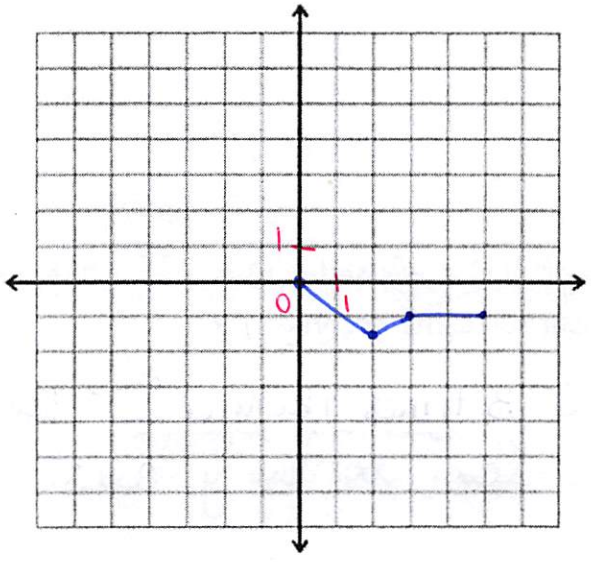
1

Invariant points: points on the y-axis.

$\Rightarrow$ y-int: $(0; -3)$

8. Graph the following transformation of $f(x)$ and write its equation (with respect to f): reflection in the x-axis and a vertical stretch by a factor of $\frac{1}{2}$.





$y = -\frac{1}{2}f(x)$

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