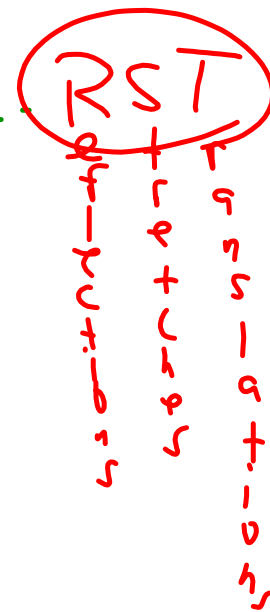


$$g(x) = -3 \left[ f \left( \frac{1}{2}(x-5) \right) \right] + 7$$

Ref.  $\uparrow$  SF
Ref.  $\uparrow$  SF

Identify all transformations...



Reflection

$\Rightarrow$  In x-axis

Stretches

$\Rightarrow$  Vertically stretched by a factor of 3

$\Rightarrow$  Horizontally by a factor of  $\frac{1}{2}$

Translations

$\Rightarrow$  Right 5

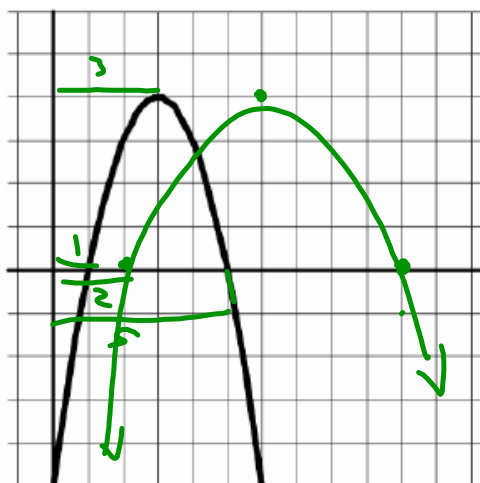
$\Rightarrow$  Up 7

$$(x, y) \rightarrow \left( \frac{1}{2}x + 5, -3y + 7 \right)$$

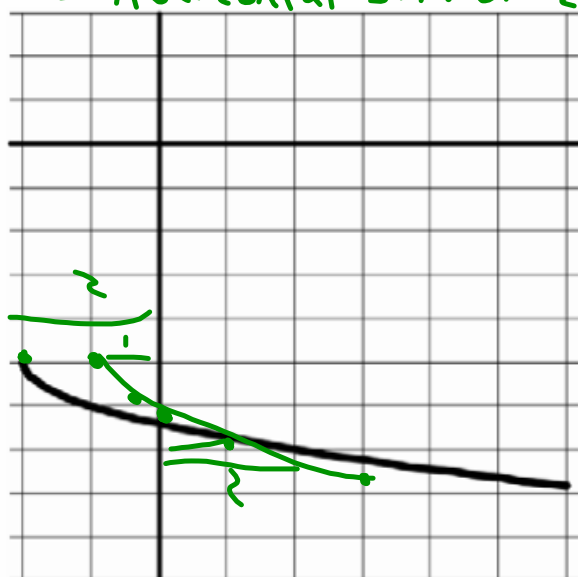
## Horizontal Stretch or Compression...

- When the input of a function  $y = f(x)$  is multiplied by a non-zero constant  $b$ , the result,  $y = f(bx)$ , is a horizontal stretch of the graph about the  $y$ -axis by a factor of  $\frac{1}{|b|}$ . If  $b < 0$ , then the graph is also reflected in the  $y$ -axis.

**Example 1: Apply  $f\left(\frac{1}{2}x\right)$  to the graph.**  
 Hor. S. Factor  $\Rightarrow 2$



**Apply  $f(2x)$  to the given graph.**  
 $\Rightarrow$  Horizontal S.F. of  $\frac{1}{2}$



Practice problems...

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#5, 6, 7, 8, 9, 14, C4