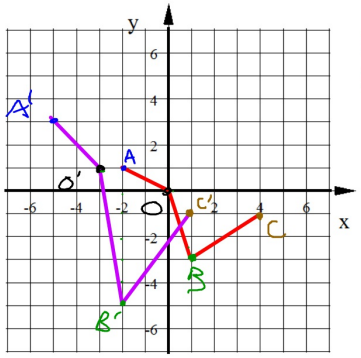
In general, if the function $y = f(x)$ is transformed the following way:

$$y = a\, f(x - h) + k$$

The parent function has been:

- Streched/Shrunk vertically by a factor of a
- Reflected over x-axis if $a<0$
- Translated horizontally h units.
- Translated vertically k units.

Below is the graph of $y = f(x)$. Original function is in Red



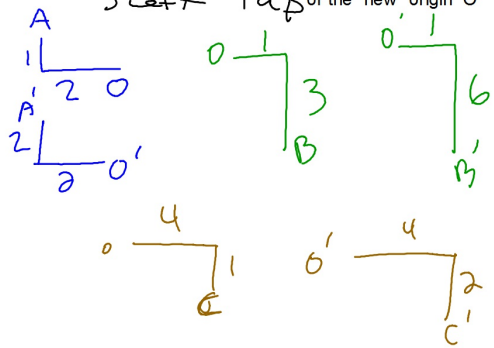
Graph the following transformation of $y = f(x)$:

vertical stretch factor.... twice as tall

$y = 2f(x + 3) + 1$

3 Left 1 up

this gives the location of the "new" origin O'



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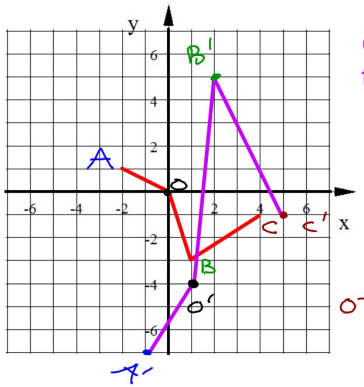

Graph the following transformation of $y = f(x)$:

$y = -3f(x-1) - 4$

1 RT 4 down