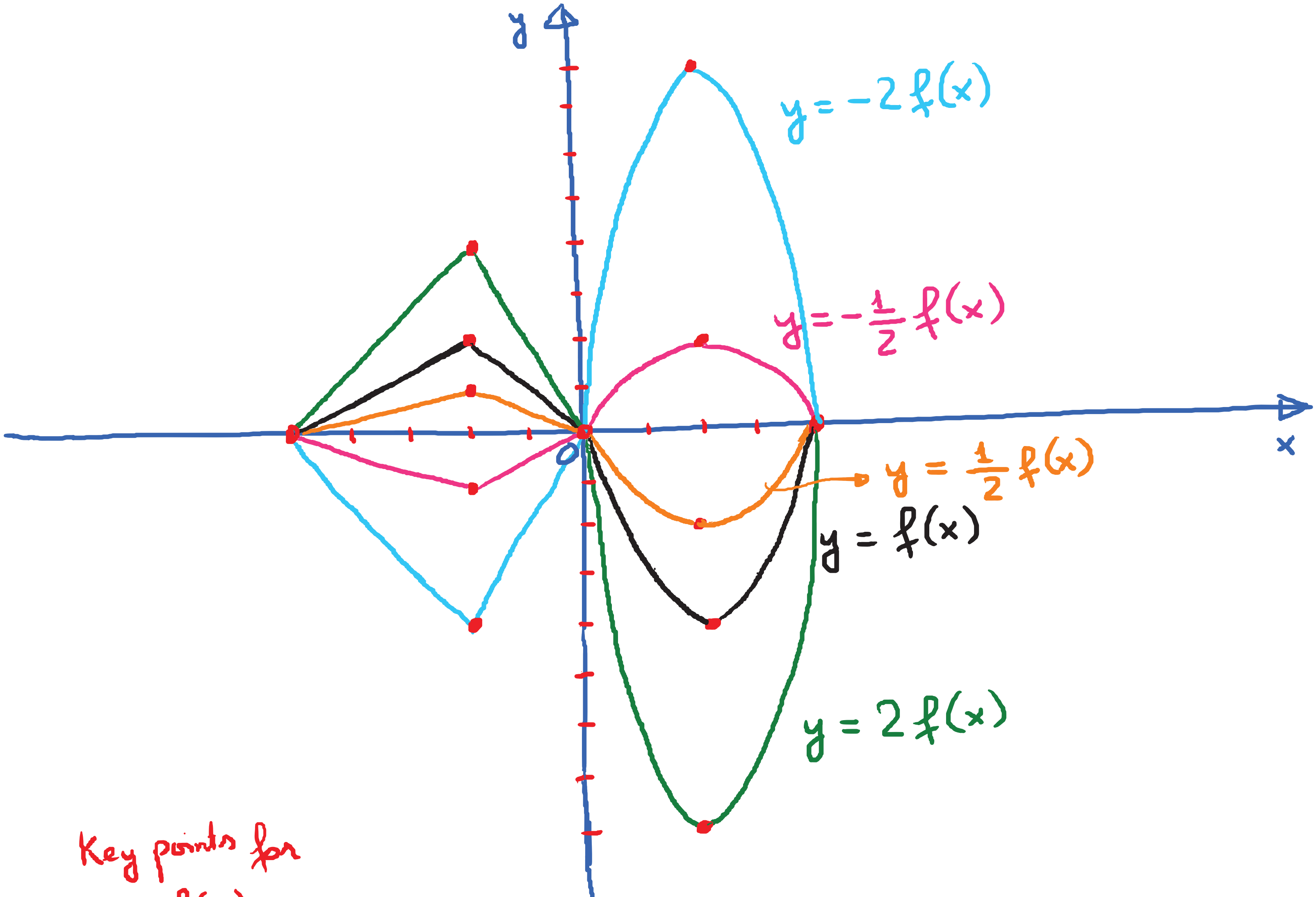


Key points for $y = f(x)$	Key points for $y = 2f(x)$	Key points for $y = \frac{1}{2} f(x)$
$(-5, 0)$	$(-5, 0)$	$(-5, 0)$
$(-2, 2)$	$(-2, 4)$	$(-2, 1)$
$(0, 0)$	$(0, 0)$	$(0, 0)$
$(2, -4)$	$(2, -8)$	$(2, -2)$
$(4, 0)$	$(4, 0)$	$(4, 0)$

* Horizontal Stretching and Shrinking

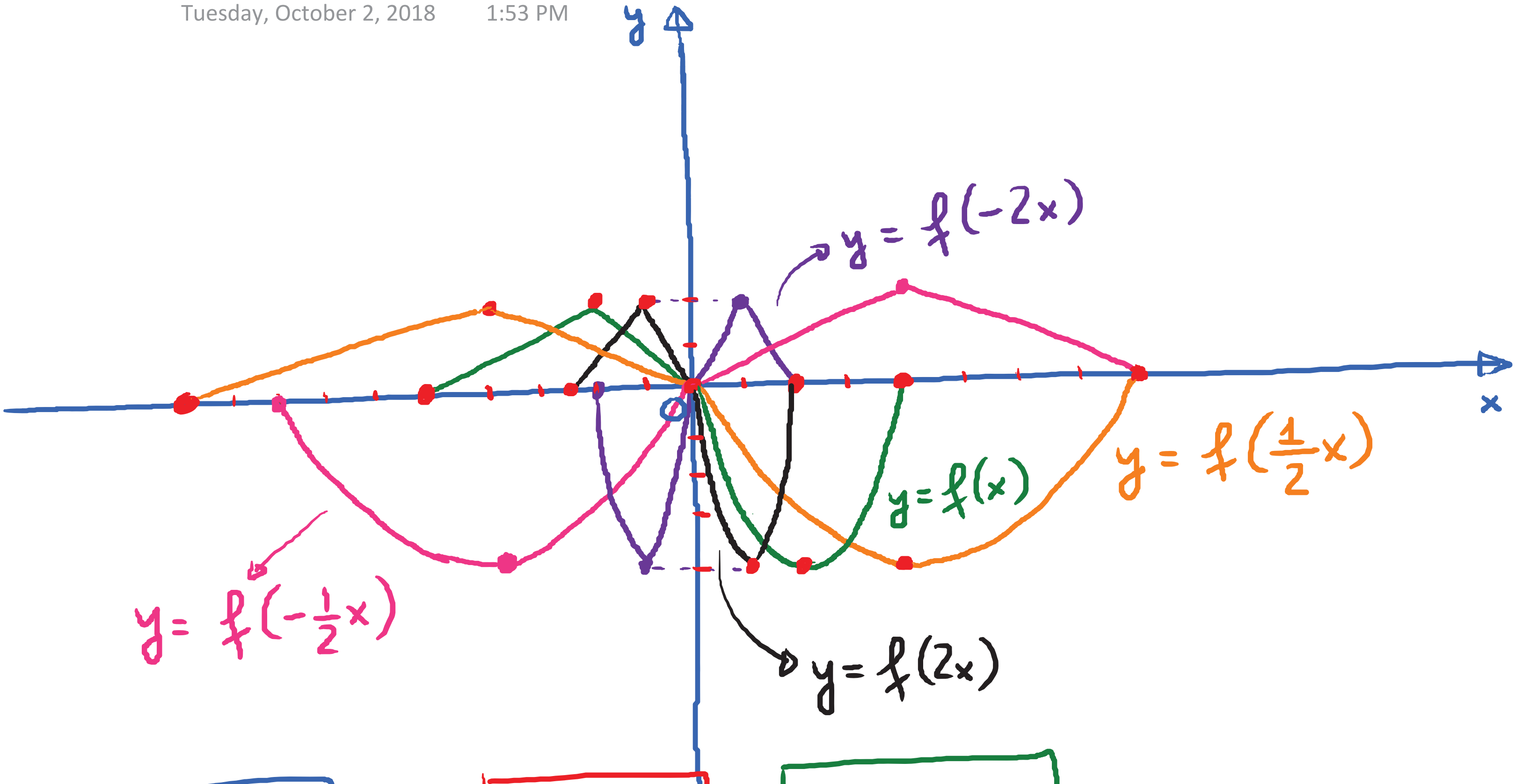
For $c > 0$

The graph of $y = f(cx)$ can be obtained from the graph of $y = f(x)$ by:

* shrinking horizontally if $c > 1$
* stretching horizontally if $c < 1$

* If $c < 0$, the graph is also reflected across the y-axis.

E.g. Use the graph of $y = f(x)$ to obtain the graph of $y = f(2x)$; $y = f(\frac{1}{2}x)$; $y = f(-2x)$ and $y = f(-\frac{1}{2}x)$.



Key points of $y = f(x)$	Key points for $y = f(2x)$	Key points for $y = f(\frac{1}{2}x)$
$(-5, 0)$	$(-2.5, 0)$	$(-10, 0)$
$(-2, 2)$	$(-1, 2)$	$(-4, 2)$
$(0, 0)$	$(0, 0)$	$(0, 0)$
$(2, -4)$	$(1, -4)$	$(4, -4)$
$(4, 0)$	$(2, 0)$	$(8, 0)$

E.g. Describe the sequence of transformations to obtain the graph of $y=-2f(x-3)+1$ from the graph of $y=f(x)$

$$\boxed{y=f(x)} \xrightarrow{\text{Shift to the right 3 units}} \boxed{y=f(x-3)}$$

$$\boxed{y=f(x-3)} \xrightarrow{\text{Stretch Vertically by a factor of 2}} \boxed{y=2f(x-3)}$$

$$\boxed{y=2f(x-3)} \xrightarrow{\text{flip across x-axis}} \boxed{y=-2f(x-3)}$$

$$\boxed{y=-2f(x-3)} \xrightarrow{\text{Shift up 1 unit}} \boxed{y=-2f(x-3)+1}$$

E.g. Given the graph of $y = x^2$. $\longrightarrow f(x) = x^2$

* Shift to the left 3 units $\longrightarrow f(x+3) = (x+3)^2$
* Reflect across x-axis $\longrightarrow -f(x+3) = -(x+3)^2$
* Shift down 6 units $\longrightarrow -f(x+3)-6 = -(x+3)^2-6$

Q: Find the formula for the resulting graph (after these transformations)

Answer: $\boxed{y = -(x+3)^2 - 6}$