7.2 - Graph Transformations

Monday, October 1, 2018 11:54 AM

Objectives: (1) Vertical and Horizontal Translations.

(2) Reflections

(3) Vertical and Horizontal Stretching or Shrinking.

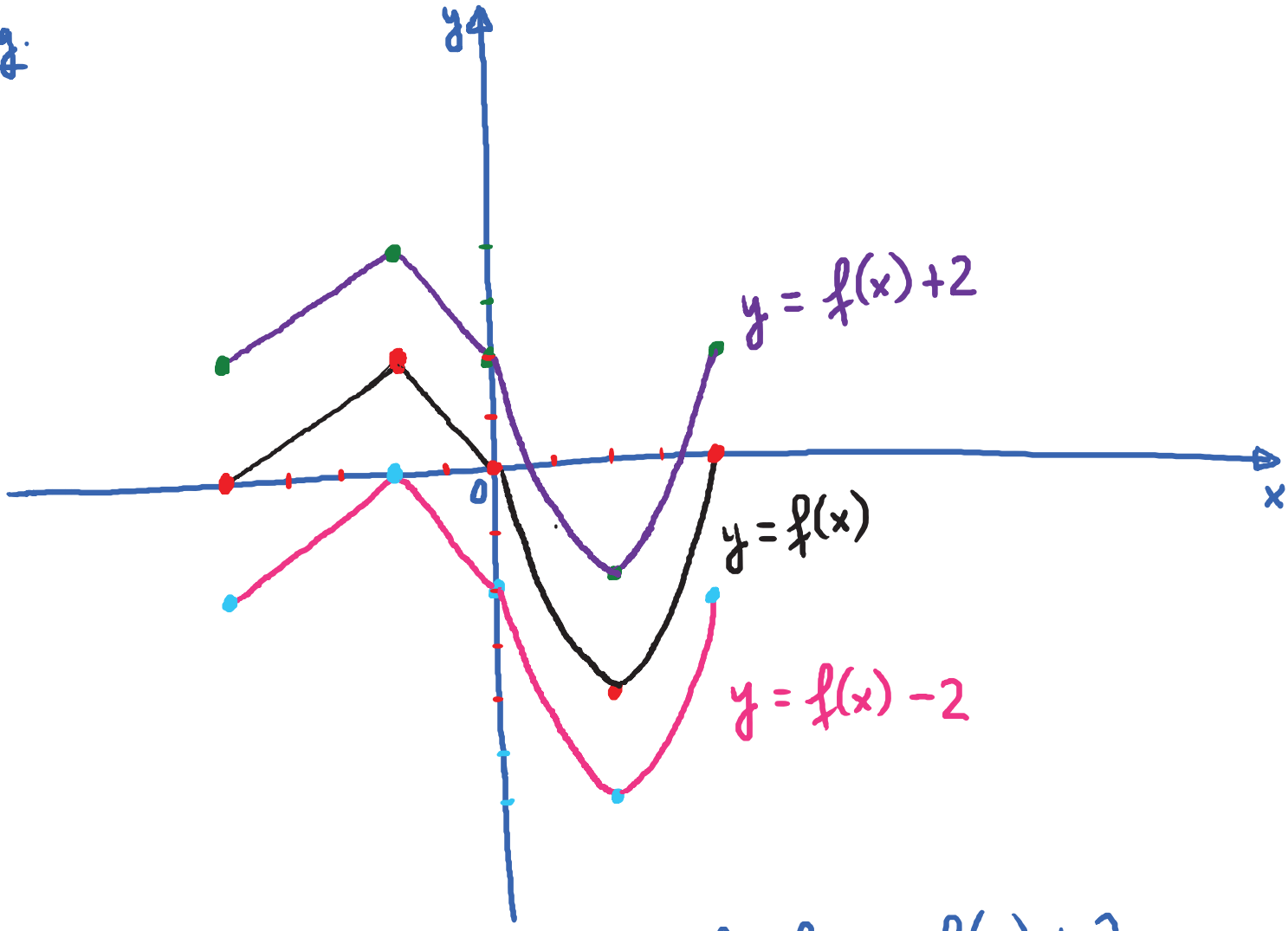
(1) Vertical Translation.

For $b > 0$:

* The graph of $y = f(x) + b$ is the graph of $y = f(x)$ shifted up by b units

* The graph of $y = f(x) - b$ is the graph of $y = f(x)$ shifted down by b units

E.g.



Use this graph to obtain the graph of $y = f(x) + 2$

and the graph of $y = f(x) - 2$

Key points of $y = f(x)$

x	$y = f(x)$	(x, y)
-5	0	$(-5, 0)$
-2	2	$(-2, 2)$
0	0	$(0, 0)$
2	-4	$(2, -4)$
4	0	$(4, 0)$

Key points for $y = f(x) + 2$

$(-5, 2)$, $(-2, 4)$, $(0, 2)$, $(2, -2)$, $(4, 2)$

Key points for $y = f(x) - 2$

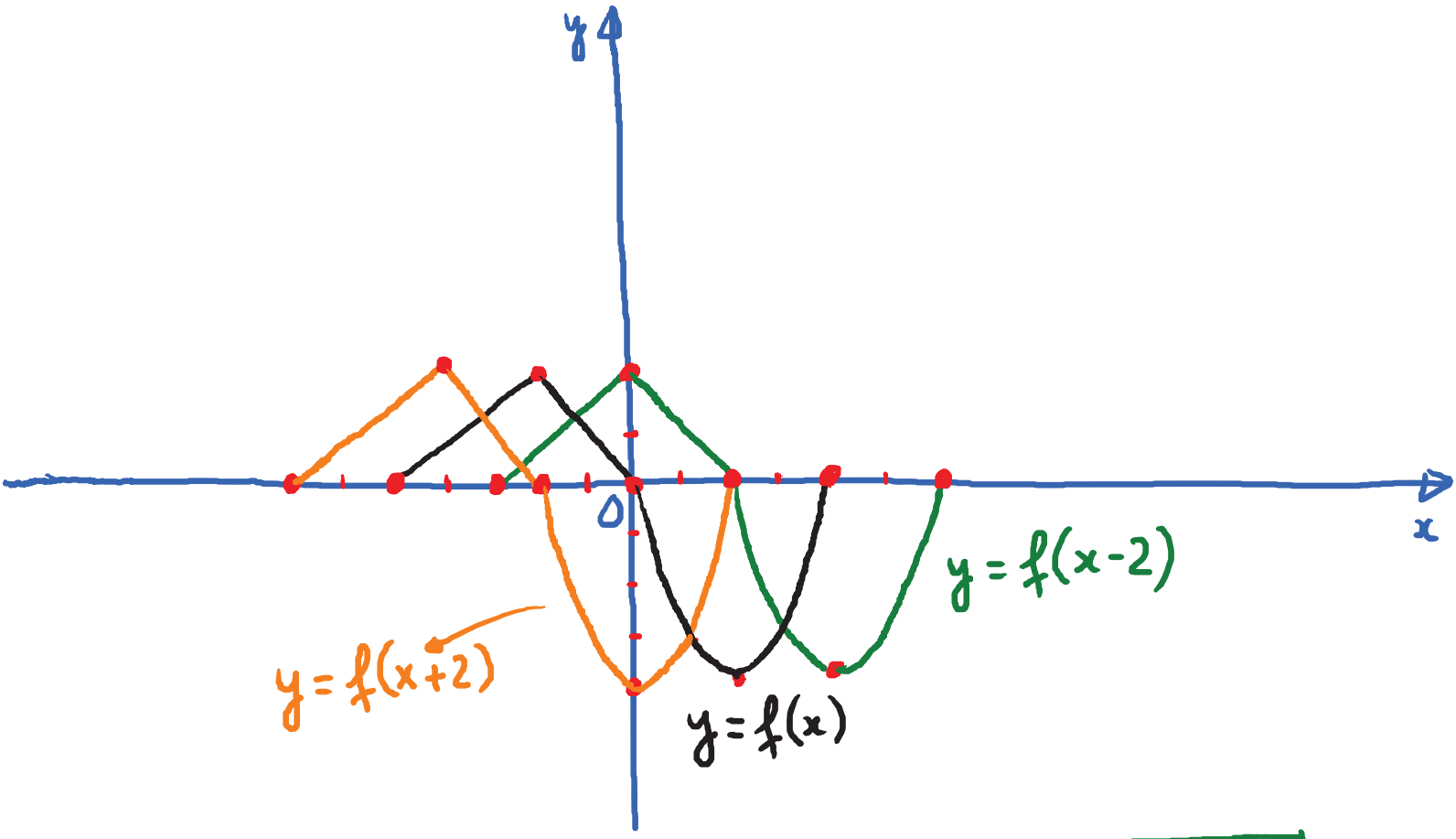
$(-5, -2)$, $(-2, 0)$, $(0, -2)$, $(2, -6)$, $(4, -2)$

* Horizontal Translation.

For $d > 0$:

* The graph of $y = f(x - d)$ is the graph of $y = f(x)$ shifted to the right d units.

* The graph of $y = f(x + d)$ is the graph of $y = f(x)$ shifted to the left d units.



Q: Use this graph to obtain the graph of $y = f(x-2)$ and $y = f(x+2)$.

Key points of $y = f(x)$	Key points of $y = f(x-2)$	Key points of $y = f(x+2)$
$(-5,0)$	$(-3,0)$	$(-7,0)$
$(-2,2)$	$(0,2)$	$(-4,2)$
$(0,0)$	$(2,0)$	$(-2,0)$
$(2,-4)$	$(4,-4)$	$(0,-4)$
$(4,0)$	$(6,0)$	$(2,0)$

(2) Reflections

The graph of $y = -f(x)$ is the reflection of the graph of $y = f(x)$ across the x-axis.

The graph of $y = f(-x)$ is the reflection of the graph of $y = f(x)$ across the y-axis.