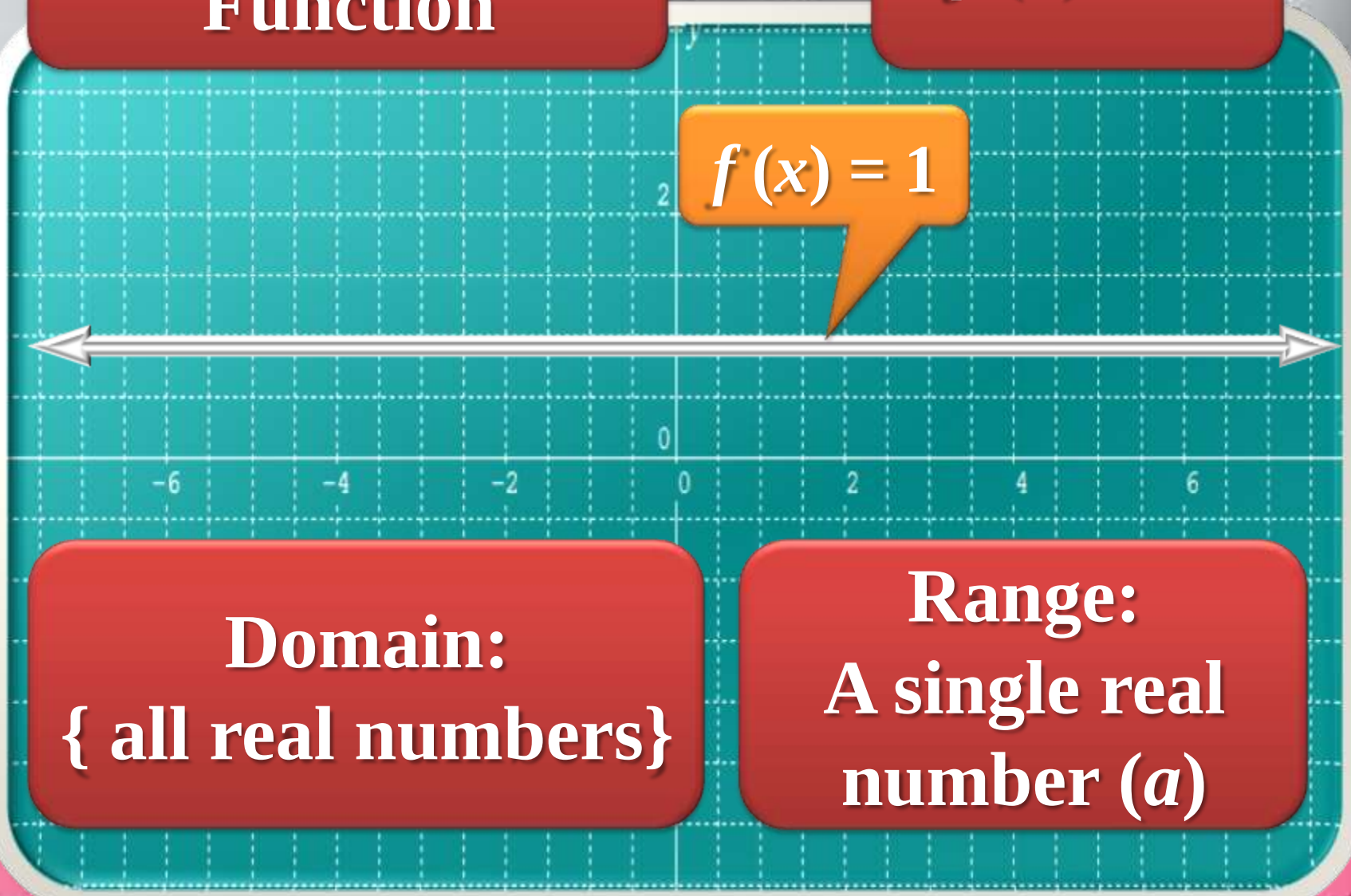

Parent Functions
and
Transformations


Parent
Functions

Constant Function

$f(x) = a$

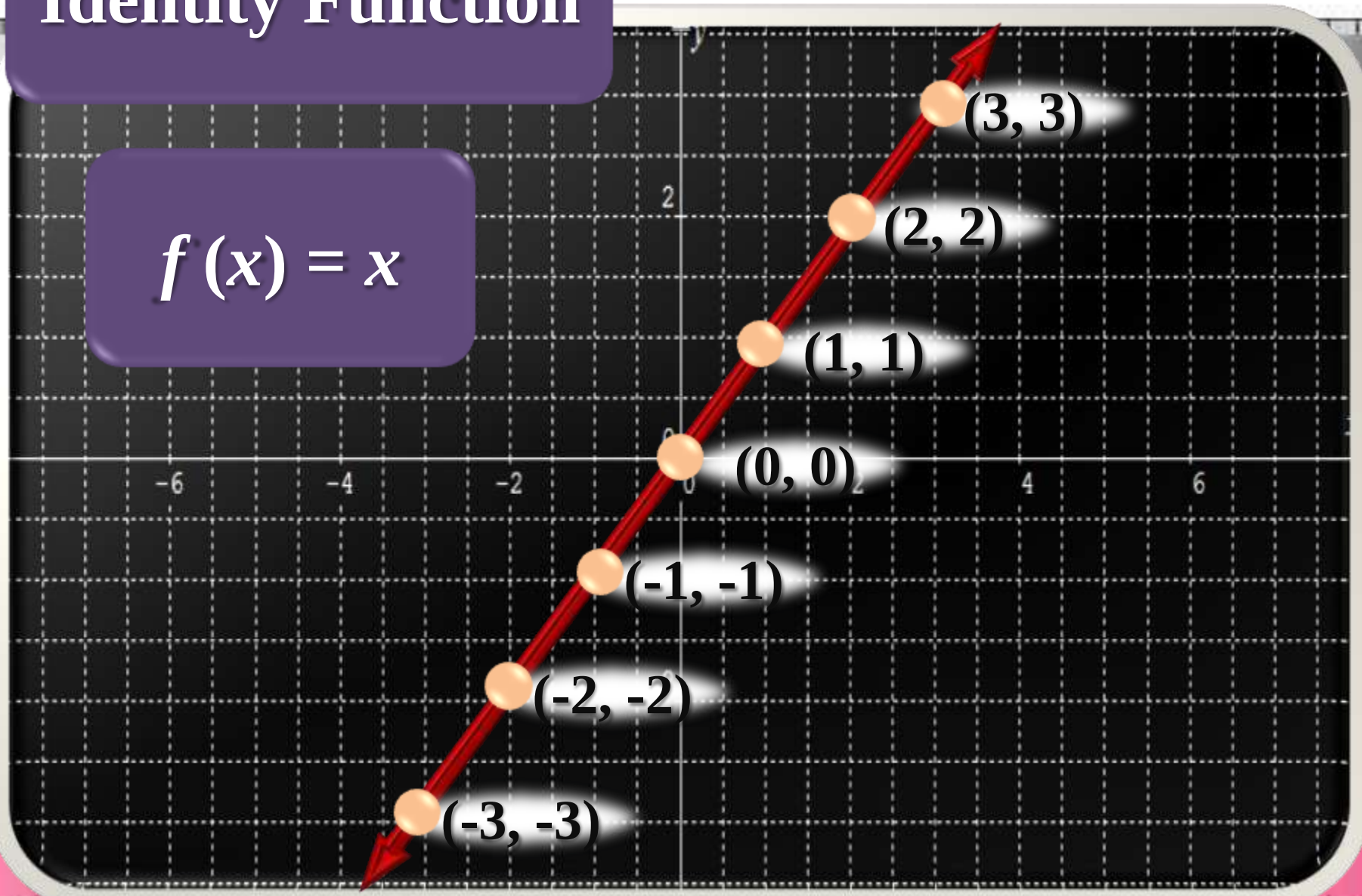


Domain:
{ all real numbers}

Range:
A single real number (a)

Identity Function

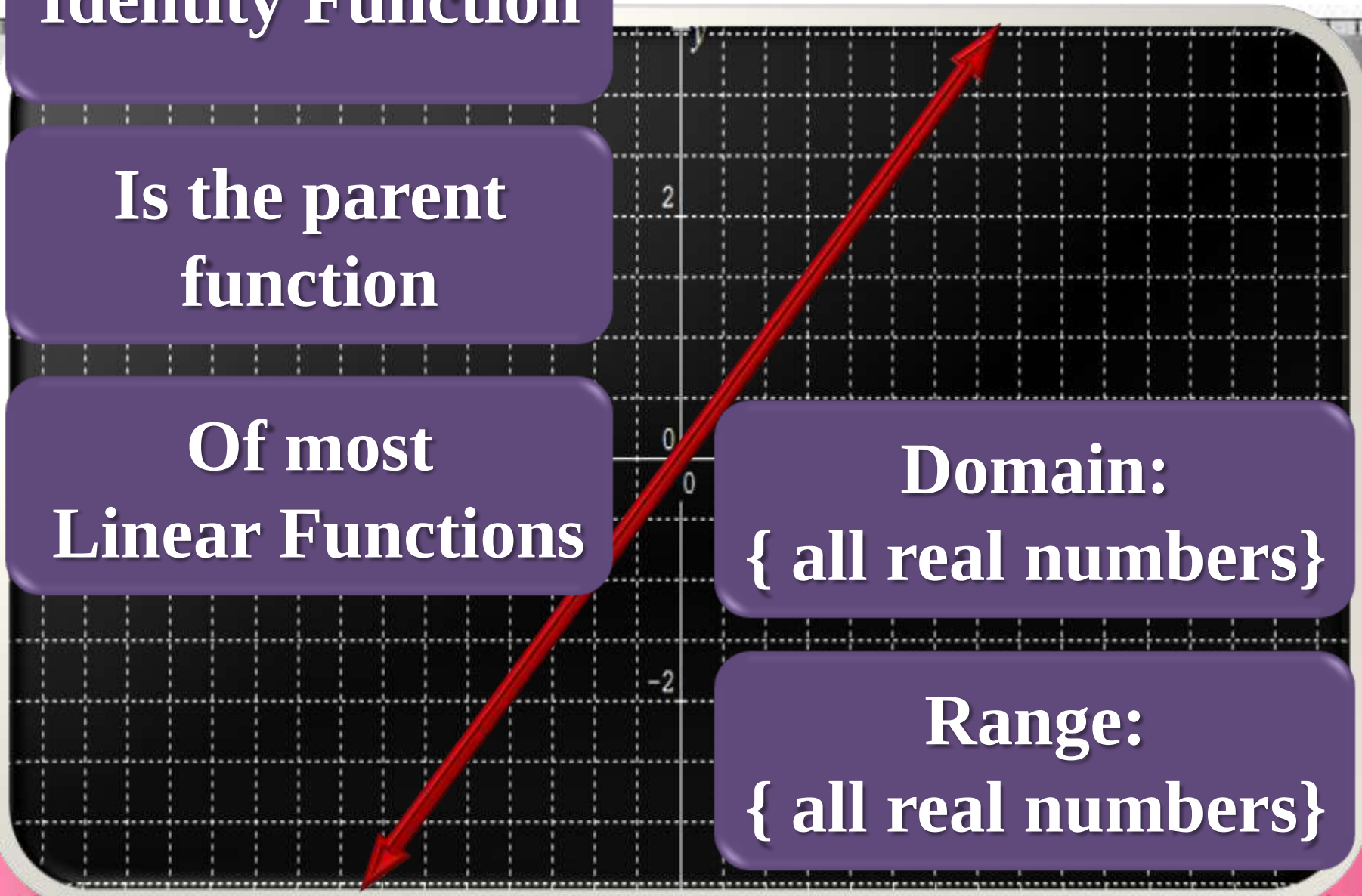
$f(x) = x$



Identity Function

Is the parent function

Of most Linear Functions

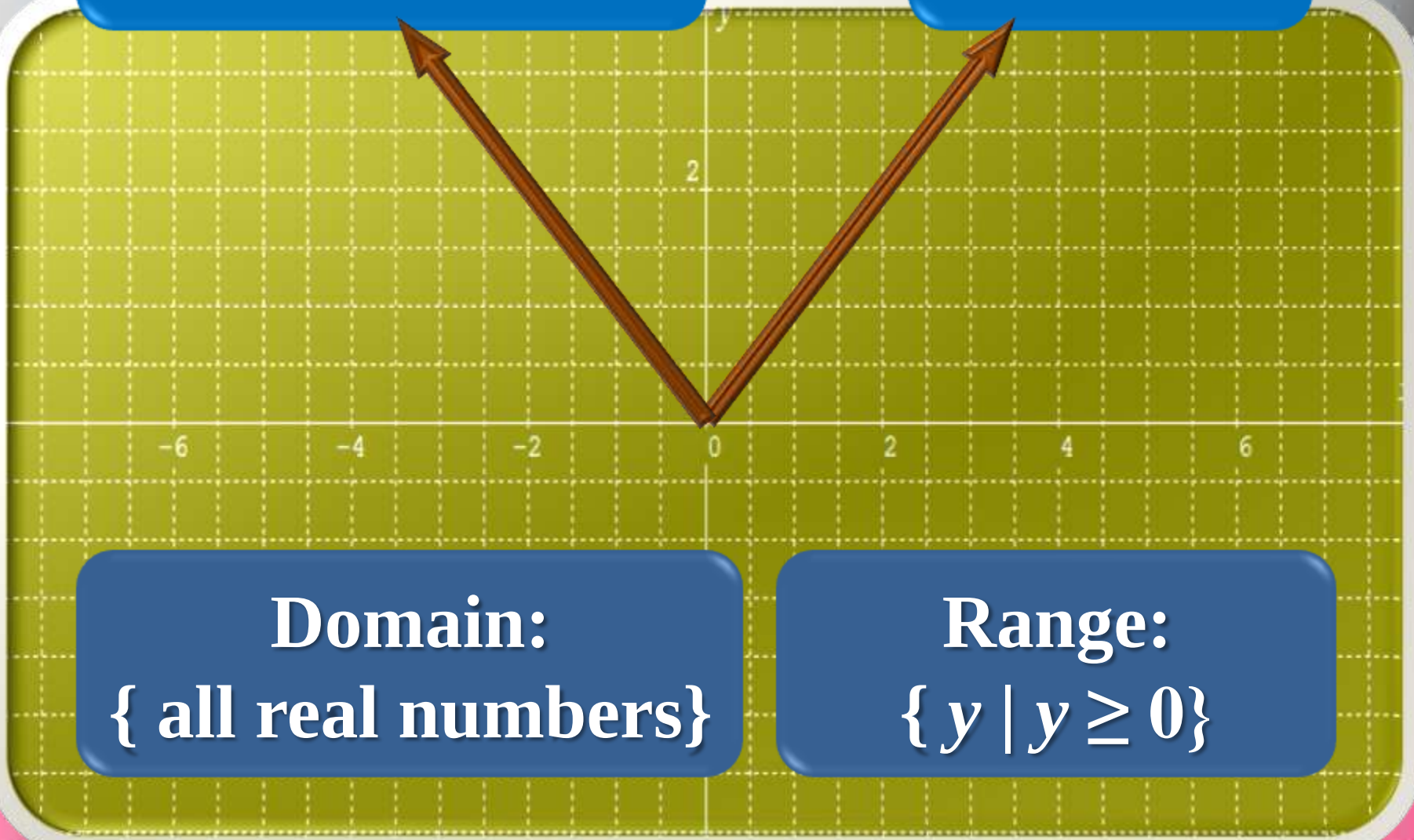


Domain:
{ all real numbers}

Range:
{ all real numbers}

Absolute Value Function

$f(x) = |x|$

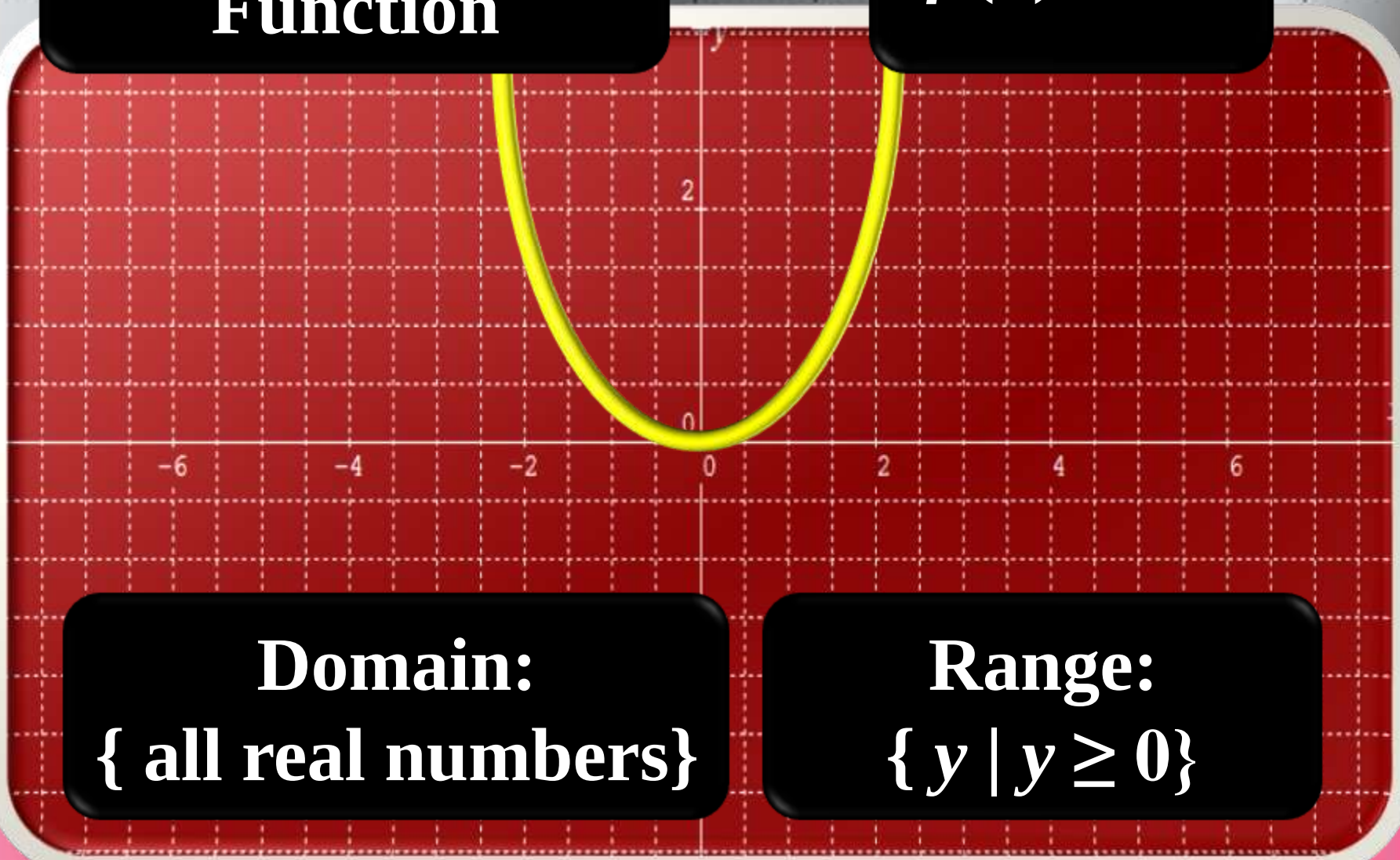


Domain:
{ all real numbers}

Range:
$\{ y \mid y \geq 0 \}$

Quadratic Function

$f(x) = x^2$



Domain:
{ all real numbers}

Range:
$\{ y \mid y \geq 0 \}$


Transformations

Translation

Vertical Translation	$f(x) \pm k$
$f(x) = x + 2$	2 units up
$f(x) = x^2 - 4$	4 units down
$f(x) = \|x\| + 5$	5 units up

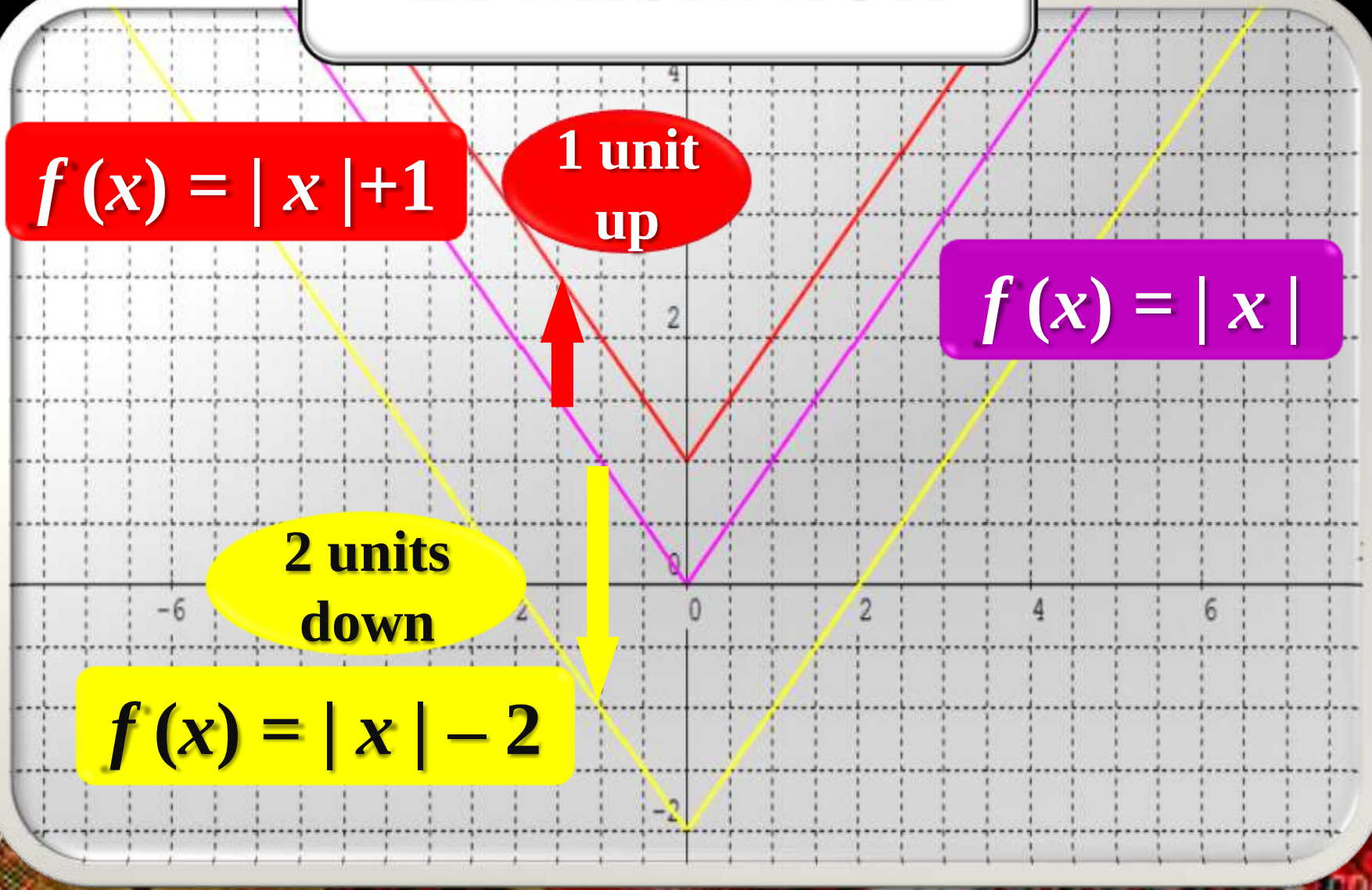
Translation

Horizontal Translation	$f(x \pm h)$
$f(x) = (x + 1)$	1 unit to left
$f(x) = (x^2 - 5)$	5 units to right
$f(x) = \|x + 3\|$	3 units to left

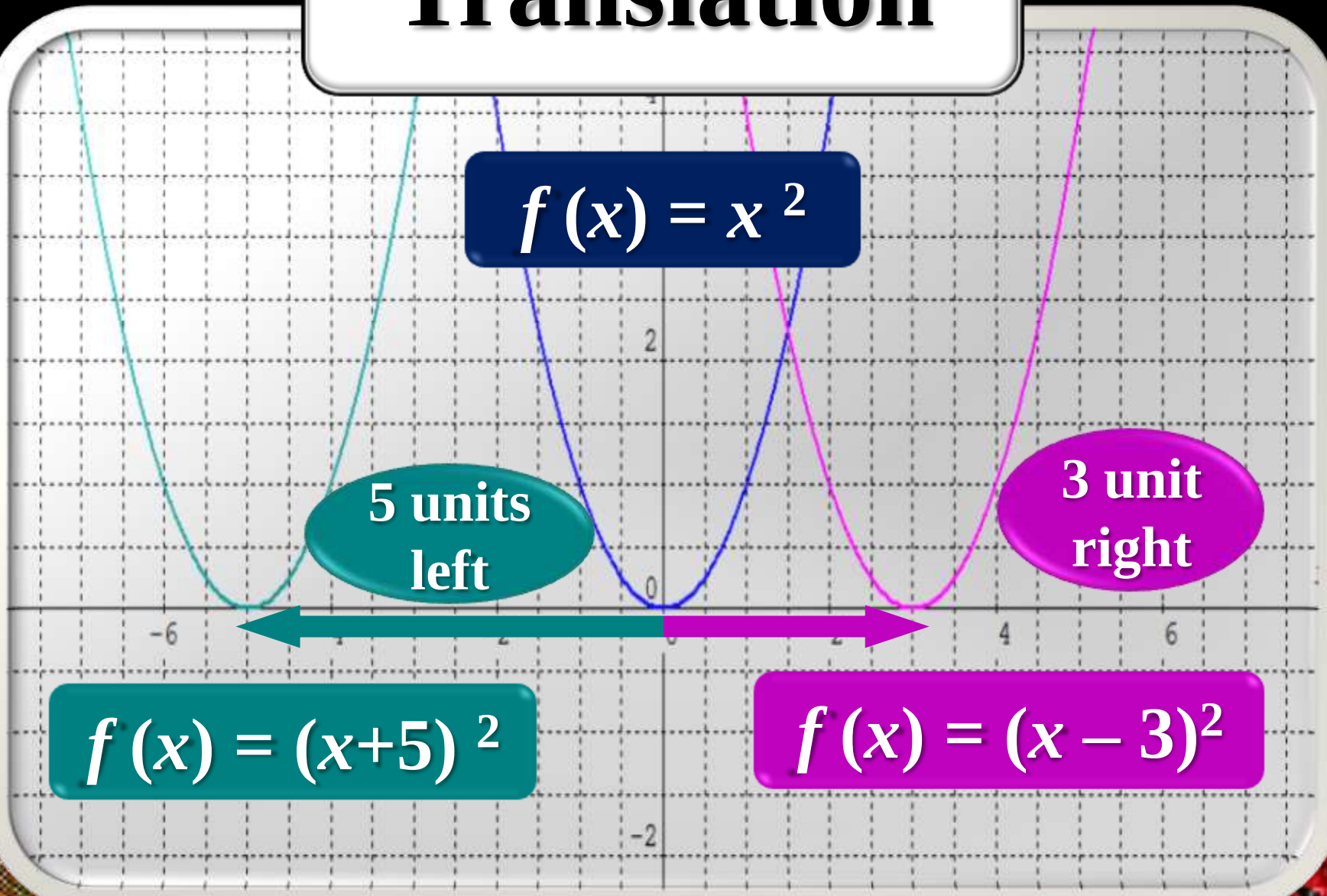
Translation

Vertical Translation		Horizontal Translation	
$f(x) \pm k$		$f(x \pm h)$	
$+k$	Up ↑	$+h$	Left ←
$-k$	Down ↓	$-h$	Right →

Translation



Translation



Reflection

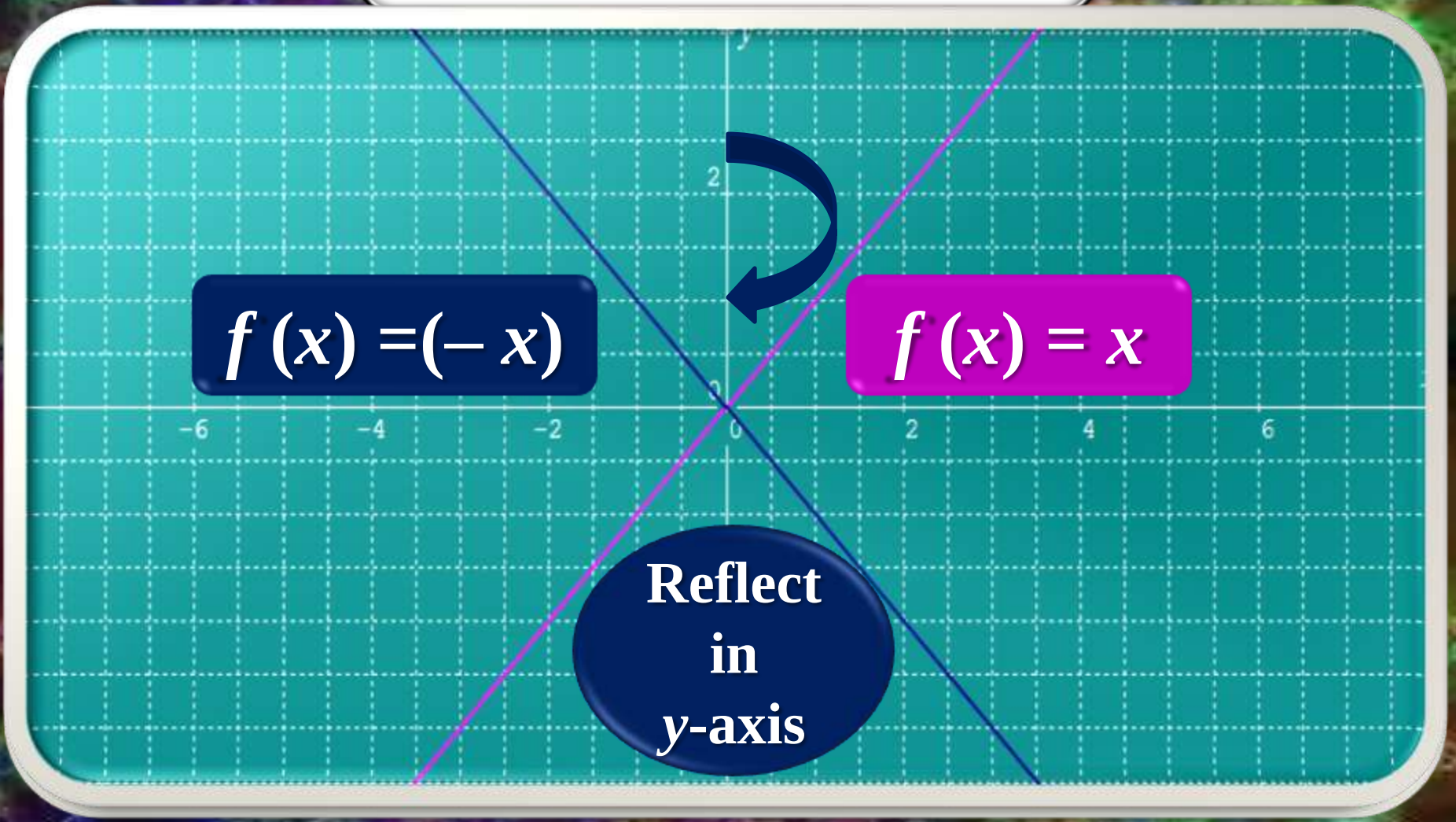
$-f(x)$

Reflects graph in the x-axis

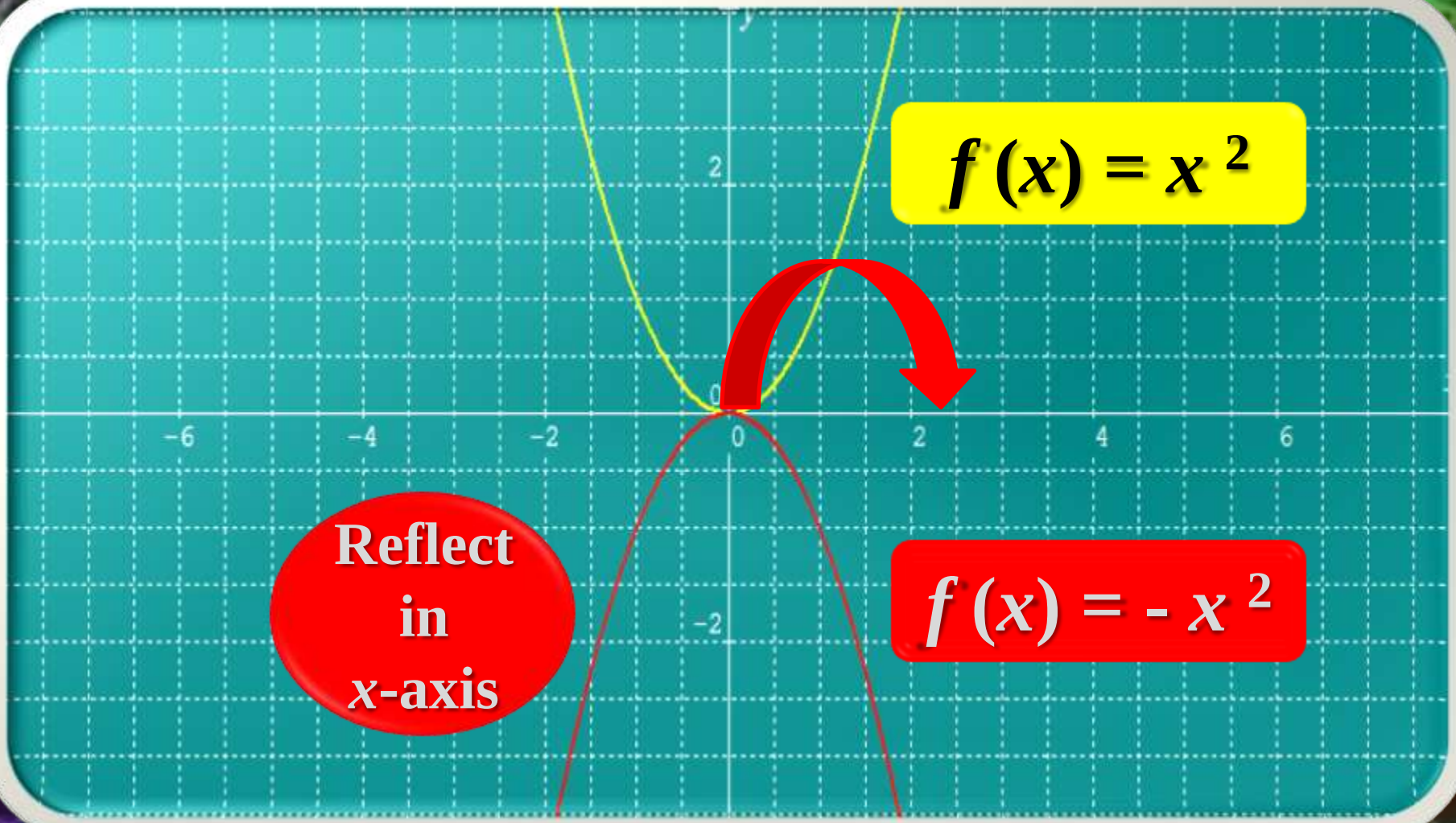
$f(-x)$

Reflects graph in the y-axis

Reflection



Reflection



Dilation

Vertical

$a.f(x)$

Horizontal

$f(b.x)$

Stretching

$a>1$

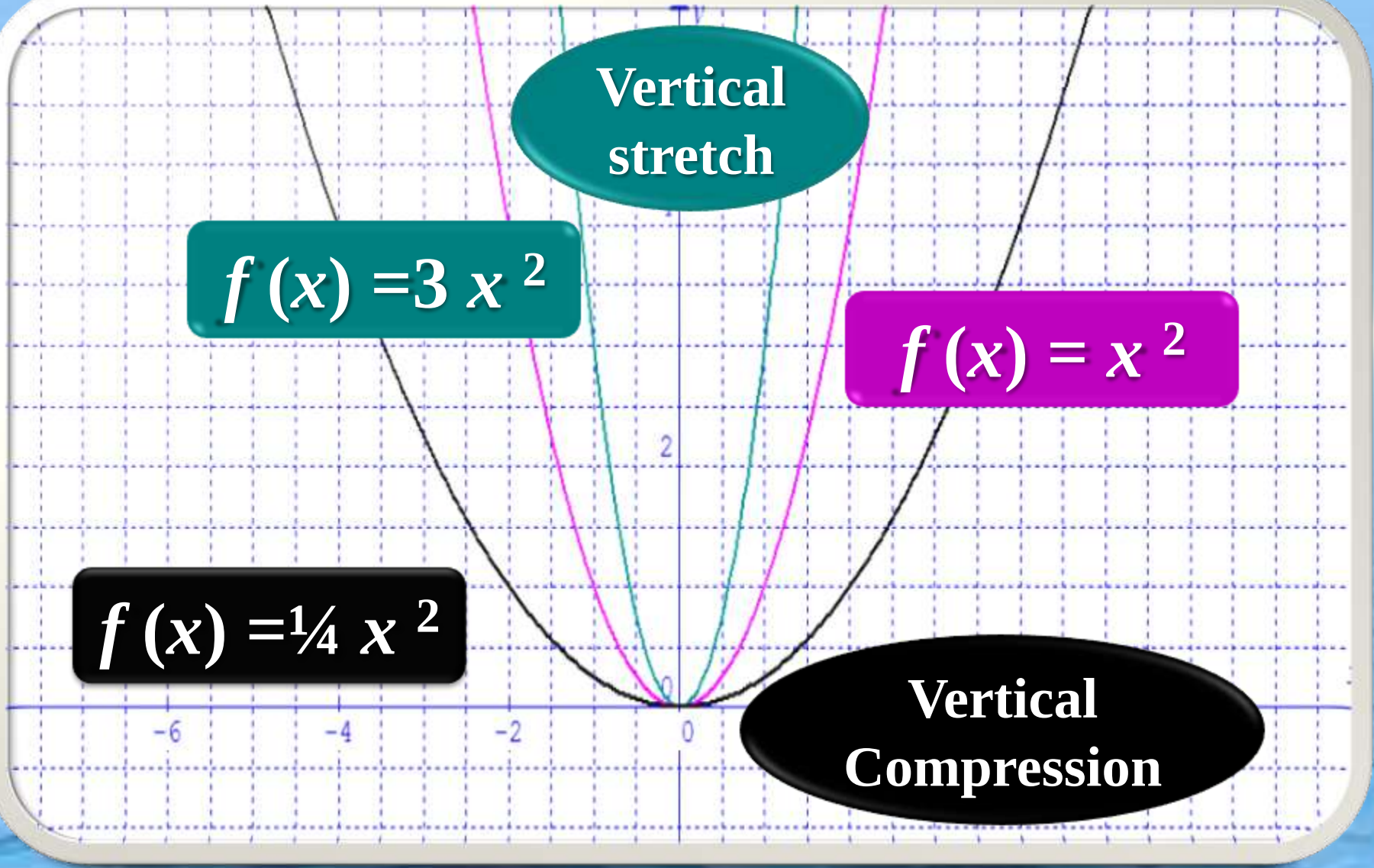
$0<b<1$

Compression

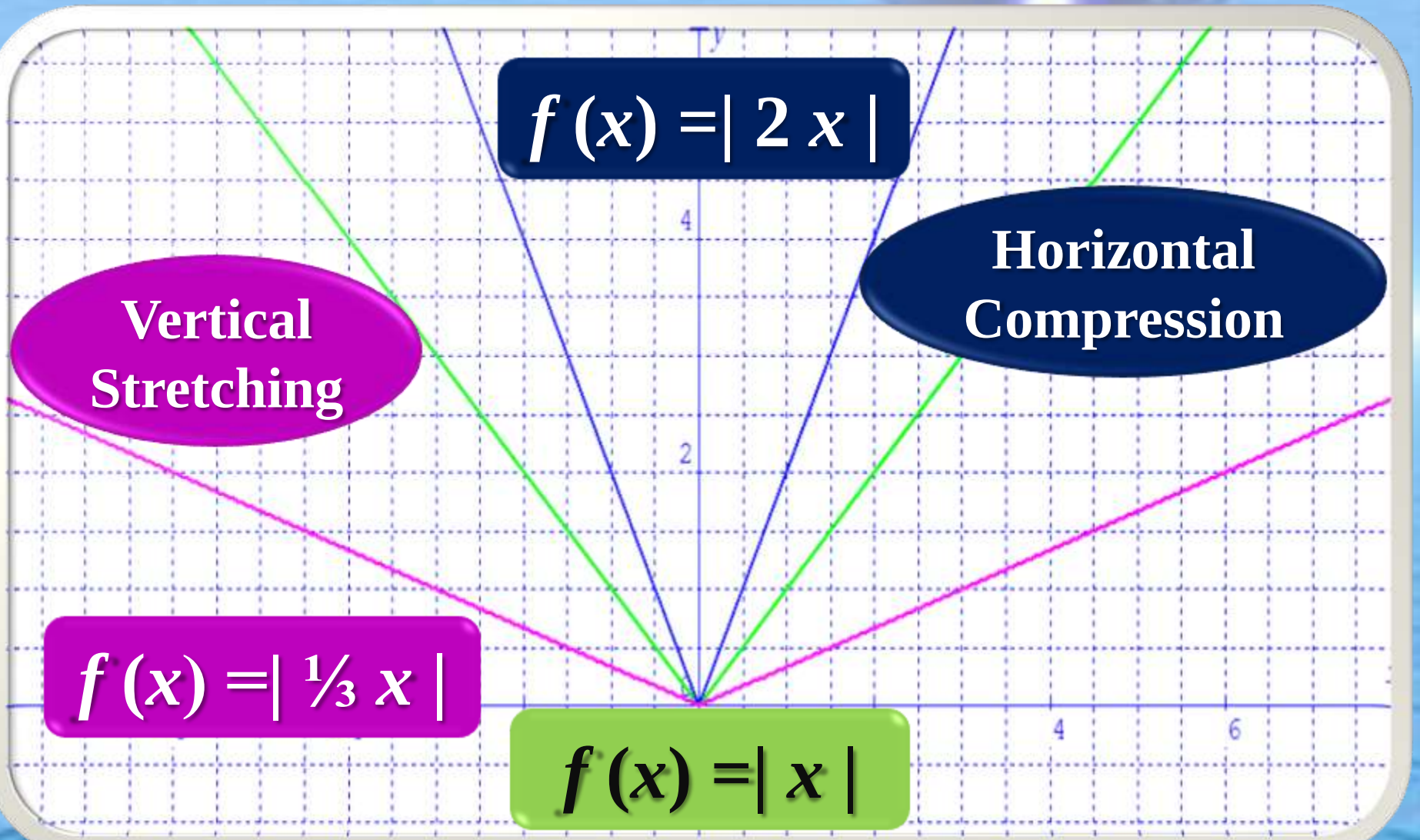
$0<a<1$

$b>1$

Dilation


Vertical stretch
$f(x) = 3x^2$
$f(x) = x^2$
$f(x) = \frac{1}{4}x^2$
Vertical Compression
2
0
-6
-4
-2
0

Dilation


f (x) =| 2 x |
Horizontal Compression
Vertical Stretching
f (x) =| ⅓ x |
f (x) =| x |
y
4
2
4
6