

TRANSFORMATION FORM

$$\underline{-a} f (bx \underline{\pm} h) \underline{\pm} k$$

OUTSIDE (y/RANGE): TELLS THE TRUTH

-a:

REFLECT
OVER

Y-AXIS

a > 1:

VERTICAL
STRETCH

0 < a < 1:

VERTICAL
COMPRESS

+k:

SHIFT UP

-k:

SHIFT
DOWN

$$\underline{-a} f (bx \underline{\pm} h) \underline{\pm} k$$

EXAMPLES

1. $f(x) - 2$

Shift
Down
2

2. $3f(x)$

Vertical
Stretch

3. $-1/2f(x)$

Vertical
Compress
↓
Reflect

LINEAR TRANSFORMATION

$$- a f (\underline{bx \pm h}) \pm k$$

INSIDE (x/DOMAIN): LIES

$b > 1$:
HORIZONTAL
STRETCH

$0 < b < 1$:
HORIZONTAL
COMPRESS

$+h$:
SHIFT LEFT

$-h$:
SHIFT
RIGHT

$$- a f (\underline{bx \pm h}) \pm k$$

EXAMPLES

1. $f(x - 7)$

Shift
Right 7

2. $f(x + 9)$

Shift
Left 9

3. $f(2x)$

Horizontal
Compress

$$- a f (b x \pm h) \pm k$$

EXAMPLES

1. $3f(x - 7)$

Vertical
Stretch
↓
Right
7

2. $1/2f(x + 9)$

Vertical
compress
↓
Left 9

3. $f(2x) - 4$

Horizontal
compress
↓
Down
4

LINEAR TRANSFORMATIONS

EX. GIVEN $f(x) = x + 1$, what would the new equation be in the transformations were applied.

$$f(x) - 3$$

$$x + 1 \\ - 3$$

$$x - 2$$

$$f(x + 3)$$

$$(x + 3) + 1$$

$$x + 4$$

$$3f(x)$$

$$3(x + 1)$$

$$3x + 3$$