Graphing Absolute Value Functions

$$f(x) = |x|$$

You can apply general transformations to absolute value functions by changing parameters in the equation

$$f(x) = a|x - h| + k$$

(Slope)

Opens up +# or open down -# vertical compression or stretched

Vertex: (h, k)

horizontal shift
negative #- shift to right
positive # - shift to left

vertical shift
positive #- shift to up
negative # - shift to down

inside absolute value

Outside absolute Value

1 Example

A The graph of $g_1(x) = |x| + 6$ will be the graph of $f(x) = |x|$ translated up 6

Vertex (0,6)

$a = 1/1$

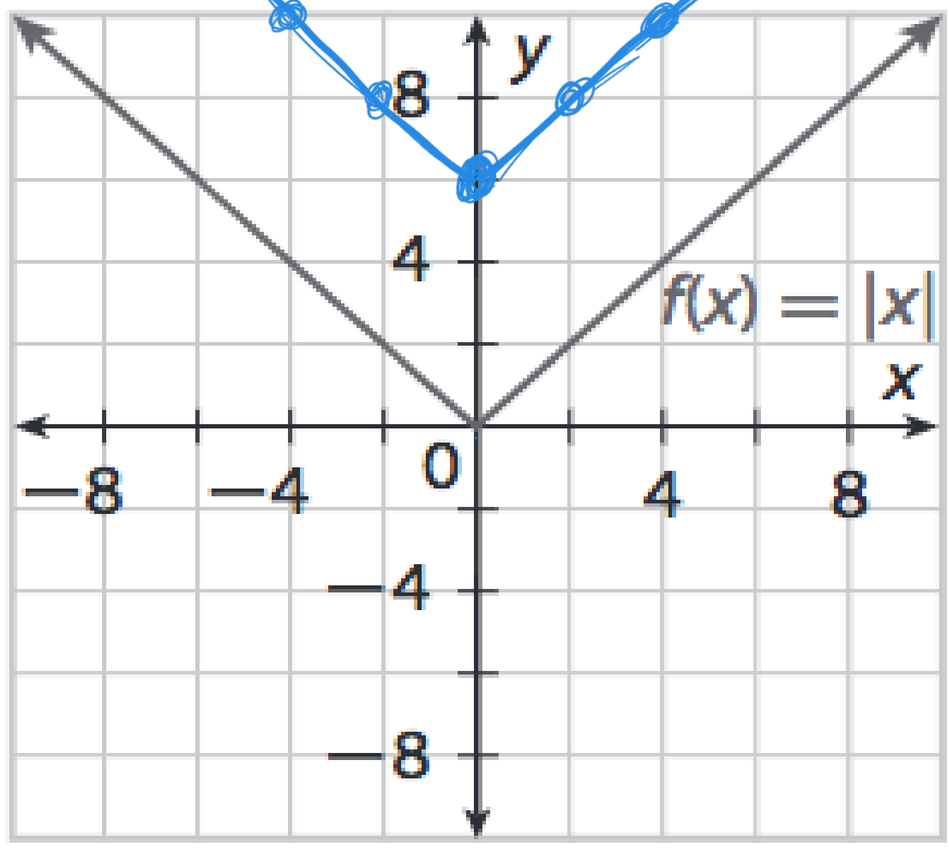
$k = 6$ up 6

$h = 0$

Graph vertex 1st

D: $\{x \in \mathbb{R}\}$

R: $\{y \in \mathbb{R} \mid y \geq 6\}$



Vertex (0,0)

transformation

ample

The graph of $g_1(x) = |x - 3|$ will be the graph of $f(x) = |x|$

translated right 3.

Vertex (3, 0)

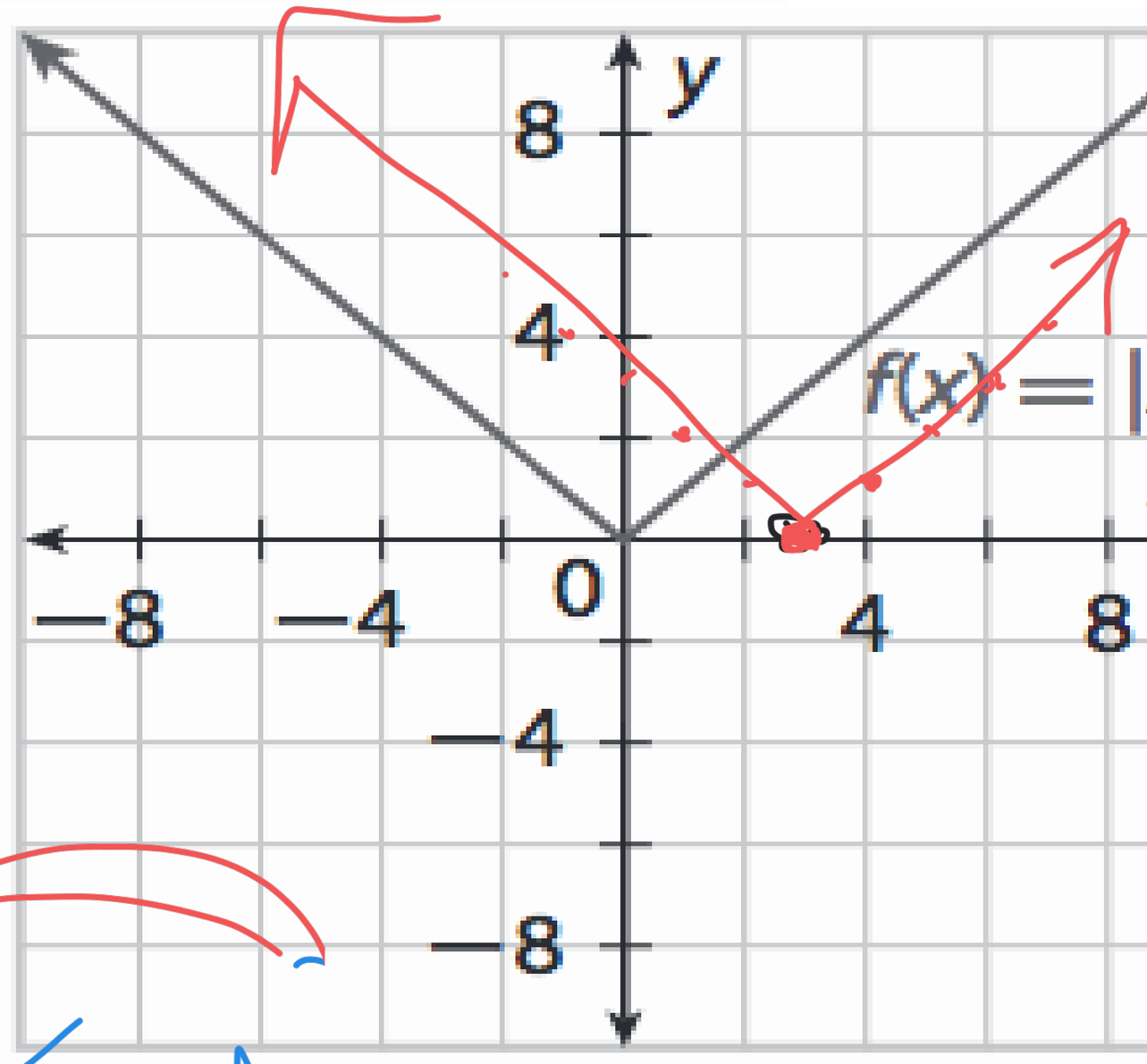
$h = +3$

$k = 0$

$a = 1$

D: $-\infty < x < \infty$

R: $0 \leq y$



1 Example

C

The graph of $g_1(x) = \frac{1}{4}|x|$ will be the graph of $f(x) = |x|$ compressed

up | & NEW 4

a : 1/4

h : 0

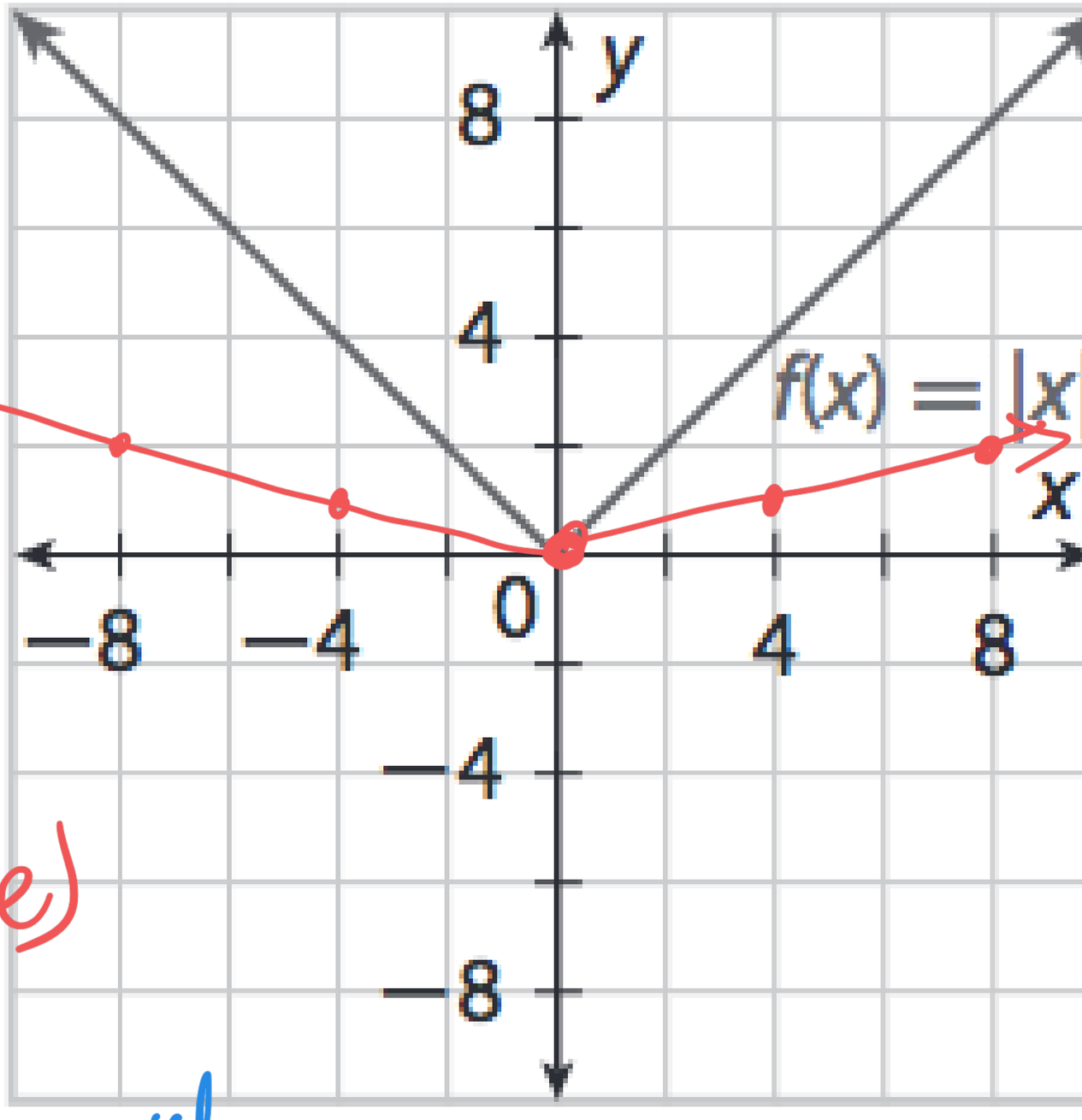
K : 0

Vertex : (0,0)

1st Vertex then a value (slope)

Domain : $(-\infty, \infty)$

Range : $[0, \infty)$



interval:

Example

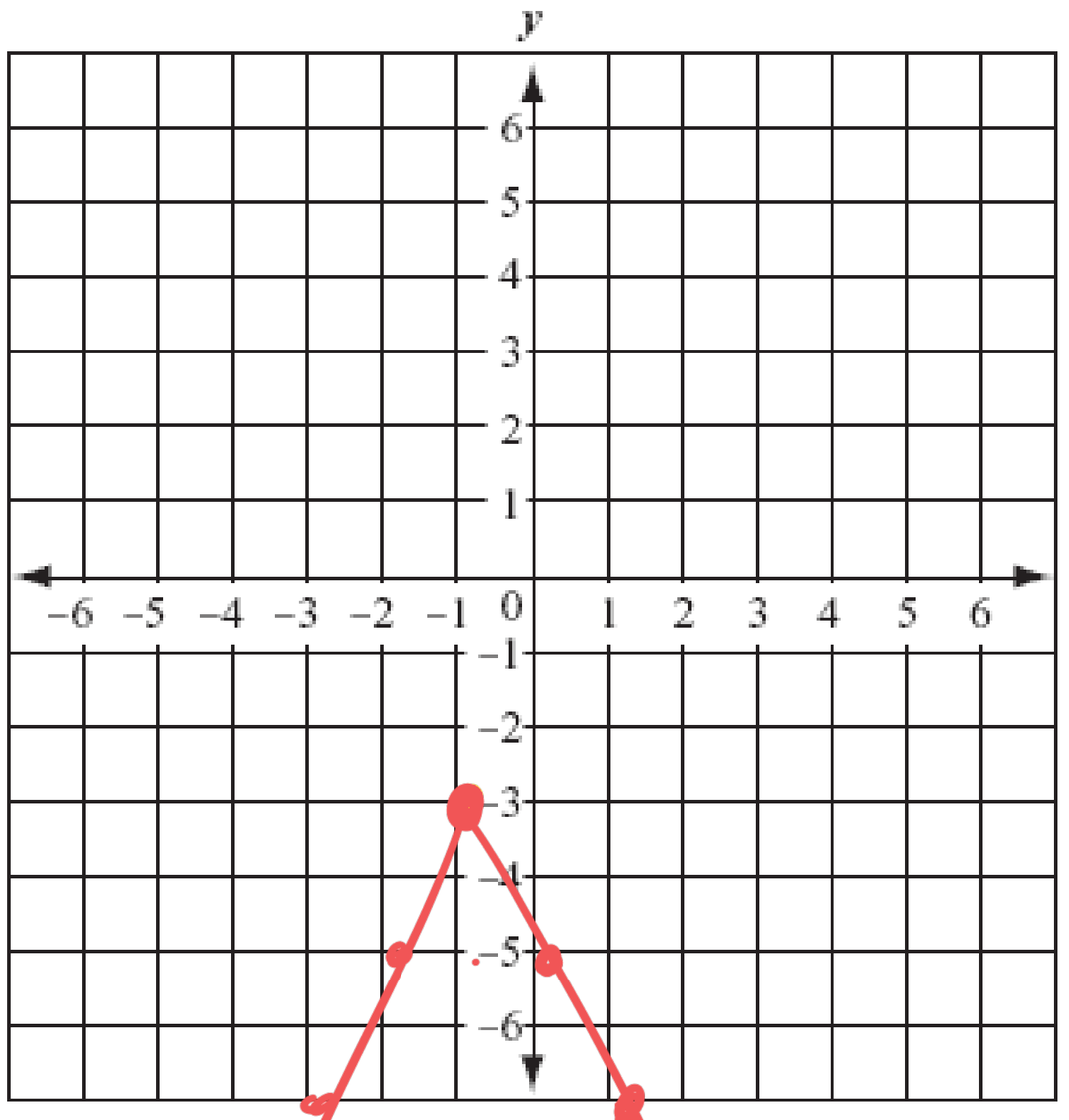
Graph $f(x) = -2|x+1|-3$

$a = -2/1$

$h = -1$

$k = -3$

Vertex $(-1, -3)$



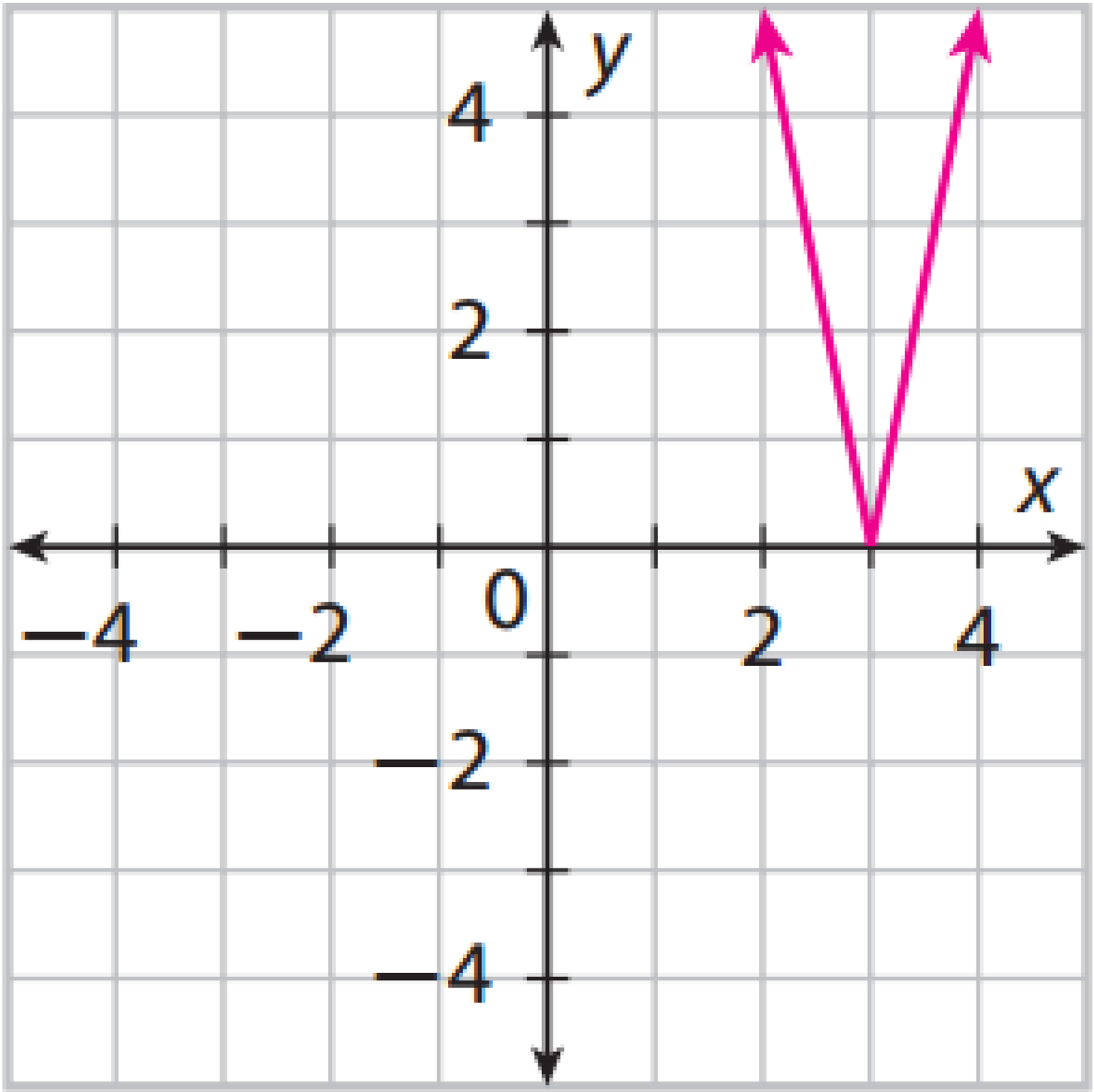
1st Vertex, then a rise/run

$D: (-\infty, \infty)$ $R: (-\infty, -3]$

Intercepts

5 Example

Given the graph of an absolute value function, write the function in the form $f(x) = a|x-h|+k$,



$f(x) = \frac{5}{1}|x-3|$