Algebra 2 2.6 *Algebra 1

Write and graph piecewise defined functions

Write and graph step functions

Write and graph absolute value functions

domain* x

range* y

piecewise function $f(x) = \begin{cases} \\ \\ \end{cases}$

step function not connected (range)

GIF greatest integer function (tricky)

absolute value function*

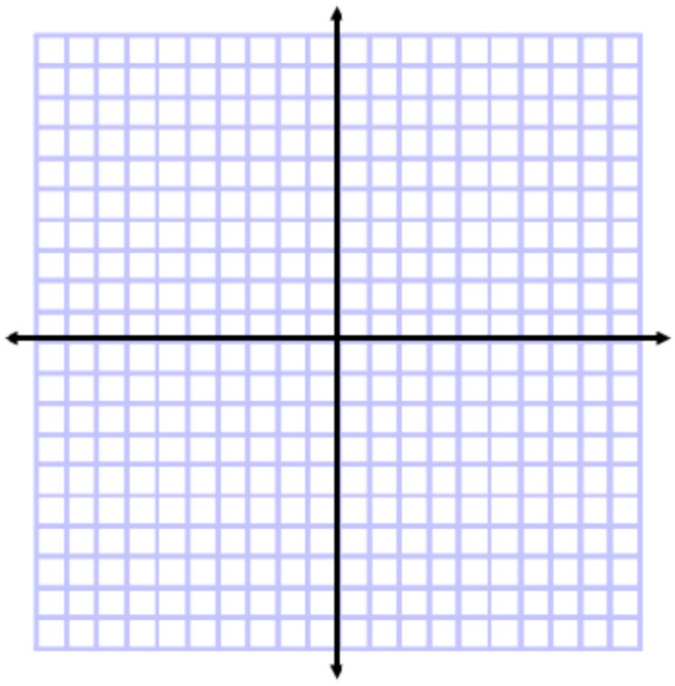
$y = [x]$ "floor"

$y = [\![x]\!]$

GuidedPractice

1. Graph $f(x) = \begin{cases} x + 2 & \text{if } x < 0 \\ x & \text{if } x \geq 0 \end{cases}$. Identify the domain and range.

Piecewise



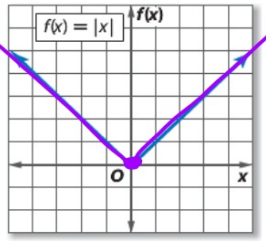
Absolute value: distance from zero (can't be negative)

KeyConcept Parent Function of Absolute Value Functions

Parent function: $f(x) = |x|$, defined as

$$f(x) = \begin{cases} x \text{ if } x > 0 \\ 0 \text{ if } x = 0 \\ -x \text{ if } x < 0 \end{cases}$$

$y = x$ $y = 0$ $y = -x$



$y = |x|$

Type of graph:	V-shaped
Domain:	all real numbers
Range:	all nonnegative real numbers
Intercepts:	$x = 0$, $f(x) = 0$
Not defined:	$f(x) < 0$

$y \geq 0$

[ ]

$|3| = 3$ $|0| = 0$

$|-5| = 5$

Guided Practice **4A, 4B. See margin.**

Graph each function. Identify the domain and range.

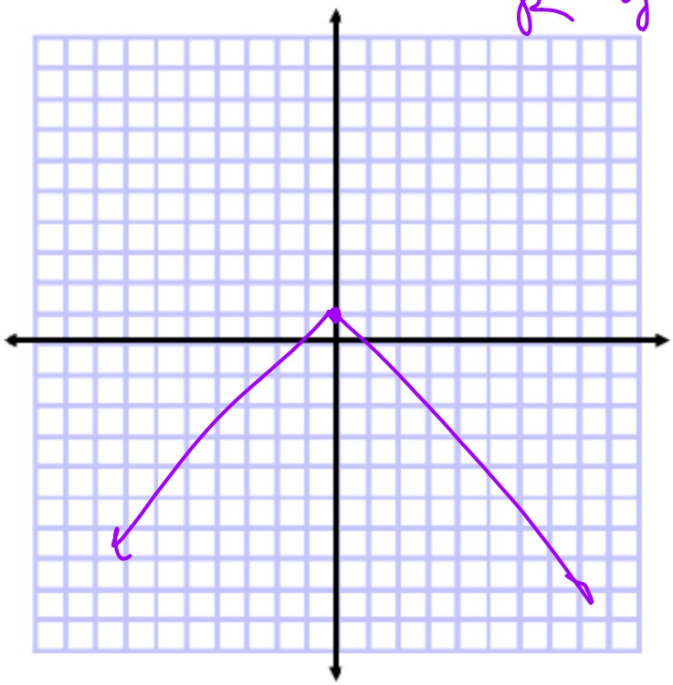
4A. $f(x) = |x - 2|$

4B. $f(x) = -|x| + 1$

How steep is it?

Where does it turn around?

move 2 →

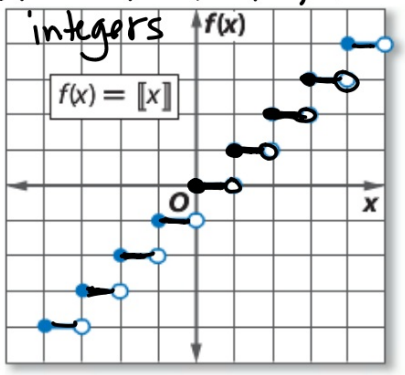


Step function: (informally, it is a floor function)

D = ARN

R = −3, −2, −1, 0, 1, 2, 3

The **greatest integer function**, written $f(x) = [\![x]\!]$, is one kind of step function. The symbol $[\![x]\!]$ means *the greatest integer less than or equal to x*. For example, $[\![3.25]\!] = 3$ and $[\![-4.6]\!] = -5$.



3 -5

floor

2.5	2
2.6	2
2.7	2
2.8	2
−2.2	−3
−2.3	−3
−2.4	−3

StudyTip

Greatest Integer Function

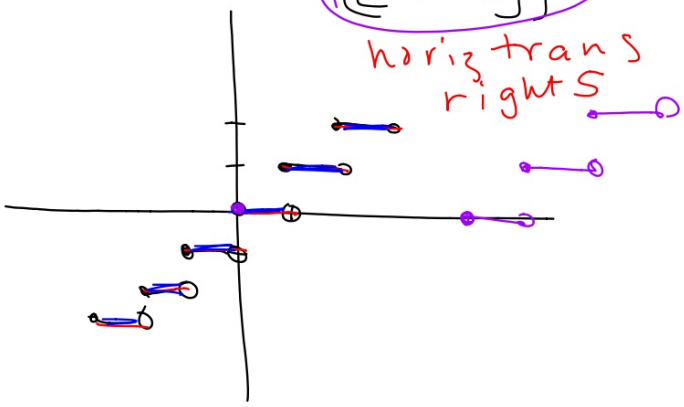
Notice that the domain of this step function is all real numbers and the range is all integers.

Recognize as a specific subtype of step function
Be able to tell domain and range--that's all

Graph $y = [\![x]\!]$

$[\![x+5]\!]$ horiz trans right 5

$[\![x]\!] - 5$ vert trans down 5

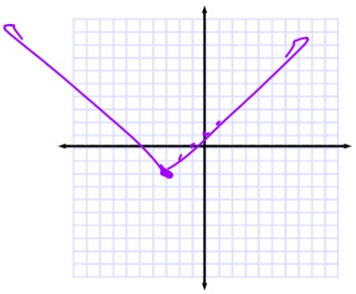


$y = +|x+3| - 2$

opp same

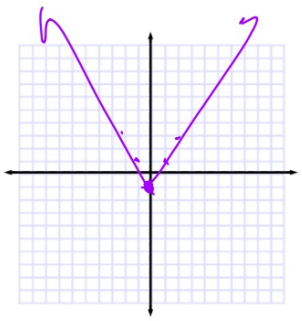
D ARN

R $y \geq -2$

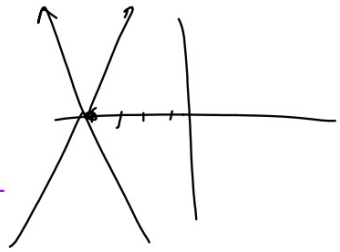


$y = 2|3x| - 1$

$\frac{2}{1}$



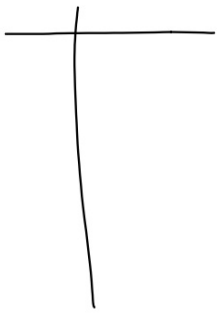
$-|3(x+4)|$

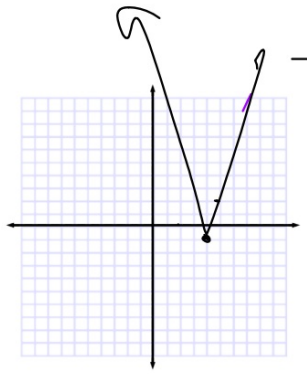


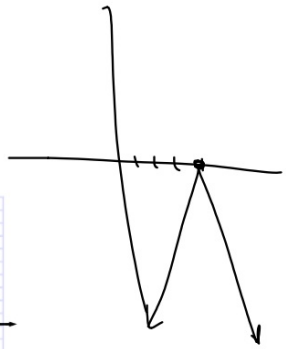
$y = -3|x-4|$

$y = |2x-6| + 2$

$y = |2(x-3)| + 2$

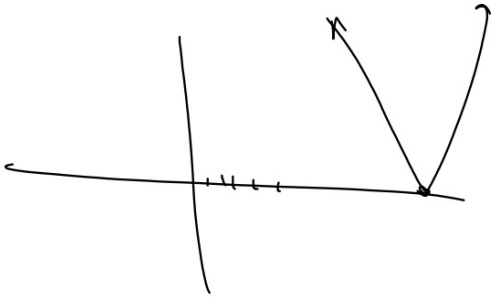






$y = |3x-12| - 1$

$3|x-12|$



WB 2.6 prac

3. $y=[x-1]$