Algebra 1 9.7

Identify and graph step functions

Identify and graph absolute value functions

Identify and graph piecewise functions (Frankenfunction)

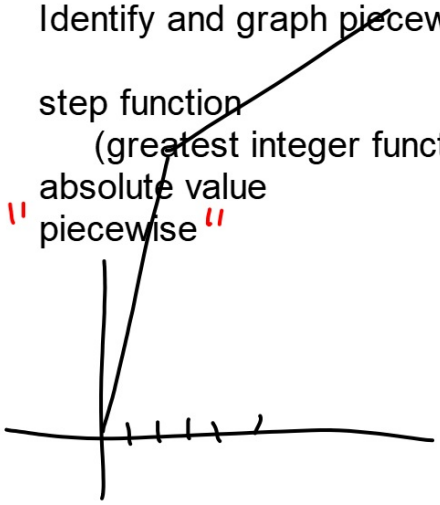
$y = 2|x-1| + 3$

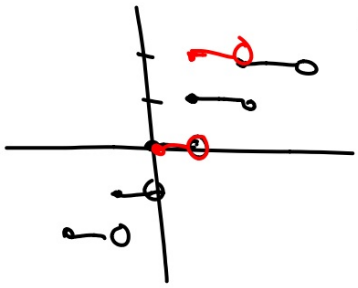
step function

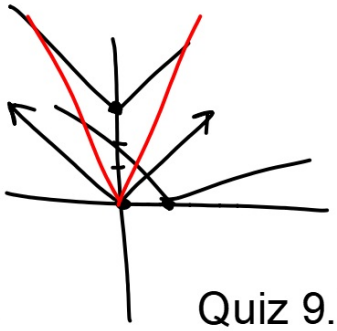
(greatest integer function) $y = 2[\![x - 1]\!]$

absolute value

"piecewise"







Quiz 9.7 Fri.

KeyConcept Absolute Value Function

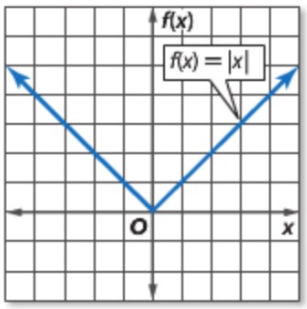
Parent function: $f(x) = |x|$, defined as

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

Type of graph: V-shaped

Domain: all real numbers

Range: all nonnegative real numbers

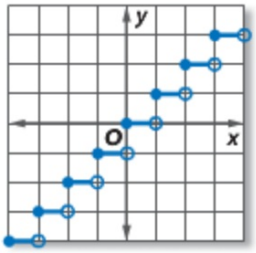
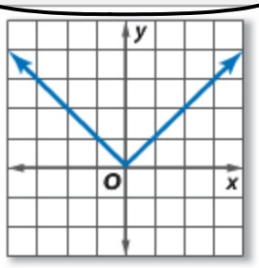
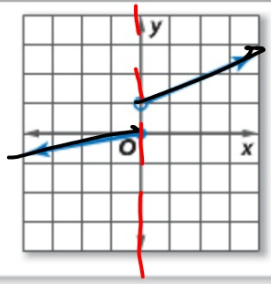


Parent graph

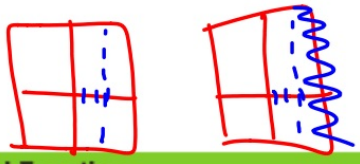
Example 3 Absolute Value Function

Graph $f(x) = |x+3|$ **. State the domain and range.**

ConceptSummary Special Functions

Step Function	Absolute Value Function	Piecewise-Defined Function
		

Don't panic.
This is two equations. Each equation has its own region (domain) zone defense
1. Locate boundary
2. Graph the function
3. Keep what is in the correct region, erase the rest
4. Repeat

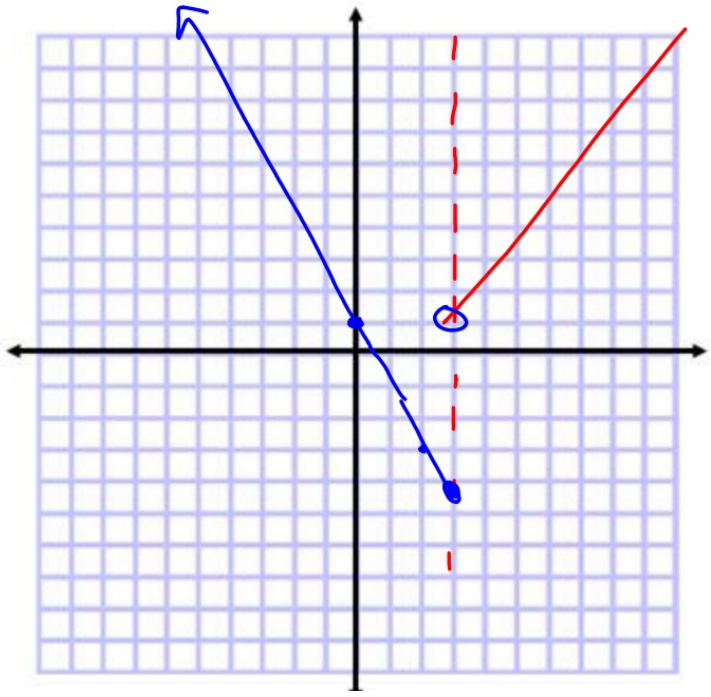


Example 4 Piecewise-Defined Function

$y = x - 2$

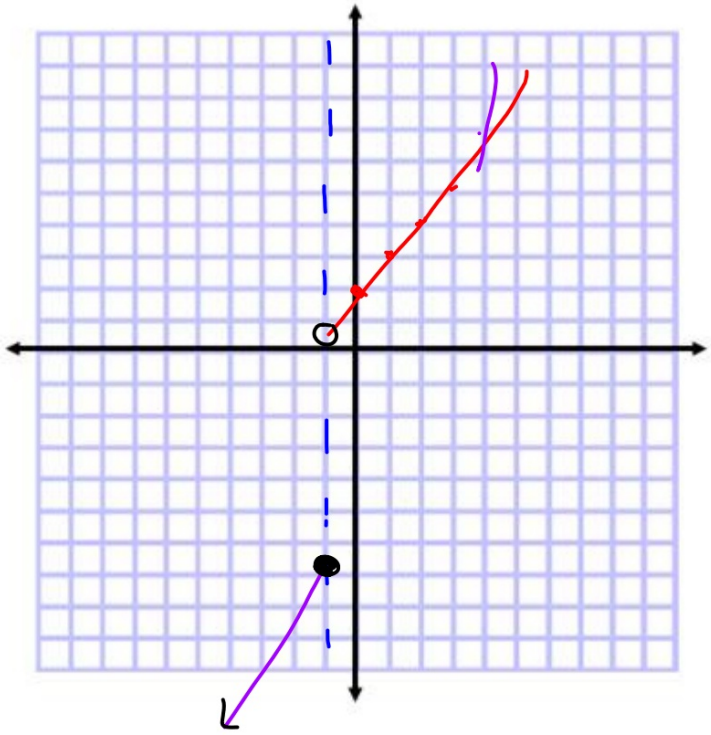
Graph $f(x) = \begin{cases} x - 2 & \text{if } x > 3 \\ -2x + 1 & \text{if } x \leq 3 \end{cases}$. State the domain and range.

$y = -2x + 1$



Graph $f(x) = \begin{cases} x + 2 & \text{if } x > -1 \\ 3x - 5 & \text{if } x \leq 1 \end{cases}$

- $y = 1x + 2$
- $y = 3x - 5$



KeyConcept Greatest Integer Function

Parent function: $f(x) = [\![x]\!]$

Type of graph: disjointed line segments

Domain: all real numbers

Range: all integers