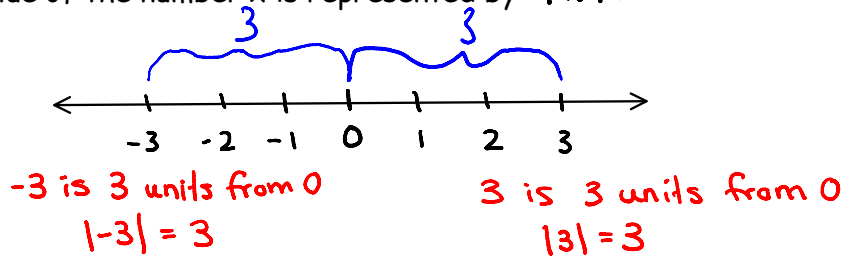


Chapter 7: Absolute Value and Reciprocal Functions**7.1 Absolute Value**

Absolute Value - The distance a number is from zero on the number line. The absolute value of the number x is represented by $|x|$.



Ex. 1) Determine each.

a) $|7| = 7$

b) $|-5| = 5$

c) $|0| = 0$

d) $|\frac{1}{4}| = \frac{1}{4}$

e) $3|-10| = 3(10)$
 $= 30$

f) $-2|-2| =$
 $-2(2)$
 (-4)

Note: When you take the absolute value, put the answer in brackets to maintain the operation being indicated.

Ex. 3) Evaluate (follow order of operations treating absolute value similar to brackets)

a) $|3| - |-8|$
 $3 - 8$
 -5

b) $5 - 4|7 - 2|$
 $5 - 4|5|$
 $5 - 4(5)$
 $5 - 20$
 -15

c) $-4|-3(2-5)^2 + 6|$
 $-4|-27 + 6|$
 $-4|-21|$
 $-4(21) = -84$

Ex. 4) A bell-hop rides the elevator from the 1st floor to the 6th floor, then down to the 2nd floor, up to the 8th floor, and finally, back to the 1st floor. What is the total change in floors?

$|1-6| + |6-2| + |2-8| + |8-1|$

$$|-5| + |4| + |-6| + |7| = 5 + 4 + 6 + 7 = \underline{22 \text{ floors}}$$

Ex. 5) A stock starts at a price of \$8.73 in the morning. It rises to \$10.25, then tumbles to \$7.97, and finally closes at \$8.95.

a) What is the total change in price over the day?

$$|8.73 - 10.25| + |10.25 - 7.97| + |7.97 - 8.95|$$

$$1.52 + 2.28 + 0.98 = \underline{\$4.78}$$

b) What is the net change in price for the day?

net Δ = closing price - starting price

$$8.95 - 8.73 = \underline{\$0.22}$$

Part 1: Assignment: p363 #1-7 (aces), 8, 11, 12b

7a $(8, 1)$ $(3, 1)$

$$|3 - 8|$$

15min

7.2a Linear Absolute Functions

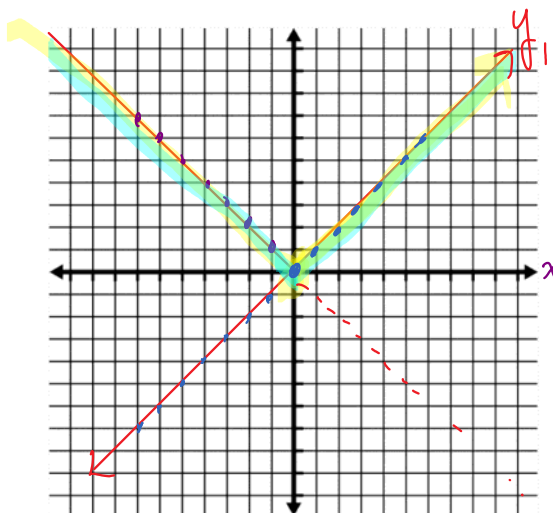
$$y = x$$

b Graph $y_1 = x$ and $y_2 = |x|$ using a table of values.

x	$y_1 = x$	$y_2 = x $
-4	-4	4
-3	-3	3
-2	-2	2
-1	-1	1
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4

reflected in the x-axis

Same



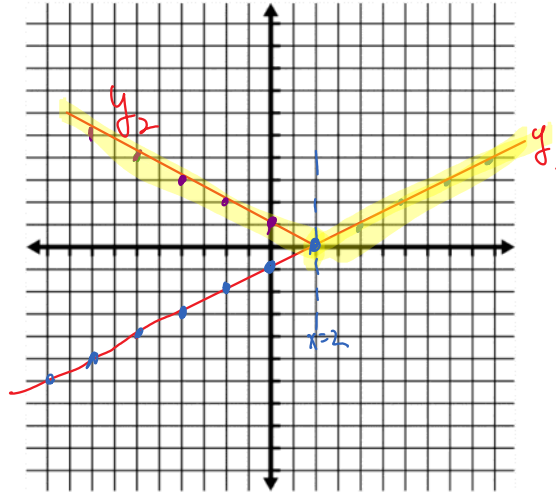
Notice that $y = |x|$ is defined by two different rules.

1. $y = x$, if $x \geq 0$ } piecewise function

1. $y = x$, if $x \geq 0$
 2. $y = -x$, if $x < 0$
- } piecewise function

2. Graph $y_1 = \frac{x}{2} - 1$ and $y_2 = \left| \frac{x}{2} - 1 \right|$ using a table of values.

x	y_1	y_2
-4	-3	3
-3		
-2	-2	2
-1		
0	-1	1
1		
2	0	0
3		
4	1	1



Write the piecewise function for the function

$$y = \left| \frac{x}{2} - 1 \right| \begin{cases} \rightarrow y = \frac{x}{2} - 1, x \geq 2 \\ \rightarrow y = -\left(\frac{x}{2} - 1\right) \\ y = -\frac{x}{2} + 1, x < 2 \end{cases}$$

3. Given $y = |3x - 6|$

$$\begin{aligned} 0 &= |3x - 6| \\ 0 &= 3x - 6 \\ 6 &= 3x \end{aligned}$$

a) Determine the y and x intercepts $x=2$

b) Sketch the graph

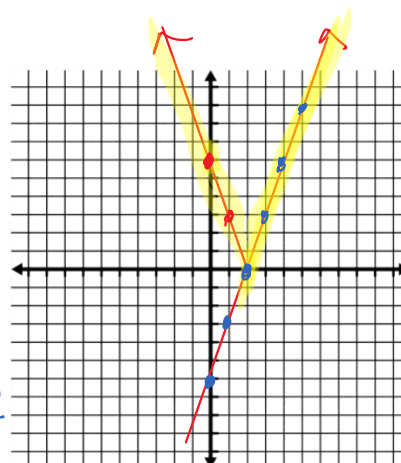
$$\begin{aligned} x\text{-int} &: 2 \\ y\text{-int} &: 6 \end{aligned}$$

Graph

- ① $y = \frac{3x - 6}{1}$

② Reflect -y's in x-axis

$$\begin{cases} y = 3x - 6, x \geq 2 \\ y = -3x + 6, x < 2 \end{cases}$$



Write a piecewise function.

Part 2: Assignment: p375 #1a,2,5ac, 6ac, 9ac