

PC11 Lesson 7.1

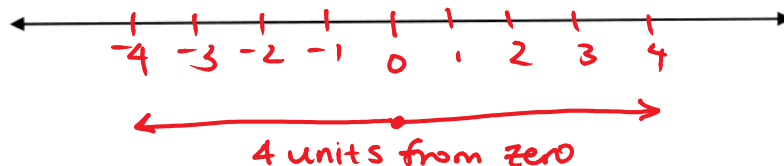
Saturday, February 4, 2017 4:45 PM



Chapter 7 Notes

7.1 Absolute Value

On a number line the numbers -4 and 4 are the same distance from zero.



Absolute Value represents the distance from zero on a number line, regardless of direction. Vertical bars around a number, or expression, represent its absolute value. The diagram above shows the $|-4| = 4$ and $|4| = 4$

Example 1: Evaluate

a) $|33| = 33$

b) $|0| = 0$

c) $|-17| = 17$

d) $|\frac{-5}{3}| = \frac{5}{3}$

Example 2: Evaluate each absolute value expression.

a) $|5 - 9| = 4$
 $|-4|$

b) $|2| - |3(-4)| = -10$
 $2 - |-12|$
 $2 - 12$

c) $|5(-2)^2 + 7(-3) - 15| = 16$
 $|20 + (-21) - 15|$
 $|-16|$

d) $-4|\frac{1}{2} - \frac{3}{4}| = -1$
 $-4|\frac{2}{4} - \frac{3}{4}|$
 $-4(\frac{1}{4})$

Summary:

- $|x| = \underline{x}$. This means the absolute value of a positive number is positive.
- $|-x| = \underline{x}$. This means the absolute value of a negative number is positive.
- $|0| = \underline{0}$. This means the absolute value of zero is zero.

Example 3: The surface of Great Slave Lake is 156 m above sea level. At the deepest point, the bottom of the lake is 485 m below sea level.

- a) Use absolute value symbols to write a statement to determine the depth of the lake.

$$\begin{aligned}d &= 156 + |-485| \\d &= |-485 - 156| \\d &= |156 - (-485)|\end{aligned}$$

- b) What is the depth of the lake?

$$641\text{m}$$

Example 4: A stock opened Monday's trading at \$25.98/share. On Friday, the stock closed trading at \$26.83/share.

- a) Write a statement to show the change in value from Monday's opening to Friday's closing.

$$|25.98 - 26.83| = |-0.85| = \$0.85 \text{ or } 85\text{¢}$$

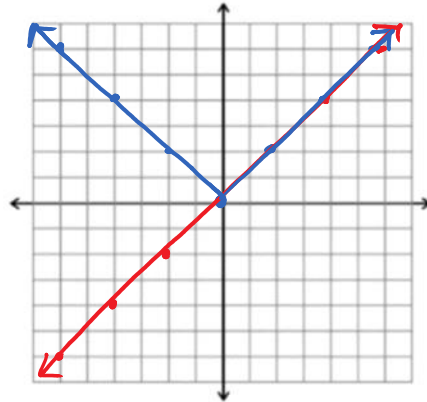
- b) On Tuesday, the stock's value dropped \$2.31/share. On Wednesday, it dropped by \$0.75/share. On Thursday, it rose \$1.15/share. Determine the total change in value of the stock.

$$\begin{aligned}& |-2.31| + |-0.75| + |1.15| \\&= 2.31 + 0.75 + 1.15 \\&= \$4.21\end{aligned}$$

Absolute Value Investigation - Linear Relations

1. Complete the table of value for the function $f(x) = x$.
2. Use the table of value to graph $f(x)$.

x	$f(x)$
-6	-6
-4	-4
-2	-2
0	0
2	2
4	4
6	6



x	$g(x)$
-6	6
-4	4
-2	2
0	0
2	2
4	4
6	6

3. Complete the table of value for the function $g(x) = |x|$.
4. Use the table of value to graph $g(x)$ in your favorite color.
5. Compare the graphs if $f(x)$ and $g(x)$. What characteristics are

a. Similar?

when $x \geq 0$, the graphs overlap.

b. Different?

$g(x)$ is always positive.

6. Explain why the absolute value relation is a function.

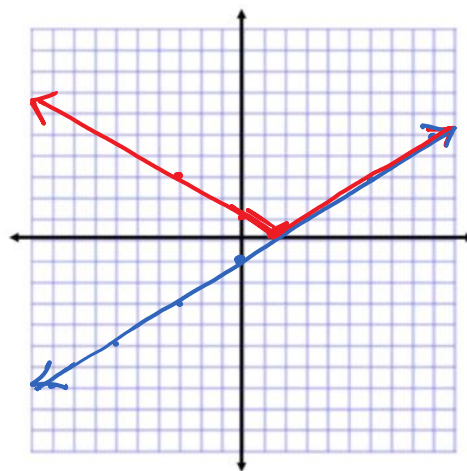
Each input has a single output.

Example 5: Graph $y = f(x)$ and $y = |f(x)|$ on the same coordinate system, using a different colour for each function.

a) $y = \frac{2}{3}x - 1$

$$y = \frac{2}{3}x - 1$$

$$y = \left| \frac{2}{3}x - 1 \right|$$



b) $y = -2x + 5$

$$y = -2x + 5$$

$$y = \left| -2x + 5 \right|$$

