Today's Materials:

☐ pencil

☐ a smile

Absolute Value Functions (Part 2)

Lesson 14

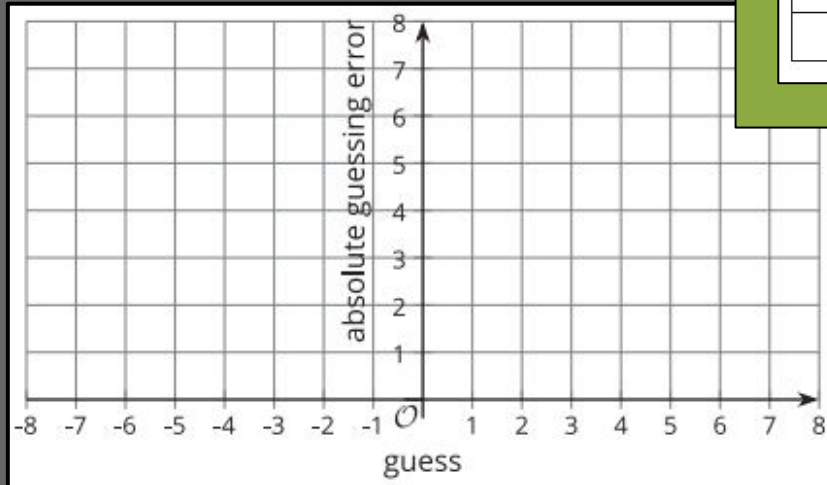# Temperature in Toronto

14.1 Warm-up: 10 minutes

Answer #1 & 2 in your packet

Toronto is a city at the border of the United States and Canada, just north of Buffalo, New York. Here are twelve guesses of the average temperature of Toronto, in degrees Celsius, in February 2017.

5	2	-5	3	0	-1	1.5	4
-2.5	6	4	-0.5				

x	y

1. The actual average temperature of Toronto in February 2017 is 0 degree Celsius.

Use this information to **sketch a scatter plot** representing the guesses, *x*, and the corresponding absolute guessing erros, *y*.
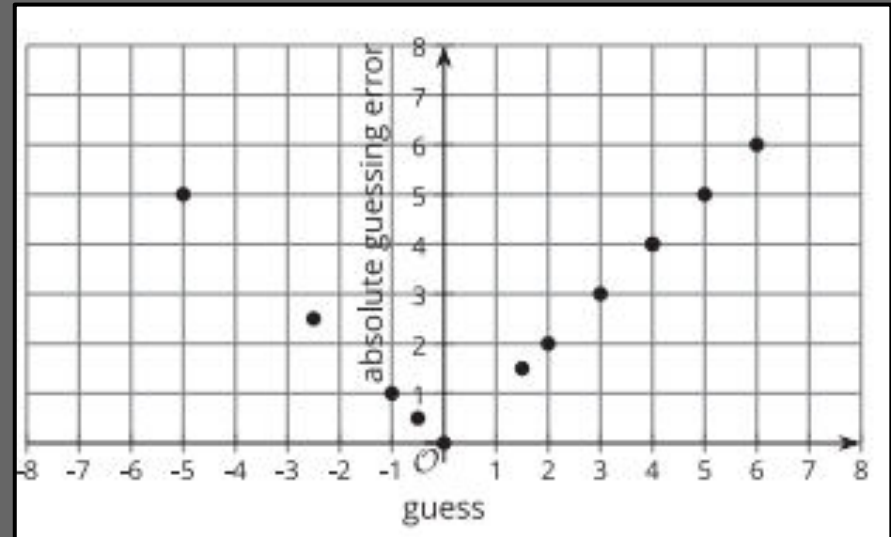

pg 19

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How did it go?

2. What rule can you write (describe) to find the output given in the input?

Let's investigate distance as a function.

Today's Goals:

❏ **I can describe** the effects of adding a number to the expression that defines absolute value function.

❏ **I can explain** the meaning of absolute value function in terms of distance.

❏ When given an absolute value function in words or in function notation, **I can make sense** of it, and **can create** a table of values and a graph to represent it.

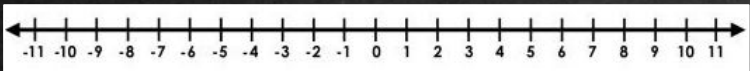# The Distance Function

14.2 Activity: 15 minutes
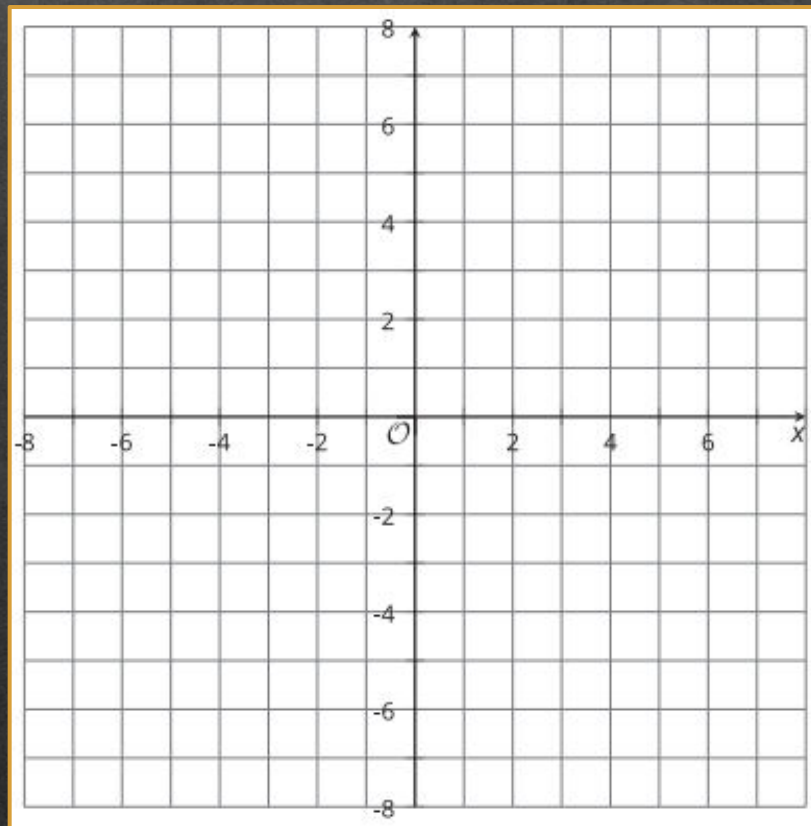
The Distance Function:

The function *A* gives the distance of *x* from 0 on the number line.

1. Complete the table and sketch a graph of function *A*.

x	*A(x)*
8	
	5.6
π	
$\frac{1}{2}$	
	1
0	
$-\frac{1}{2}$	
-1	
-5.6	
	8

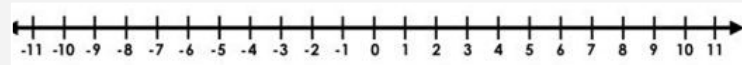**The function _A_ gives the <u>distance of _x_ from 0</u> on the number line.**

#1 solutions (for reference)

2. **Andre and Elena are trying to write a rule for this function.**

○ Andre writes: $A(x) = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$
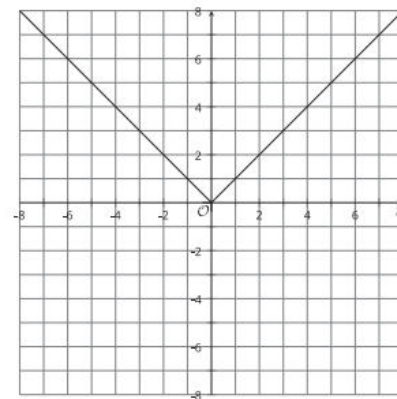
○ Elena writes: $A(x) = |x|$

Discuss with your teammates why BOTH equations correctly represent the function A.
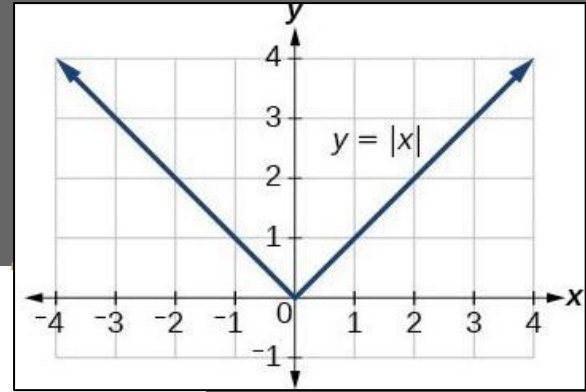
After you discuss, help one person type your group's response...

Synthesis...

Function A is the **absolute value function**. It gives the distance of an input value from a certain value.

The graph is a V shape and the point where the graph changes direction is called the **vertex** (minimum of the groah).

Moving Graphs Around

y=|x|

TEXAS INSTRUMENTS

14.3 Activity: 10 minutes

DESMOS Time!

There are five equations & graphs that represent absolute value functions on **page 21** of your packet.

Directions:

1) **Graph the parent function:** $f(x) = |x|$ (leave it on your screen at ALL times)

2) **Graph one of the 4 remaining functions and observe how the parent function changes** (watch what happens to the vertex)

3) **Repeat with the remaining 3 graphs** and record your observations in your packet

- Function g: Subtracting 2 from x moves the V-shaped graph to the right by 2 units.

- Function h: Adding 2 to x moves the graph to the left by 2 units.

- Function j: Subtracting 2 from $|x|$ moves the V-shaped graph down by 2 units.

- Function k: Adding 2 to $|x|$ moves the graph up by 2 units.

Activity Synthesis...

Can you predict the effects on the following graphs?

Describe how the parent function will change after the subtraction of 5?

1) $p(x) = |x| - 5$

2) $q(x) = |x - 5|$

More Moving Graphs Around

10.4 OPTIONAL: 15 minutes

Elevations of Places

COOL DOWN