

Name: _____

Date: _____



THE ABSOLUTE VALUE AND STEP FUNCTIONS

Do Now: For each of the following, give the equation of the line shown or described.

(a)

Handwritten labels: $(3, 5)$, $(3, -3)$, $(3, -5)$

EQUATION: $x = 3$

(b)

EQUATION: $x = -4$

(c)

EQUATION: $y = -1$

(d)

EQUATION: $x = 5$

(e)

EQUATION: $y = 4$

(f)

EQUATION: $y = 2$

There are two very interesting functions that can be considered related to linear, the **absolute value function** and the **step function**. Let's start with the simpler of the two, the **absolute value**.

Exercise #1: The absolute value gives us the "size" or **magnitude** of a number. Find each of the following.

(a) $|-7| = 7$

(b) $|-2| = 2$

(c) $|6| = 6$

(d) $|0| = 0$

Ok! So, we can do that! Now, what does the basic **absolute value** function "look like?"

Let's investigate on the next page.

Exercise #2: Consider the absolute value function $f(x) = |x|$ Do the following. $f(-3) = |-3| = +3$

(a) Evaluate $f(-7)$ and $f(4)$.

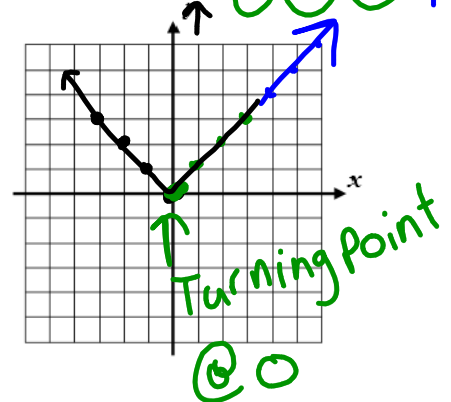
7 4

(b) Fill out the table below and graph the function over this interval. This should be extremely quick. $f(-2) = |-2| = +2$

x	-3	-2	-1	0	1	2	3
f(x)	3	2	1	0	1	2	3

(c) What is the minimum value of the function on this interval?

Zero



(d) Over what domain interval is $f(x) = |x|$ increasing?

$(0, \infty)$

Exercise #3: For the function $f(x) = |x - 4| + 7$ which of the following is the value of $f(1)$? Show the calculations that lead to your answer.

- (1) 10
- (2) -2

- (3) 12
- (4) 4

input
↓

$$f(x) = |x - 4| + 7$$

$$f(1) = |1 - 4| + 7$$

$$|-3| + 7$$

$$3 + 7 = 10$$

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ABSOLUTE VALUE AND STEP FUNCTIONS – HW!



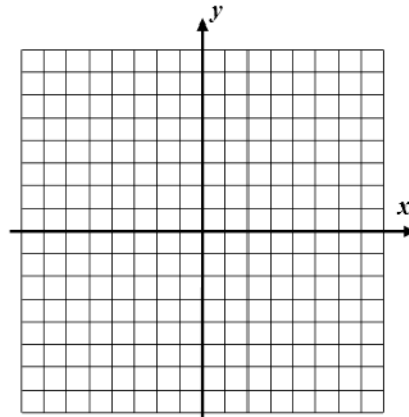
FLUENCY

1. Consider the absolute value function $f(x) = |x + 3|$ only on the interval $-6 \leq x \leq 2$.

(a) Evaluate $f(-5)$ and $f(2)$ without a calculator.

(b) Graph this function over the interval $-6 \leq x \leq 2$. Show your table below.

x	-6	-5	-4	-3	-2	-1	0	1	2
y									



(c) Over which of the following intervals is $f(x)$ always increasing? Circle the correct choice.

- (1) $-6 < x < -3$
- (2) $-2 < x < 1$
- (3) $-4 < x < 0$
- (4) $-5 < x < 2$

(d) State the range of $f(x)$ on this domain interval.

2. Are the two expressions $|x - 5|$ and $|x| - 5$ equivalent? Give evidence to support your yes or no answer. Remember, for expressions to be equivalent, they must have the same value for all values of the input variable, x .