Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**CFS for top quality work**

* + **Constraints** are labeled
	+ Two sets of different numbers are **applied and tested**
	+ Solution addresses **all parts** of the prompt

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

UNIT 1 LESSON 12

**AIM**: Given constraints for the values of p and q, SWBAT use symbolic reasoning to solve problems involving algebraic representations

**THINK ABOUT IT!**

Two points are plotted on the number line below.

**

Which of the following has the greatest value? Try to answer this question without doing any actual calculations.

a) W – X c) W + X

b) X – W d) X + W

Two points are plotted on the open number line below and drawn to scale. Which of the following expressions have the largest value?

**0**

**B**

**A**

a) A – B c) B + A

b) A + B d) B – A

Explain how your strategy changed to solve.

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Key Point

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| Rational number \_\_\_\_\_\_\_\_\_\_\_\_\_ rules can be applied to algebraic representations |

**Interaction with New Material**

Example 1: Assume that x > 0 and y < 0. Will the inequality x - y > 0 be always, sometimes, or never true?

**CFS for top quality work**

* + **Constraints** are labeled
	+ Two sets of different numbers are **applied and tested**
	+ Solution addresses **all parts** of the prompt

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**PARTNER PRACTICE**

**CFS for top quality work**

* + **Constraints** are labeled
	+ Two sets of different numbers are **applied and tested**
	+ Solution addresses **all parts** of the prompt

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| *Bachelor Level* |

1. Name at least three values that could be substituted in for a, b, and c:
	1. If a > 0, a could be \_\_\_\_\_\_\_, \_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_.
	2. If b < 0, b could be \_\_\_\_\_\_\_, \_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_.
	3. If c ≠ 0, c could be \_\_\_\_\_\_\_, \_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_.
2. Find values of a and b that make each mathematical statement true
	1. a + b = 5 a = \_\_\_\_\_\_\_\_\_ b = \_\_\_\_\_\_\_\_\_\_
	2. a + b = 0 a = \_\_\_\_\_\_\_\_\_ b = \_\_\_\_\_\_\_\_\_\_
	3. a + b = -1 a = \_\_\_\_\_\_\_\_\_ b = \_\_\_\_\_\_\_\_\_\_
	4. a – b = -5 a = \_\_\_\_\_\_\_\_\_ b = \_\_\_\_\_\_\_\_\_\_

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| *Master Level* |

1. If x < 0 and y < 0, what must be true about the sum x + y? Explain how you know.

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1. If x > 0 and y > 0, will x + (-y) always be positive, always be negative, or could be positive or negative. Provide examples to justify your explanation.

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**INDEPENDENT PRACTICE**

**CFS for top quality work**

* + **Constraints** are labeled
	+ Two sets of different numbers are **applied and tested**
	+ Solution addresses **all parts** of the prompt

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| *Bachelor Level* |

1. On the number line below, the numbers a and b are the same distance from 0.



Step A: What is a + b? Explain how you know

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Step B: Which of the following will yield (result) in a positive value? Explain how you know.

1. b + a
2. a + b
3. b – a
4. a – b

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Step C: Write a statement using a and b that will result in a negative value.

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Step D: Explain how you know your statement will result in a negative value.

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| *Master Level* |

1. Assume that a ≠ 0, will |a| always, sometimes, or never be greater than a? Explain your answer using examples.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A number line, drawn to scale, is shown below. The numbers 0 and 1 are marked, as are two other numbers a and b.



1. $a - 1$  iv. |*b*|
2. $-b  $ v. $a + b$
3. $|a - b|$  vi. $b – a $

 Step A: Circle all the values that will have a positive answer

 Step B: Which expression will be larger: iii or vi? Explain how you know.

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 Step C (continued from question 3): Which expression will be larger: i or ii? Explain how you know.

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 Step D: Will the expressions “b – a” and “a – b” have the same value?

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 Step E: Is there a commutative property of subtraction? Consider your response in part c to help

 you explain.

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| *PhD Level* |

1. Assume x > y and y < 0. Will the difference x – y > 0 always, sometimes, or never be true? Explain using examples.

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1. Assume x > y and y < 0. Will x + y > 0 always, sometimes, or never be true? Explain using examples.

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**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**CFS for top quality work**

* + **Constraints** are labeled
	+ Two sets of different numbers are **applied and tested**
	+ Solution addresses **all parts** of the prompt

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**EXIT TICKET**

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| Self-assessment | I mastered the learning objective today. | I am almost there.  | Need more practice and feedback. |
| Teacher feedback | You mastered the learning objective today. | You are almost there.  | You need more practice and feedback. |

1. Assume x > 0 and y < 0. For each statement, determine whether it is sometimes, never or always true. Explain your answer.
2. x + y > 0

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. y – x < 0

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