Tennessee Comprehensive Assessment Program

TCAP/CRA 2013

6

Anchor Set

Grade 6 – Comparing on a Number Line Task

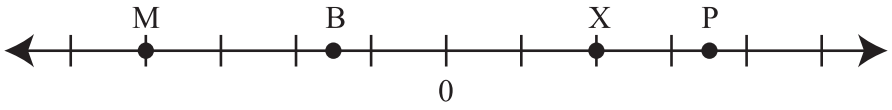
SECURE MATERIAL - Reader Name: _____

Tennessee Comprehensive Assessment Program

Part 1: Constructed Response Task Section

Comparing on a Number Line Task

Points M, B, X and P represent numbers.



a. Insert >, <, or = into the circles to make each statement true.

M ◯ B

P ◯ X

How are the positions of the points on the number line used to compare the numbers represented by the points?

GO ON TO THE NEXT PAGE

b. Insert >, <, or = into the circles to make each statement true.

|B| ◯ |X| |M| ◯ |P|

How is a number line used to compare the absolute values of numbers?

c. In the space below, draw *one* number line and plot a point labeled G and a point labeled F so that both of the following statements are true:

G > F

|G| = |F|

Scoring Guide

The CCSS for Mathematical Content (4 points)

6.NS.C.7a(x) Explains that values increase from left to right on a horizontal number line. _____
(1 Point)

6.NS.C.7c(x) Explains that absolute value indicates distance from zero. _____
(1 Point)

6.NS.C.7a(z) Places G and F on the number line such that G is to the right of F on the number line. _____
(1 Point)

6.NS.C.7c(z) Uses the meaning of absolute value as distance from zero to place G and F at points equidistant from zero on the number line. _____
(1 Point)

The CCSS for Mathematical Practice (3 points)

MP1 Completes all parts of the problem, demonstrating understanding that numbers can be ordered using inequality symbols and understands that in part c there is only one point G and one point F. **(1 Point)** _____
(MP1: Make sense of problems and persevere in solving them.)

MP4 Draws an appropriate number line in part c and plots points to model the relationship between the values. _____
(1 Point)
(MP4: Model with mathematics.)

MP6 Uses precise mathematical vocabulary in explanation in parts a and b. **(1 Point)** _____
(MP6: Attend to precision.)

TOTAL POINTS: 7

The CCSS for Mathematical Content Addressed In This Task

Apply and extend previous understandings of numbers to the system of rational numbers.	
6.NS.C.7a	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret -3 > -7 as a statement that -3 is located to the right of -7 on a number line oriented from left to right.*
6.NS.C.7c	Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of -30 dollars, write |-30| = 30 to describe the size of the debt in dollars.*

The CCSS for Mathematical Practice*

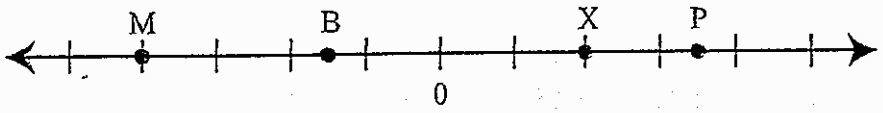
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

* Gray type indicates Mathematical Practices not addressed in this assessment.

A-1a

2. Comparing on a Number Line Task

Points M, B, X and P represent numbers.



a. Insert >, <, or = into the circles to make each statement true.

M ◯ B

P ◯ X

How are the positions of the points on the number line used to compare the numbers represented by the points?

The further left you put the point the smaller the number

A-1b

b. Insert >, <, or = into the circles to make each statement true.

|B| < |X| |M| > |P|

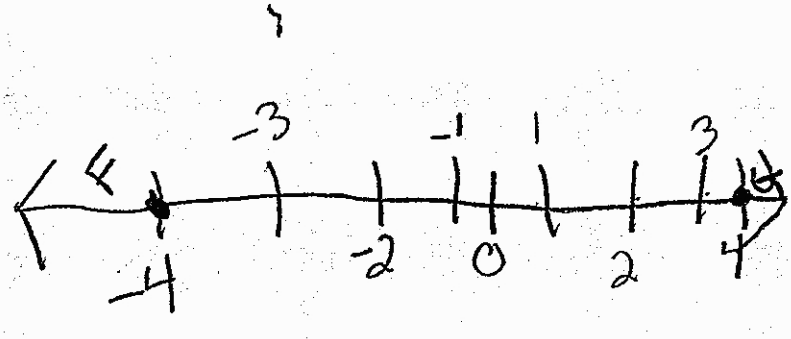
How is a number line used to compare the absolute values of numbers?

The absolute value of where one point is the distance from zero.

c. In the space below, draw *one* number line and plot a point labeled G and a point labeled F so that both of the following statements are true:

G > F

|G| = |F|



Litho#: 0082

Anchor 1 Litho 0082

Total Content Points: 4 (6.NS.7a (x), 6.NS.7c (x), 6.NS.7a (z), 6.NS.7c (z))

Total Practice Points: 3 (MP1, MP4, MP6)

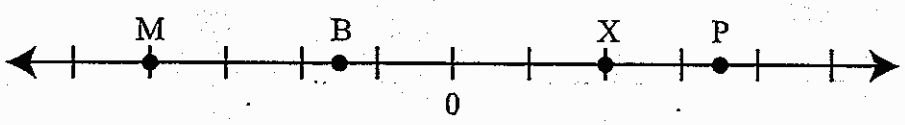
The student explains in Part A that values increase from left to right on a horizontal number line by stating, "The further left…the smaller the number" (6.NS.7a (x)). In Part B the student explains that absolute value indicates distance from zero (6.NS.7c (x)). The student places G and F on a number line in Part C such that G is to the right of F (6.NS.7a (z)). G and F are also placed equidistant from zero on the number line (4 and –4 respectively) (6.NS.7c (z)). The student draws an appropriate number line in Part C and plots points that model the relationship between the values (MP4). The student completes all parts of the problem, correctly orders the four inequality symbols in Parts A and B, and understands that in Part C there is only one point G and one point F (MP1). The student uses precise mathematical vocabulary in the explanations in Parts A and B (MP6).

Total Awarded Points: 7 out of 7

A-2a

2. Comparing on a Number Line Task

Points M, B, X and P represent numbers.



a. Insert >, <, or = into the circles to make each statement true.

M (<) B P (>) X

How are the positions of the points on the number line used to compare the numbers represented by the points?

You can use the position of the points to compare the numbers because you are given a number to compare the points, zero. We can conclude that numbers on the left side of zero are less than zero, and the further left they are, the smaller they get (and the more they decrease). We can conclude that numbers on the right side of zero are greater than zero, and get larger & increase the further right you go. Therefore, the letters / variable from least to greatest are M, B, X, P

Litho#: 0124

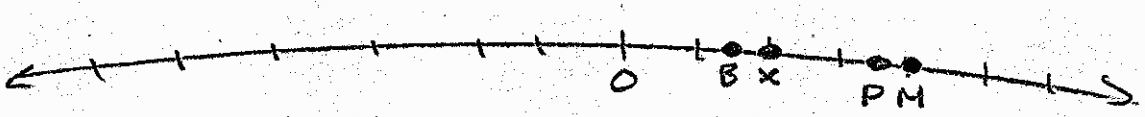
A-2b

b. Insert >, <, or = into the circles to make each statement true.

|B| (<) |X| |M| (>) |P|

How is a number line used to compare the absolute values of numbers?

An absolute value turns any negative numbers into positive numbers by only taking away the negative sign. We know that M and B are negative, since they are less than zero. To find the absolute value, you reflect them over zero to the right side. Then, your number line would look something like this:

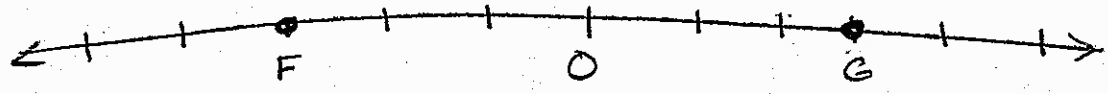


Now, in order from least to greatest, the variables are B, X, P, M.

c. In the space below, draw *one* number line and plot a point labeled G and a point labeled F so that both of the following statements are true:

G > F

|G| = |F|



G is greater than F, since F is negative and G is positive, but the absolute value of both numbers are equal

Anchor 2 Litho 0124

Total Content Points: 3 (6.NS.7a (x), 6.NS.7a (z), 6.NS.7c (z))

Total Practice Points: 3 (MP1, MP4, MP6)

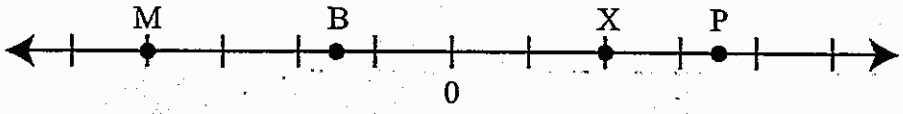
The student demonstrates understanding in Part A that values increase from left to right on a horizontal number line by stating "get larger & increase the further right you go" (6.NS.7a (x)). The student response in Part B that to find the absolute value of negative numbers "you reflect them over zero to the right side" does not explain that absolute value indicates distance from zero (no credit for 6.NS.7c (x)). The student places G and F on a number line in Part C such that G is to the right of F and the points are equidistant from zero, which is determined by using the same number of increment marks (3) between both zero and F and zero and G (6.NS.7a (z), 6.NS.7c (z)). The student draws an appropriate number line in Part C and plots points that model the relationship between the values (MP4). The student completes all parts of the problem, correctly orders the four inequality symbols in Parts A and B, and understands that in Part C there is only one point G and one point F (MP1). The student uses precise mathematical vocabulary in the explanations in Parts A and B (MP6).

Total Awarded Points: 6 out of 7

A-3a

2. Comparing on a Number Line Task

Points M, B, X and P represent numbers.



a. Insert >, <, or = into the circles to make each statement true.

M (<) B P (>) X

How are the positions of the points on the number line used to compare the numbers represented by the points?

The number line shows which letter is bigger or smaller than the other letters. M is smaller than B because farther in the negatives than B is. Just like P and X, P is farther down the number line but it's a positive so that means that it's greater or bigger than X.

A-3b

b. Insert >, <, or = into the circles to make each statement true.

|B| < |X| |M| > |P|

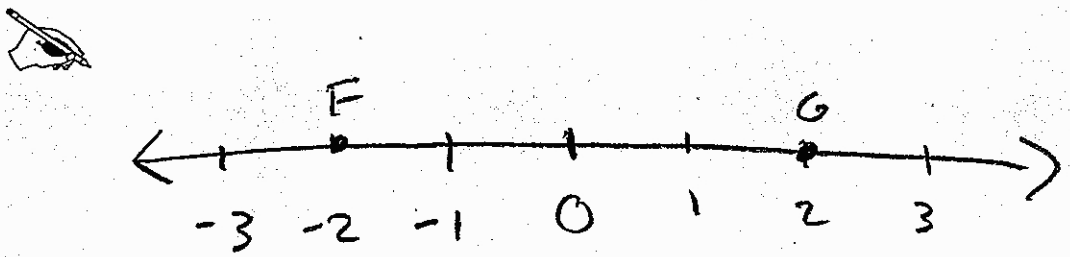
How is a number line used to compare the absolute values of numbers?

The number line is used to compare the absolute values of numbers by comparing how many spaces or numbers are in between 0 and the letter. |B| is smaller than |X| because X has more space or distance between 0 and itself. Same thing goes for |M| and |P|. Even though |P| is greater than in numbers but not absolute value. |M| has more distance between itself and 0.

c. In the space below, draw *one* number line and plot a point labeled G and a point labeled F so that both of the following statements are true:

G > F

|G| = |F|



Litho#: 0180

Anchor 3 Litho 0180

Total Content Points: 4 (6.NS.7a (x), 6.NS.7c (x), 6.NS.7a (z), 6.NS.7c (z))

Total Practice Points: 2 (MP1, MP4)

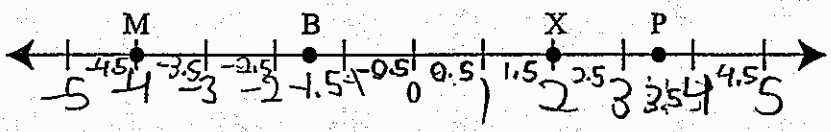
The student demonstrates understanding in Part A that values increase from left to right on a horizontal number line by stating "M is smaller than B because farther in the negatives than B is," and "P is farther down the number line…it's greater or bigger than X" (6.NS.7a (x)). The student demonstrates understanding in Part B that absolute value indicates distance from zero by stating "how many spaces or numbers are in between 0 and the letter" (6.NS.7c (x)). The student places G and F on a number line in Part C such that G is to the right of F and the points are equidistant from zero (2 and –2 respectively) (6.NS.7a (z), 6.NS.7c (z)). The student draws an appropriate number line in Part C and plots points that model the relationship between the values (MP4). The student completes all parts of the problem, correctly orders the four inequality symbols in Parts A and B, and understands that in Part C there is only one point G and one point F (MP1). The student response in Part A that "P is farther down the number line" lacks precise mathematical language regarding direction, and the statement in Part B "Even though |P| is greater than in numbers…" does not give a precise mathematical description of the situation (no credit for MP6).

Total Awarded Points: 6 out of 7

A-4a

2. Comparing on a Number Line Task

Points M, B, X and P represent numbers.



a. Insert >, <, or = into the circles to make each statement true.

M ◯ B

P ◯ X

How are the positions of the points on the number line used to compare the numbers represented by the points?

Count where they are on the number line. I labeled numbers onto the number line.

Litho#: 0054

A-4b

b. Insert >, <, or = into the circles to make each statement true.

|B| ◯ |X| |M| ◯ |P|

How is a number line used to compare the absolute values of numbers?

Count how far it is to the starting point of the number line.

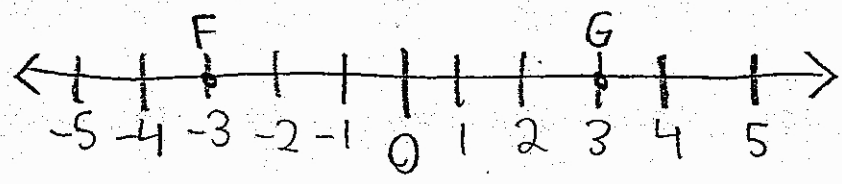
c. In the space below, draw *one* number line and plot a point labeled G and a point labeled F so that both of the following statements are true:

G > F

|G| = |F|

G>F

|G|=|F|



Litho#: 0054

Anchor 4 Litho 0054

Total Content Points: 3 (6.NS.7c (x), 6.NS.7a (z), 6.NS.7c (z))

Total Practice Points: 2 (MP1, MP4)

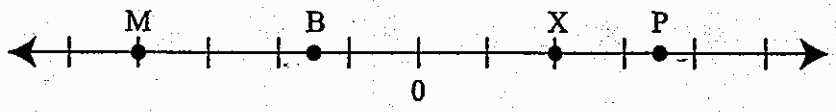
The student response in Part A does not indicate that values increase from left to right on a horizontal number line (no credit for 6.NS.7a (x)). The student response in Part B stating "Count how far it is to the starting point" demonstrates understanding that absolute value indicates distance from zero (6.NS.7c (x)). The student places G and F on a number line in Part C such that G is to the right of F and the points are equidistant from zero (3 and –3 respectively) (6.NS.7a (z), 6.NS.7c (z)). The student draws an appropriate number line in Part C and plots points that model the relationship between the values (MP4). The student completes all parts of the problem, correctly orders the four inequality symbols in Parts A and B, and understands that in Part C there is only one point G and one point F (MP1). The student lacks precise mathematical language for the explanations in Parts A and B (no credit for MP6).

Total Awarded Points: 5 out of 7

A-5a

2. Comparing on a Number Line Task

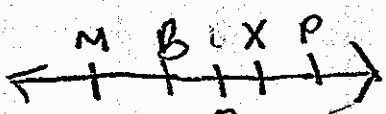
Points M, B, X and P represent numbers.



a. Insert >, <, or = into the circles to make each statement true.

M (<) B P (>) X

How are the positions of the points on the number line used to compare the numbers represented by the points?

The number line  shows the numbers from little to BIG so you can tell the bigger one from the littler one

A-5b

b. Insert >, <, or = into the circles to make each statement true.

|B| ⊜ |X| |M| ⊜ |P|

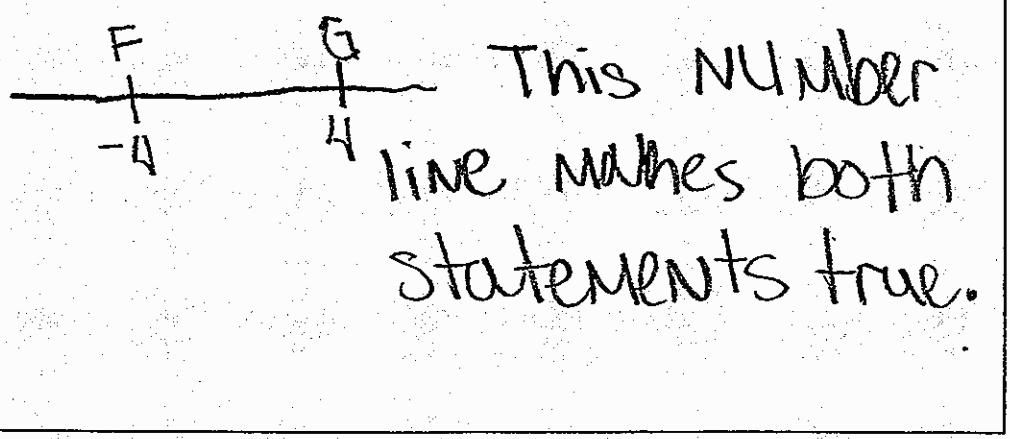
How is a number line used to compare the absolute values of numbers?

A number line -2 -1 0 1 2 can compare absolute values if you switch positive to negative and negative to + ↷ − − ↷ + positive

c. In the space below, draw *one* number line and plot a point labeled G and a point labeled F so that both of the following statements are true:

G > F

|G| = |F|



Anchor 5 Litho 0060

Total Content Points: 3 (6.NS.7a (x), 6.NS.7a (z), 6.NS.7c (z))

Total Practice Points: 1 (MP4)

The student demonstrates understanding in Part A that values increase from left to right on a horizontal number line by stating that numbers go "from little to BIG" (6.NS.7a (x)). The student response in Part B, stating that absolute values can be compared "if you switch positive to negative and negative to positive," does not explain that absolute value indicates distance from zero (no credit for 6.NS.7c (x)). The student places G and F on a number line in Part C such that G is to the right of F and gives the points numeric labels (4 and –4) that indicate each point is equidistant from zero (6.NS.7a (z), 6.NS.7c (z)). The student draws an appropriate number line in Part C and plots points that model the relationship between the values (MP4). The student completes all parts of the problem and understands that in Part C there is only one point G and one point F; however, the student incorrectly determines in Part B that $|B| > |X|$ (no credit for MP1). The student lacks precise mathematical language in Part A by using the vague description "little to BIG" (no credit for MP6).

Total Awarded Points: 4 out of 7

A-6a

2. Comparing on a Number Line Task

Points M, B, X and P represent numbers.

a. Insert >, <, or = into the circles to make each statement true.

M (<) B P (>) X

How are the positions of the points on the number line used to compare the numbers represented by the points?

right is positive -1,2,3,4
Left is negative --1,-2,-3,-4

A-6b

b. Insert >, <, or = into the circles to make each statement true.

|B| (=) |X| |M| (<) |P|

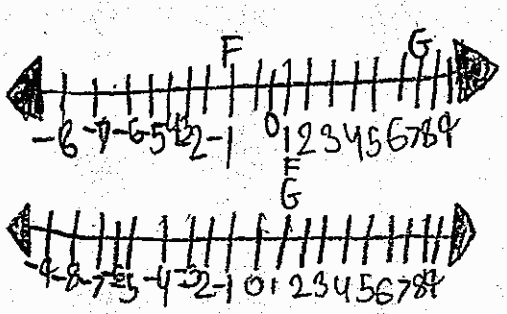
How is a number line used to compare the absolute values of numbers?

Where the PUt the Letter determins the number.

c. In the space below, draw *one* number line and plot a point labeled G and a point labeled F so that both of the following statements are true:

G > F

|G| = |F|



Anchor 6 Litho 0018

Total Content Points: 2 (6.NS.7a (z), 6.NS.7c (z))

Total Practice Points: 1 (MP4)

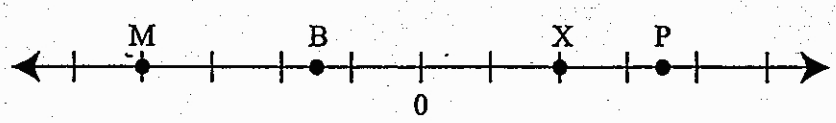
The student response in Part A that states “right is positive” and “left is negative” does not adequately explain that values increase from left to right on a horizontal number line (no credit for 6.NS.7a (x)). The student does not give an acceptable explanation in Part B that absolute value indicates distance from zero (no credit for 6.NS.7c (x)). The student places G and F on one number line in Part C such that G is to the right of F (6.NS.7a (z)). On a different number line, the student places G and F equidistant from zero, both points located at 1 (6.NS.7c (z)). The student draws appropriate number lines in Part C and plots points that model each relationship between the values (MP4). The student completes all parts of the problem; however, the student incorrectly determines in Part B that $|M| < |P|$ (no credit for MP1). The student lacks precise mathematical language in Parts A and B (no credit for MP6).

Total Awarded Points: 3 out of 7

A-7a

2. Comparing on a Number Line Task

Points M, B, X and P represent numbers.



a. Insert >, <, or = into the circles to make each statement true.

M < B P > X

How are the positions of the points on the number line used to compare the numbers represented by the points?

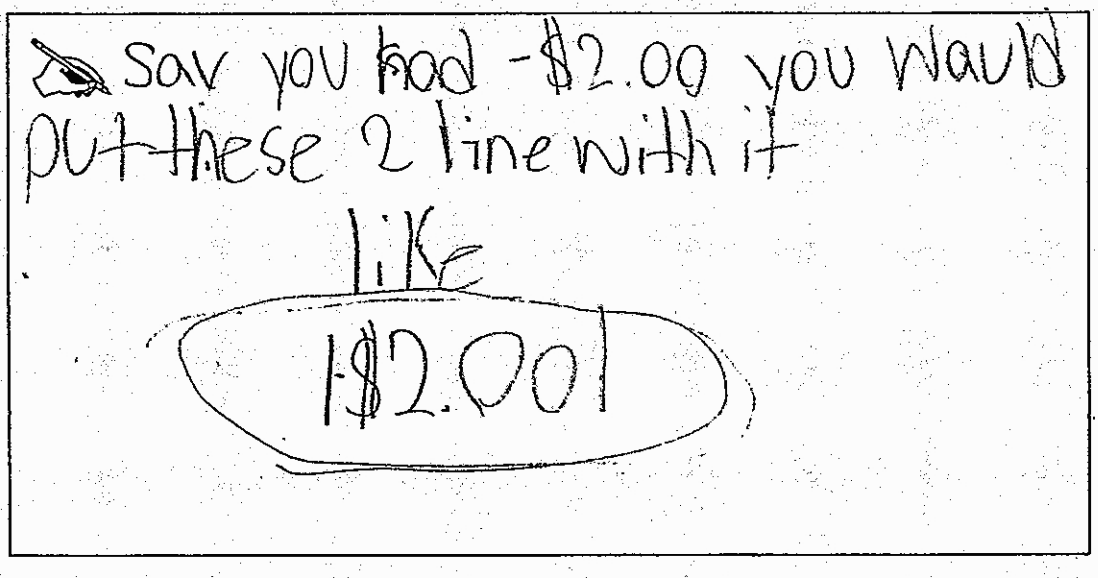
to show what the number is.

A-7b

b. Insert >, <, or = into the circles to make each statement true.

|B| < |X| |M| > |P|

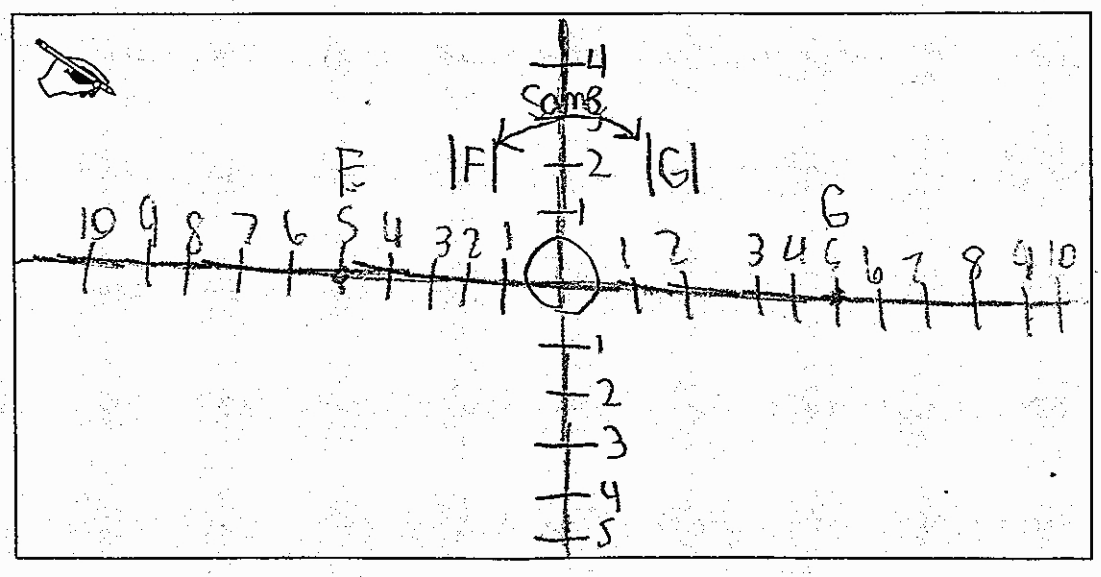
How is a number line used to compare the absolute values of numbers?



c. In the space below, draw *one* number line and plot a point labeled G and a point labeled F so that both of the following statements are true:

G > F

|G| = |F|



Litho#: 0029

Anchor 7 Litho 0029

Total Content Points: 2 (6.NS.7a (z), 6.NS.7c (z))

Total Practice Points: 1 (MP1)

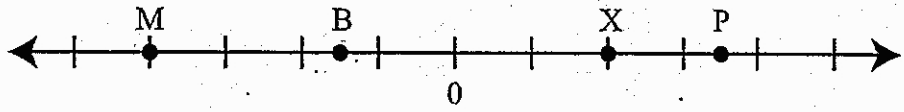
The brief student response in Part A does not adequately explain that values increase from left to right on a horizontal number line (no credit for 6.NS.7a (x)). The student does not give an acceptable explanation in Part B that absolute value indicates distance from zero (no credit for 6.NS.7c (x)). The student places G and F on a number line in Part C such that G is to the right of F (6.NS.7a (z)). The points G and F are also equidistant from zero on the number line (5 increments each from zero) (6.NS.7c (z)). However, the student does not draw an appropriate number line in Part C to model the relationship between the values because the values to the left of zero are positive numbers, not negative numbers (no credit for MP4). The student completes all parts of the problem, correctly orders the four inequality symbols in Parts A and B, and understands that in Part C there is only one point G and one point F (MP1). The student lacks precise mathematical language for the explanations in Parts A and B (no credit for MP6).

Total Awarded Points: 3 out of 7

A-8a

2. Comparing on a Number Line Task

Points M, B, X and P represent numbers.



a. Insert >, <, or = into the circles to make each statement true.

M (<) B P (>) X

How are the positions of the points on the number line used to compare the numbers represented by the points?

The Positions are important because M is before B so B is greater than M, and P is greater than X.

Litho#: 0133

A-8b

b. Insert >, <, or = into the circles to make each statement true.

|B| (=) |X|

|M| (=) |P|

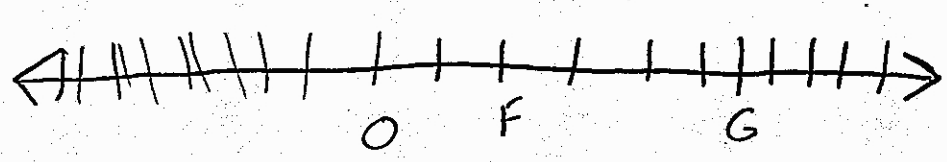
How is a number line used to compare the absolute values of numbers?

By showing distance of the numbers on a number line

c. In the space below, draw *one* number line and plot a point labeled G and a point labeled F so that both of the following statements are true:

G > F

|G| = |F|



Litho#: 0133

Anchor 8 Litho 0133

Total Content Points: 1 (6.NS.7a (z))

Total Practice Points: 1 (MP4)

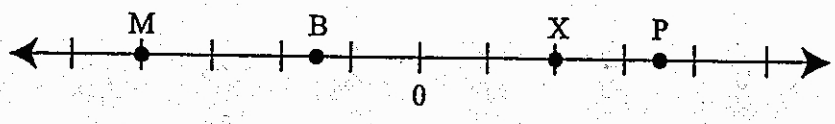
The student does not demonstrate understanding in Part A that values increase from left to right on a horizontal number line (no credit for 6.NS.7a (x)). The student response in Part B, stating "By showing distance of the numbers on a number line," does not demonstrate that absolute value indicates distance from zero (no credit for 6.NS.7c (x)). The student places G and F on a number line in Part C such that G is to the right of F (6.NS.7a (z)). However, G and F are not placed at points equidistant from zero on the number line (no credit for 6.NS.7c (z)). The student draws an appropriate number line in Part C that models the relationship between the values (MP4). The student completes all parts of the problem and understands that in Part C there is only one point G and one point F; however, the student incorrectly determines in Part B that $|B| = |X|$ and $|M| = |P|$ (no credit for MP1). The student lacks precise mathematical language for the explanations in Parts A and B (no credit for MP6).

Total Awarded Points: 2 out of 7

A-9a

2. Comparing on a Number Line Task

Points M, B, X and P represent numbers.



a. Insert >, <, or = into the circles to make each statement true.

M (<) B P (<) X

How are the positions of the points on the number line used to compare the numbers represented by the points?

It shows which one is greater when the other one. like 5 0 4, 5 is larger.

A-9b

b. Insert >, <, or = into the circles to make each statement true.

|B| ◯ |X| |M| ◯ |P|

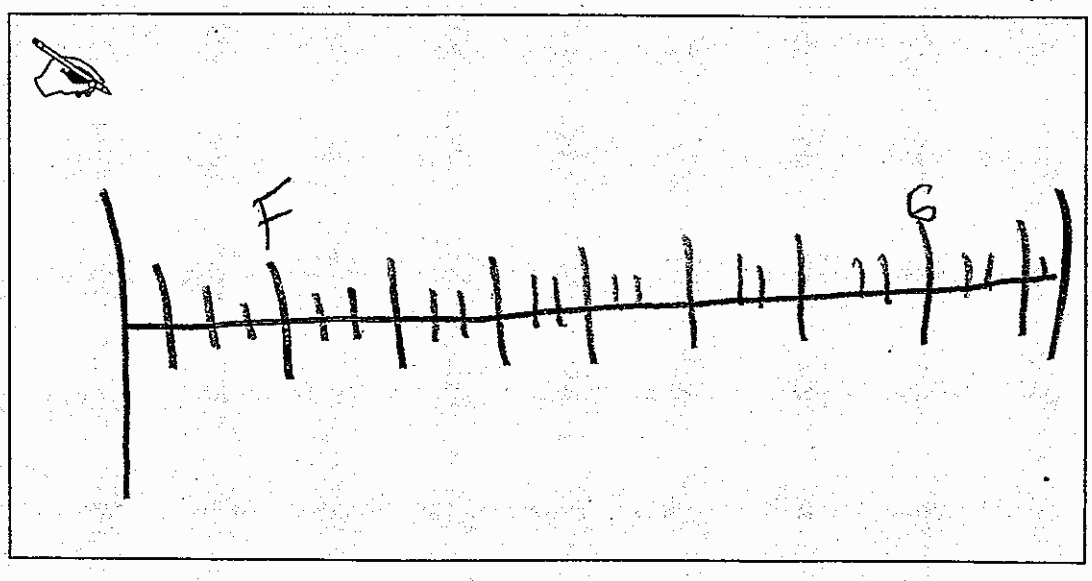
How is a number line used to compare the absolute values of numbers?

the number line helps know some are negative and some are positive.

c. In the space below, draw *one* number line and plot a point labeled G and a point labeled F so that both of the following statements are true:

G > F

|G| = |F|



Litho#: 0046

Anchor 9 Litho 0046

Total Content Points: 1 (6.NS.7a (z))

Total Practice Points: 0

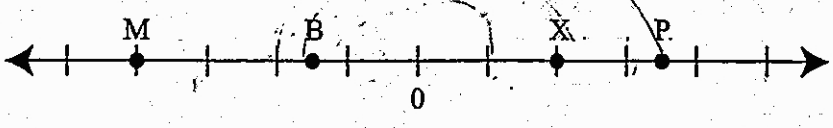
The student response in Part A describing "which one is [greater]" does not demonstrate understanding that values increase from left to right on a horizontal number line (no credit for 6.NS.7a (x)). The student response in Part B does not give an acceptable explanation that absolute value indicates distance from zero (no credit for 6.NS.7c (x)). The student places G and F on a number line in Part C such that G is to the right of F (6.NS.7a (z)). However, with no zero defined on the number line, the points G and F cannot be determined to be equidistant from zero (no credit for 6.NS.7c (z)). The student does not draw an appropriate number line in Part C to model the relationship between the values because the model has no zero point and no values assigned to G and F to indicate their locations on the number line (no credit for MP4). The student completes all parts of the problem and understands that in Part C there is only one point G and one point F; however, the student incorrectly determines in Part A that $P < X$ and in Part B that $|M| < |P|$ (no credit for MP1). The student lacks precise mathematical language for the explanations in Parts A and B (no credit for MP6).

Total Awarded Points: 1 out of 7

A-10a

2. Comparing on a Number Line Task

Points M, B, X and P represent numbers.

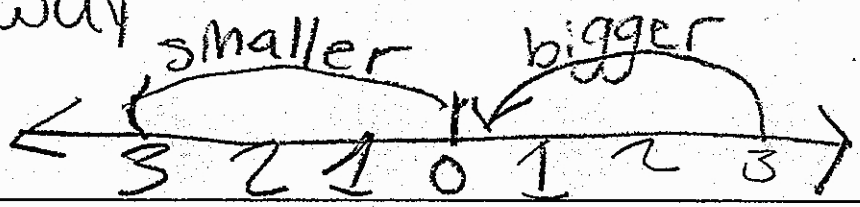


a. Insert >, <, or = into the circles to make each statement true.

M ○ B P ○ X

How are the positions of the points on the number line used to compare the numbers represented by the points?

If they want to be bigger they have to move closer to 0.
If the numbers want to smaller they have to move away



Litho#: 0037

A-10b

b. Insert >, <, or = into the circles to make each statement true.

|B| ⊜ |X| |M| ◁ |P|

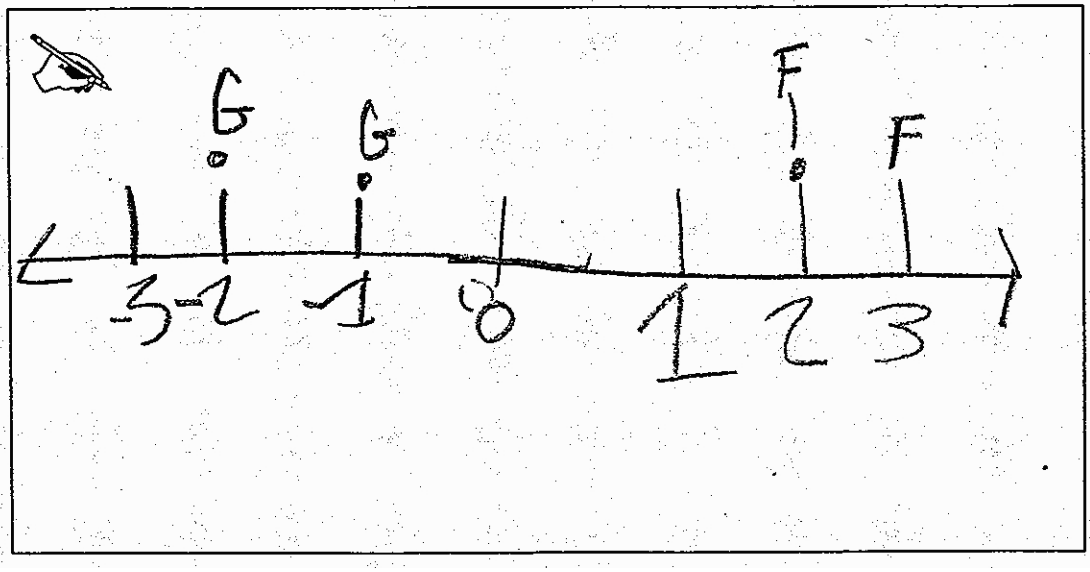
How is a number line used to compare the absolute values of numbers?

By 0 because when move closer to 0 that number gets to be bigger than that number way out from another number.

c. In the space below, draw *one* number line and plot a point labeled G and a point labeled F so that both of the following statements are true:

G > F

|G| = |F|



Litho#: 0037

Anchor 10 Litho 0037

Total Content Points: 0

Total Practice Points: 0

The student response in Part A, incorrectly indicating that numbers from 3 to zero get "bigger," does not correctly explain that values increase from left to right on a horizontal number line (no credit for 6.NS.7a (x)). The student response in Part B describing that numbers get bigger closer to zero and smaller when they move away does not demonstrate understanding that absolute value indicates distance from zero (no credit for 6.NS.7c (x)). The student does not place G and F on a number line in Part C such that G is to the right of F (no credit for 6.NS.7a (z)). The student does not clearly indicate on the number line in Part C that one point G and one point F are equidistant from zero (no credit for 6.NS.7c (z)). The student does not draw an appropriate number line in Part C to model the relationship between the values, the model having two G's and two F's, which are not clearly defined as to which G goes with which F (no credit for MP4). The student completes all parts of the problem; however, in Part A the student incorrectly determines $P < X$, and in Part B the student incorrectly determines $|B| = |X|$ and $|M| < |P|$ (no credit for MP1). The student lacks precise mathematical language for the explanations in Parts A and B (no credit for MP6).

Total Awarded Points: 0 out of 7