

SECURE MATERIAL - Reader Name: \_\_\_\_\_  
Tennessee Comprehensive Assessment Program

# TCAP/CRA

## 2014



# 6

## Phase II

### Absolute Value Task

### Anchor Set

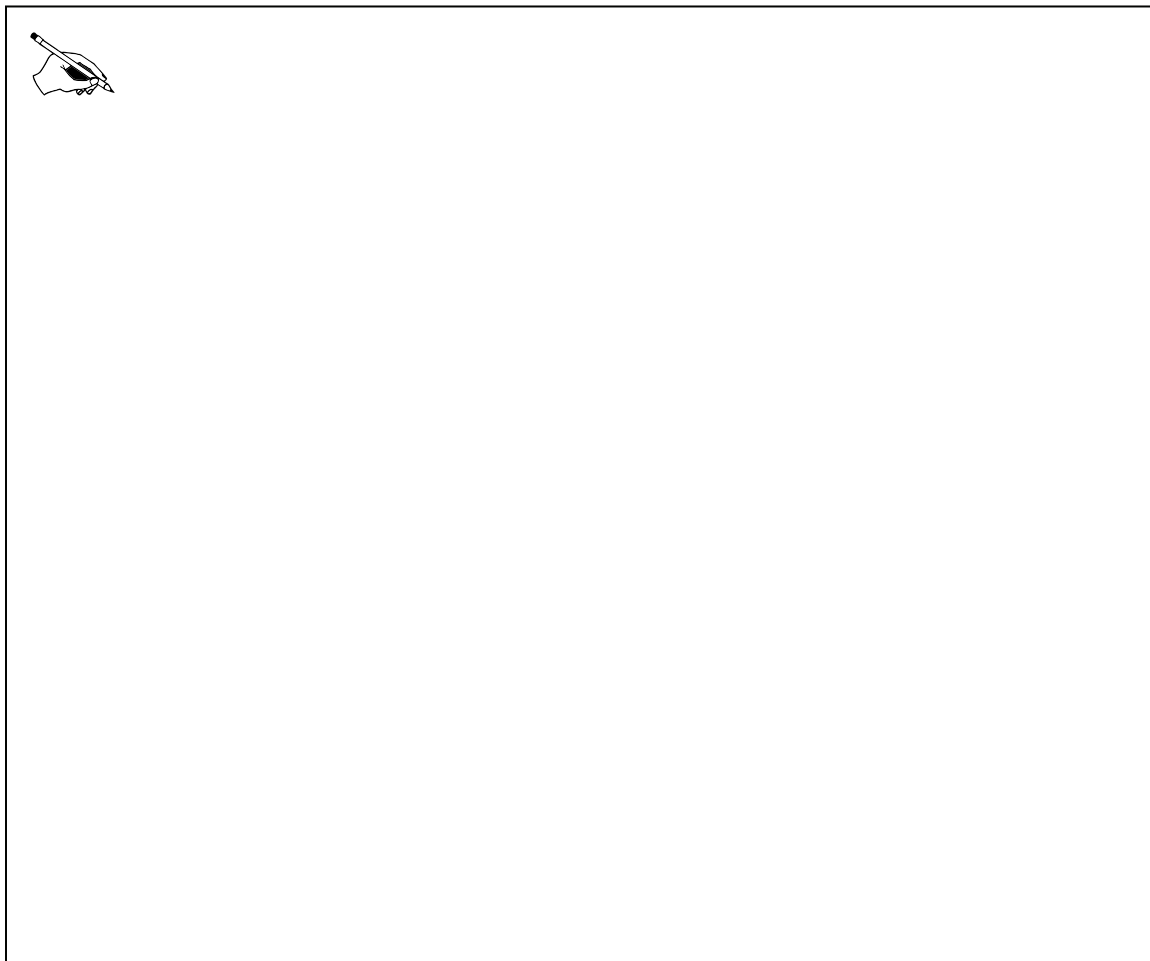
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## Part 1: Constructed Response Task Section

### Absolute Value Task

One week during the winter, the temperature ranged from  $-5^{\circ}\text{F}$  to  $-15^{\circ}\text{F}$ .

- a. Draw a number line or thermometer to represent the high and low temperatures in that week. Include 0 in your model.



- b. Complete each inequality using  $<$  or  $>$ .

$$|-15| \quad \bigcirc \quad |-5|$$


$$-15 \quad \bigcirc \quad -5$$



## Part 1: Constructed Response Task Section

### Absolute Value Task

- c. Skiing is possible when the temperature is at or below  $20^{\circ}\text{F}$ . Is  $-5^{\circ}\text{F}$  or  $-15^{\circ}\text{F}$  closer to  $20^{\circ}\text{F}$ ? Justify your answer using mathematical language. You may use one of the inequalities from part b to support your justification.




A large rectangular box for writing the answer to question c. In the top-left corner, there is a small icon of a hand holding a pen, indicating where to start writing.

- d. Tess and Jayla discuss absolute value.

Tess says  $|-5| = -5$ .

Jayla says  $|-5| = 5$ .

Who is correct? Use the definition of absolute value to explain your reasoning.



A large rectangular box for writing the answer to question d. In the top-left corner, there is a small icon of a hand holding a pen, indicating where to start writing.



## Scoring Guide

### The CCSS for Mathematical Content (2 points)

6.NS.C.7x Compares rational numbers accurately:  $|-15| > |-5|$ .  
(1 Point) \_\_\_\_\_

6.NS.C.7z Compares rational numbers accurately:  $-15 < -5$ .  
(1 Point) \_\_\_\_\_

### The CCSS for Mathematical Practice (3 points)

MP3 Writes a convincing argument to support the correct answer in part c.  
(1 Point) \_\_\_\_\_  
(MP3: Construct viable arguments and critique the reasoning of others.)

MP4 Uses an accurate number line or thermometer to show the placement of rational numbers compared to 0 and each other.  
(1 Point) \_\_\_\_\_  
(MP4: Model with mathematics.)

MP6 Uses correct mathematical reasoning, language, and notation for absolute value when explaining why Jayla is correct in part d. Student must state that the absolute value of a number is distance from zero or that distance is always positive or that the absolute value of a number is always positive.  
(1 Point) \_\_\_\_\_  
(MP6: Attend to precision.)

**TOTAL POINTS: 5**

### 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.7 Understand ordering and absolute value of rational numbers.

### The CCSS for Mathematical Practice\*

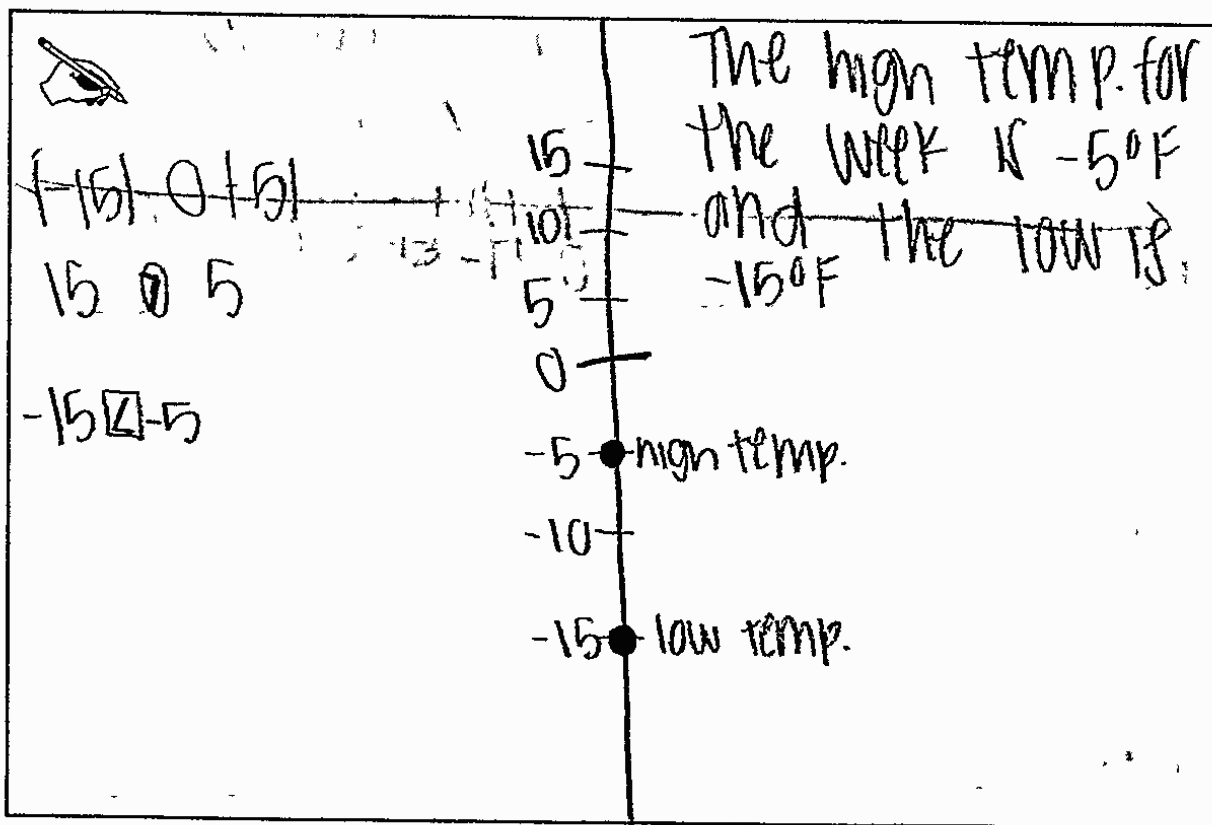
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look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

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

## Absolute Value Task

One week during the winter, the temperature ranged from  $-5^{\circ}\text{F}$  to  $-15^{\circ}\text{F}$ .

- a. Draw a number line or thermometer to represent the high and low temperatures in that week. Include 0 in your model.



- b. Complete each inequality using  $<$  or  $>$ .


$$|-15| \text{ } \textcircled{>} \text{ } |-5|$$

$$-15 \text{ } \textcircled{<} \text{ } -5$$

# A-1b

## Absolute Value Task

- c. Skiing is possible when the temperature is at or below  $20^{\circ}\text{F}$ , is  $-5^{\circ}\text{F}$  or  $-15^{\circ}\text{F}$  closer to  $20^{\circ}\text{F}$ ? Justify your answer using mathematical language. You may use one of the inequalities from part b to support your justification.

  $-5$  is closer to  $20$  than  $-15$ . Although  $-15$  seems like it is only  $5$  away from  $20$ , it isn't because it is negative. The bigger the number the farther away it is from  $0$ .


|      |      |       |       |
|------|------|-------|-------|
| $20$ | $25$ | $20$  | $35$  |
| $-5$ | $+5$ | $-15$ | $+15$ |
| $25$ | $20$ | $35$  | $20$  |

- d. Tess and Jayla discuss absolute value.

Tess says  $|-5| = -5$ .

Jayla says  $|-5| = 5$ .

Who is correct? Use the definition of absolute value to explain your reasoning.

 Jayla is correct. She is correct because absolute value is always going to be positive. If it is  $|-10|$  the answer would be  $10$  because absolute value is ALWAYS positive.

example:

$|3| = 3$   $|-1,000,000,000| = 1,000,000,000$   
 $|-3| = 3$

Anchor 1                                      Litho 00406200108

Total Content Points: 2            (6.NS.C.7(x), 6.NS.C.7(z))

Total Practice Points: 3            (MP3, MP4, MP6)

By indicating that the absolute value of  $-15$  is greater than the absolute value of  $-5$ , and that  $-5$  is greater than  $-15$ , the student compares rational numbers accurately (6.NS.C.7(x), 6.NS.C.7(z)). In Part A, the student uses an accurate number line to show the placement of rational numbers compared to 0 and each other (MP4). In Part C, by demonstrating that  $-5$  is 25 degrees away from  $+20$  and  $-15$  is 35 degrees away from  $+20$ , the student writes a convincing argument to support the correct answer (MP3). The response uses correct mathematical language, notation, and reasoning for absolute value when explaining why Jayla is correct in Part D (“absolute value is always going to be positive”) (MP6).

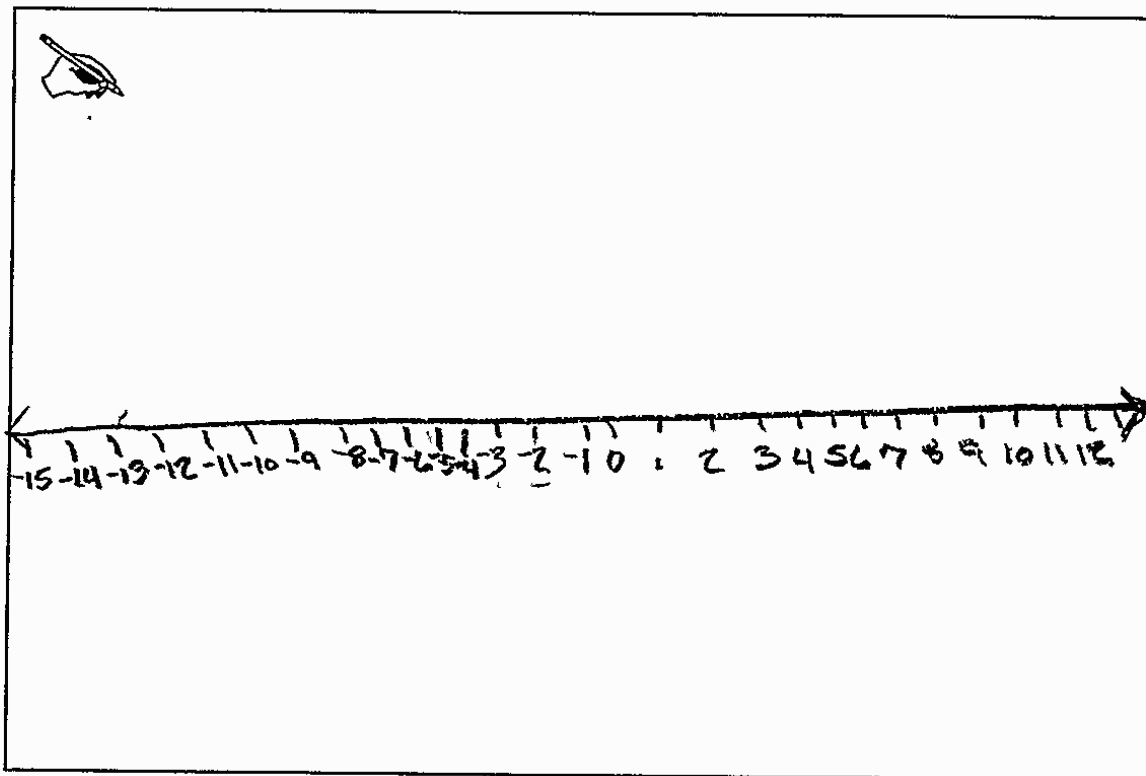
Total Awarded Points: 5 out of 5



## Absolute Value Task

One week during the winter, the temperature ranged from  $-5^{\circ}\text{F}$  to  $-15^{\circ}\text{F}$ .

- a. Draw a number line or thermometer to represent the high and low temperatures in that week. Include 0 in your model.



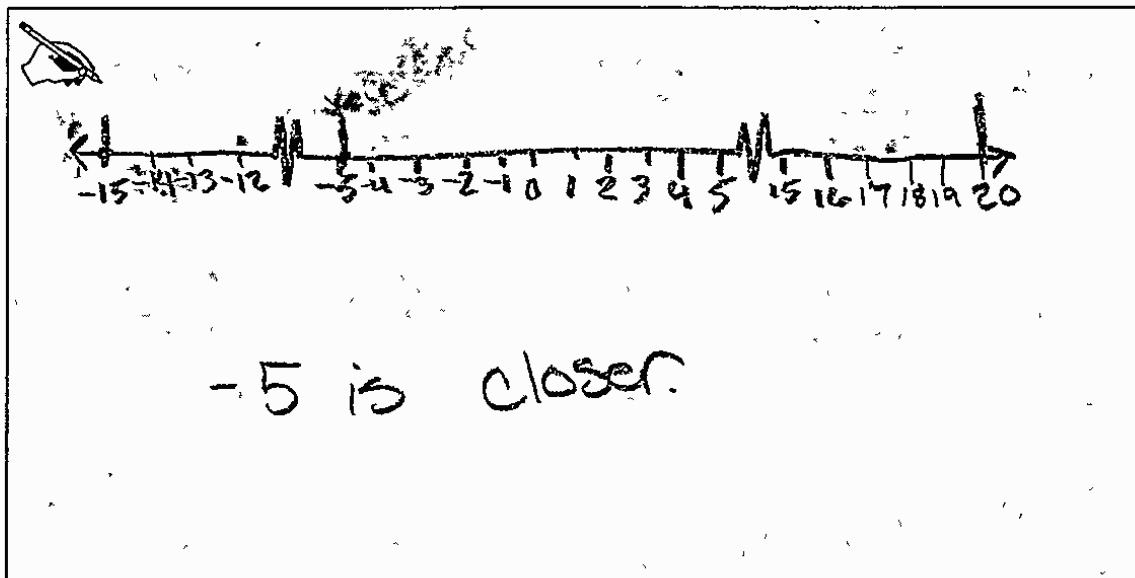
- b. Complete each inequality using  $<$  or  $>$ .

$$|-15| \quad \textcircled{>} \quad |-5|$$

$$-15 \quad \textcircled{<} \quad -5$$

## Absolute Value Task

- c. Skiing is possible when the temperature is at or below  $20^{\circ}\text{F}$ . Is  $-5^{\circ}\text{F}$  or  $-15^{\circ}\text{F}$  closer to  $20^{\circ}\text{F}$ ? Justify your answer using mathematical language. You may use one of the inequalities from part b to support your justification



- d. Tess and Jayla discuss absolute value.

Tess says  $|-5| = -5$ .

Jayla says  $|-5| = 5$ .

Who is correct? Use the definition of absolute value to explain your reasoning.

A hand-drawn response in cursive. It begins with a small drawing of a hand holding a pencil. The text reads: "Jayla, because absolute value is the number of spaces between that number and 0."

Anchor 2                              Litho 00036200105

Total Content Points: 2            (6.NS.C.7(x), 6.NS.C.7(z))

Total Practice Points: 3            (MP3, MP4, MP6)

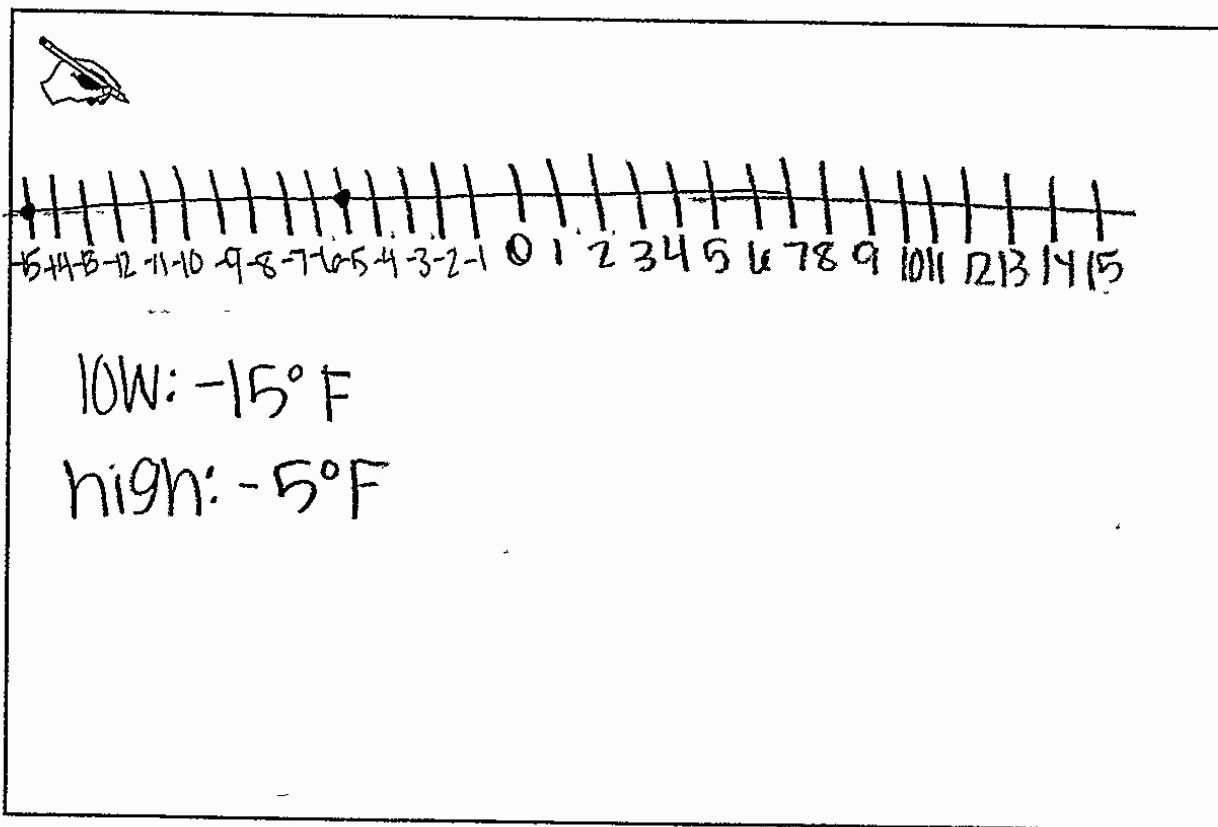
The student compares rational numbers accurately by indicating that the absolute value of  $-15$  is greater than the absolute value of  $-5$  (6.NS.C.7(x)); and also does so by correctly indicating that  $-5$  is greater than  $-15$  (6.NS.C.7(z)). Although the student does not specifically indicate the high and low temperatures on the number line drawn in Part A, the number line is accurate and shows the placement of rational numbers compared to 0 and each other (MP4). By using a number line to demonstrate that  $-5$  is closer to  $+20$  than  $-15$  is, the student writes a convincing argument to support the correct answer in Part C (MP3). The response uses correct notation and reasoning (“absolute value is the number of spaces between that number and 0”) when explaining why Jayla is correct in Part D (MP6).

Total Awarded Points: 5 out of 5

### Absolute Value Task

One week during the winter, the temperature ranged from  $-5^{\circ}\text{F}$  to  $-15^{\circ}\text{F}$ .

- a Draw a number line or thermometer to represent the high and low temperatures in that week. Include 0 in your model.



- b. Complete each inequality using  $<$  or  $>$ .

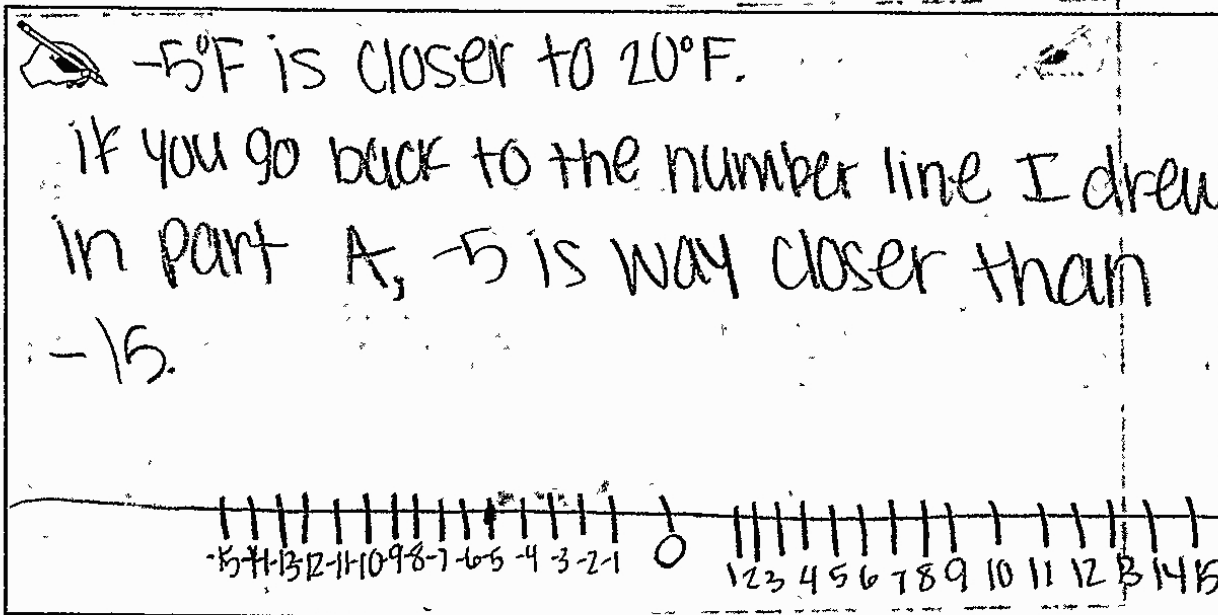
$$|-15| \quad \textcircled{>} \quad |-5|$$

15                      5

$$-15 \quad \textcircled{<} \quad -5$$

## Absolute Value Task

- c. Skiing is possible when the temperature is at or below  $20^{\circ}\text{F}$  or  $-5^{\circ}\text{F}$  or  $-15^{\circ}\text{F}$  closer to  $20^{\circ}\text{F}$ ? Justify your answer using mathematical language. You may use one of the inequalities from part b to support your justification.

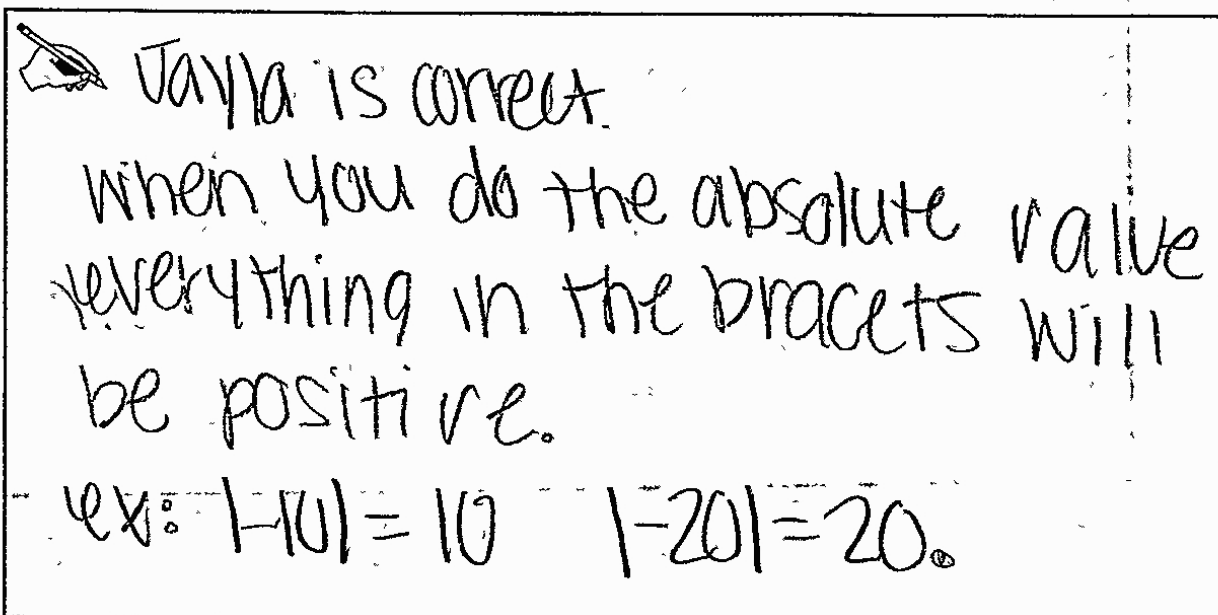


- d. Tess and Jayla discuss absolute value.

Tess says  $|-5| = -5$ .

Jayla says  $|-5| = 5$ .

Who is correct? Use the definition of absolute value to explain your reasoning.



Anchor 3                                      Litho 00176200108

Total Content Points: 2            (6.NS.C.7(x), 6.NS.C.7(z))

Total Practice Points: 2            (MP3, MP4)

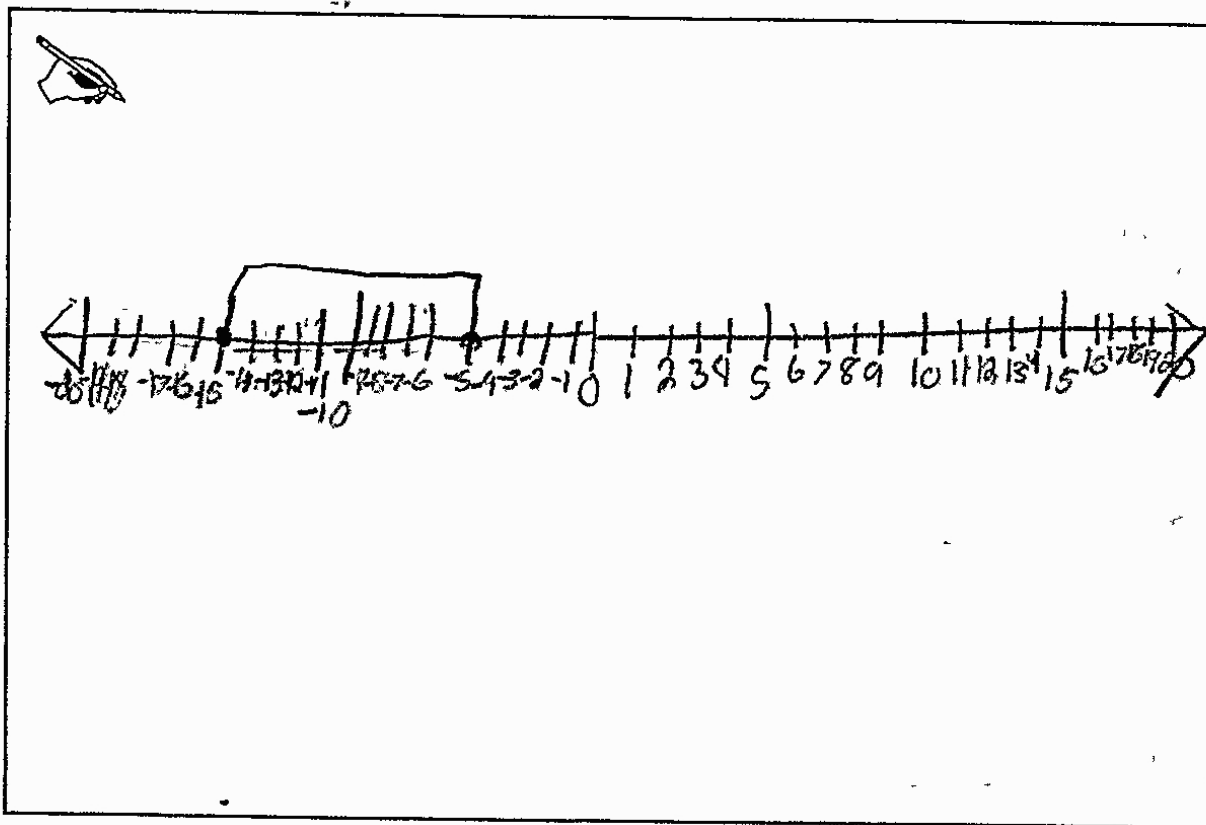
The student compares rational numbers accurately by indicating that the absolute value of  $-15$  is greater than the absolute value of  $-5$ , and that  $-5$  is greater than  $-15$  (6.NS.C.7(x), 6.NS.C.7(z)). The student uses an accurate number line to show the placement of rational numbers compared to 0 and each other (MP4). By referring to the number line drawn in Part A to demonstrate that  $-5$  is closer to  $+20$  than  $-15$  is, the student writes a convincing argument to support the correct answer in Part C (MP3). The explanation given in Part D uses imprecise mathematical language (“everything in the brackets [brackets] will be positive”) (no credit for MP6).

Total Awarded Points: 4 out of 5

## Absolute Value Task

One week during the winter, the temperature ranged from  $-5^{\circ}\text{F}$  to  $-15^{\circ}\text{F}$ .

- a. Draw a number line or thermometer to represent the high and low temperatures in that week. Include 0 in your model.



- b. Complete each inequality using  $<$  or  $>$ .


$$|-15| \quad \textcircled{<} \quad |-5|$$

$$-15 \quad \textcircled{<} \quad -5$$

## Absolute Value Task

Grade 7 Math

- c Skiing is possible when the temperature is at or below  $20^{\circ}\text{F}$  (is  $-5^{\circ}\text{F}$  or  $-15^{\circ}\text{F}$  closer to  $20^{\circ}\text{F}$ ? Justify your answer using mathematical language. You may use one of the inequalities from part b to support your justification.)


  $-5$  is closer because it is closer to 0.

- d. Tess and Jayla discuss absolute value.

Tess says  $|-5| = -5$ .

Jayla says  $|-5| = 5$ .

Who is correct? Use the definition of absolute value to explain your reasoning.

 Jayla is right because the absolute value is always positive.



Anchor 4                                      Litho 00036200108

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

Total Practice Points: 2                (MP4, MP6)

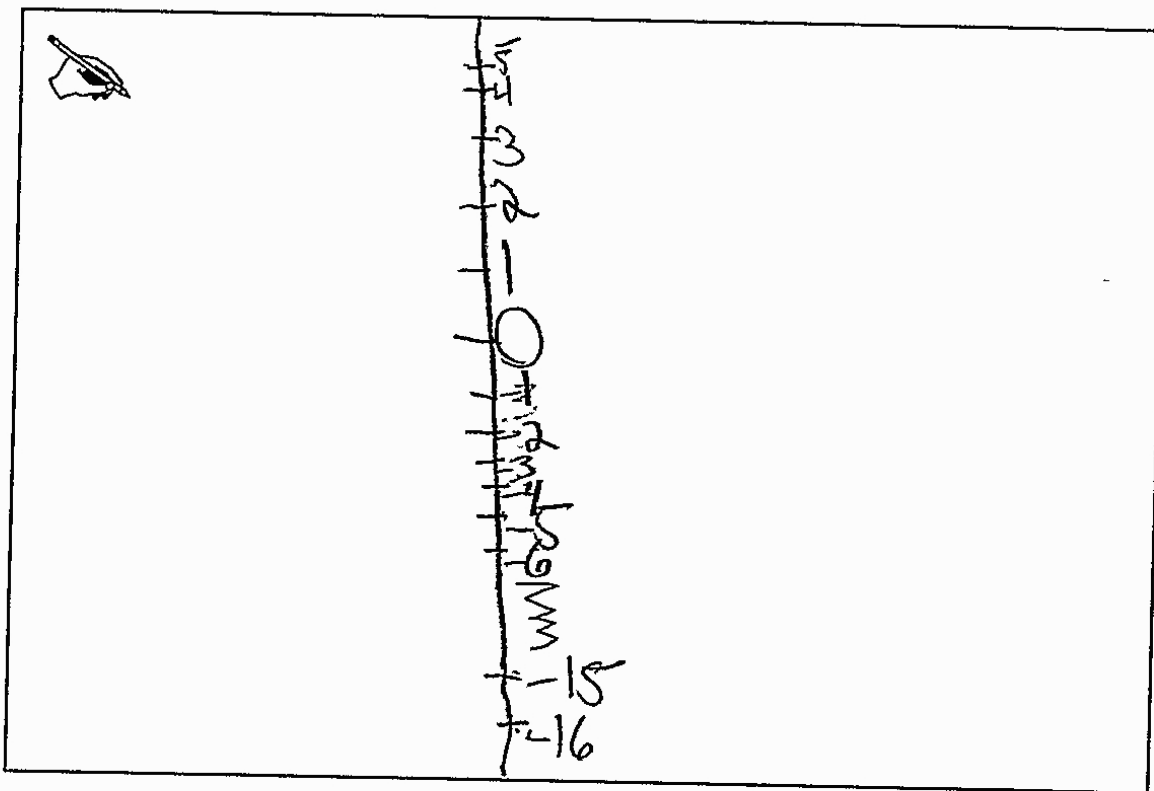
The student incorrectly indicates in Part B that the absolute value of  $-15$  is less than the absolute value of  $-5$  (no credit for 6.NS.C.7(x)); however, the student does accurately indicate that  $-5$  is greater than  $-15$  (6.NS.C.7(z)). The student uses an accurate number line to show the placement of rational numbers compared to 0 and each other (MP4). In Part C, the argument given to support the correct answer is insufficient, as it does not state why being closer to 0 means  $-5$  is closer to 20 (no credit for MP3). The response shows sufficient attention to precision in the language used in Part D when explaining why Jayla is correct (“absolute value is always positive”) (MP6).

Total Awarded Points: 3 out of 5

### Absolute Value Task

One week during the winter, the temperature ranged from  $-5^{\circ}\text{F}$  to  $-15^{\circ}\text{F}$ .

- a. Draw a number line or thermometer to represent the high and low temperatures in that week. Include 0 in your model.




- b. Complete each inequality using  $<$  or  $>$ .

$$|-15| \quad \textcircled{<} \quad |-5|$$

$$-15 \quad \textcircled{>} \quad -5$$

## Absolute Value Task

- c. Skiing is possible when the temperature is at or below  $20^{\circ}\text{F}$ . Is  $-5^{\circ}\text{F}$  or  $-15^{\circ}\text{F}$  closer to  $20^{\circ}\text{F}$ ? Justify your answer using mathematical language. You may use one of the inequalities from part b to support your justification.


  $-5$  because when you draw a number line  $-5$  is closer to  $20$  than  $-15$ .

- d. Tess and Jayla discuss absolute value

Tess says  $|-5| = -5$ .

Jayla says  $|-5| = 5$ .

Who is correct? Use the definition of absolute value to explain your reasoning.

 Jayla because absolute value means take any number in the absolute value marks and make it a positive number.

Anchor 5

Litho 00506200105

Total Content Points: 0

Total Practice Points: 3 (MP3, MP4, MP6)

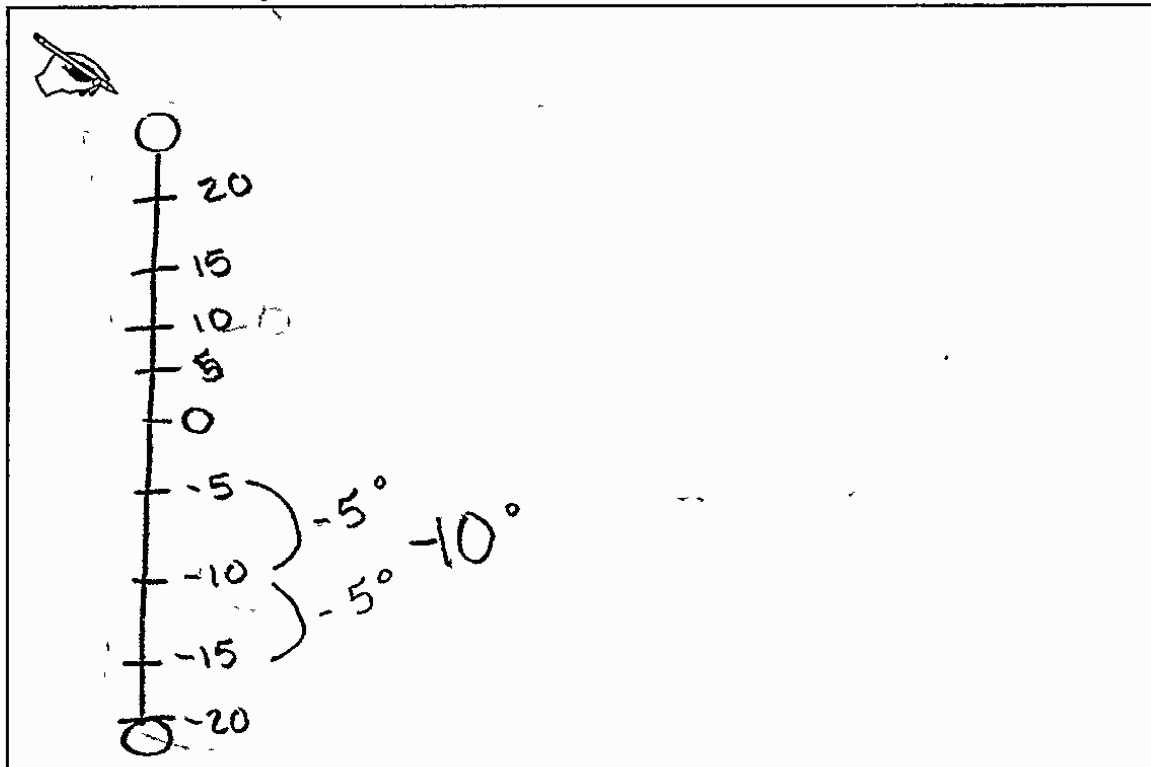
In Part B, the student incorrectly compares the absolute values of  $-5$  and  $-15$ , and also indicates that  $-5$  is less than  $-15$  (no credit for 6.NS.C.7(x), no credit for 6.NS.C.7(z)). The student uses an accurate number line to show the placement of rational numbers compared to 0 and each other (MP4). By referring to a number line, the student writes a convincing argument to support the correct answer in Part C (“because when you draw a number line  $-5$  is closer to the  $+20$  than  $-15$ ”) (MP3). The student’s reasoning, language, and notation for absolute value show sufficient attention to precision when explaining why Jayla is correct in Part D (“absolute value means take any number in the absolute value marks and make it a positive number”) (MP6).

Total Awarded Points: 3 out of 5

### Absolute Value Task

One week during the winter, the temperature ranged from  $-5^{\circ}\text{F}$  to  $-15^{\circ}\text{F}$ .

- a. Draw a number line or thermometer to represent the high and low temperatures in that week. Include 0 in your model.



- b. Complete each inequality using  $<$  or  $>$ .

$$|-15| \quad \textcircled{>} \quad |-5|$$

$$-15 \quad \textcircled{<} \quad -5$$

**Absolute Value Task**

- c. Skiing is possible when the temperature is at or below  $20^{\circ}\text{F}$ . Is  $-5^{\circ}\text{F}$  or  $-15^{\circ}\text{F}$  closer to  $20^{\circ}\text{F}$ ? Justify your answer using mathematical language. You may use one of the inequalities from part b to support your justification.

$20^{\circ}\text{F}$  is positive (+)  
 $-5^{\circ}\text{F}$   
 $-15^{\circ}\text{F}$  are both negative (-)

IF you draw a # line, you can see that  $-15^{\circ}\text{F}$  is further down the # line, and that  $-5^{\circ}\text{F}$  is further up than  $-15^{\circ}\text{F}$ .

The diagram shows a vertical number line with 0 at the top. Values 5, 10, and 15 are marked below 0. A hand-drawn arrow points to 20°F above 0. Below 0, arrows point to -5°F and -15°F. A bracket indicates that -5°F and -15°F are both negative. A separate diagram shows a horizontal number line with 0 in the middle. -5 is to the left of 0, and -15 is further to the left. Arrows and text indicate that -5 is '5 to the left' and -15 is '15 to the left'.

- d. Tess and Jayla discuss absolute value.

Tess says  $|-5| = -5$ .  
 Jayla says  $|-5| = 5$ .

Who is correct? Use the definition of absolute value to explain your reasoning

Well first absolute value is the actual magnitude of a numerical value or measurement, irrespective of its relation to other values.

SO Jayla would be correct because  $-5$  would be equal to 5.

$|-5| = 5$

SOME OTHER EXAMPLES  
 $| -3 | = 3$      $| -13 | = 13$

Anchor 6                                      Litho 00296200114

Total Content Points: 2            (6.NS.C.7(x), 6.NS.C.7(z))

Total Practice Points: 1            (MP4)

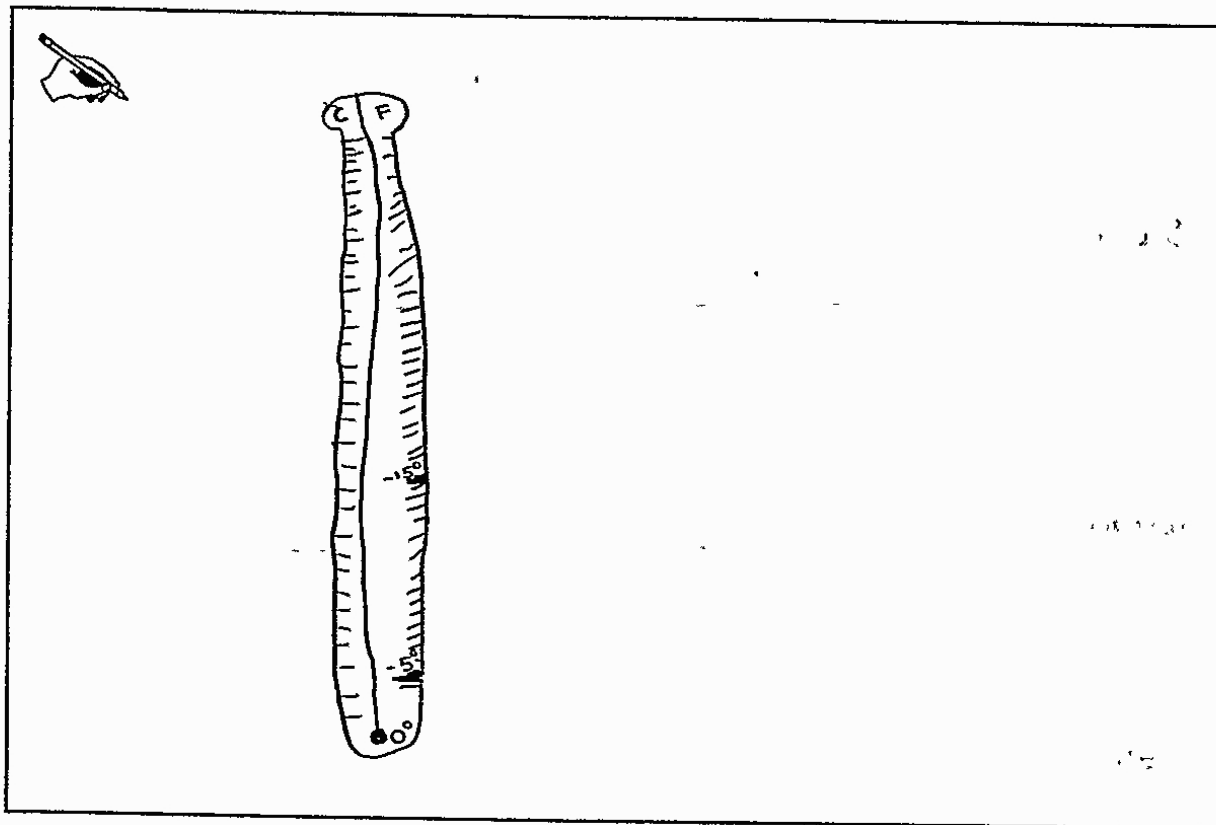
The student compares rational numbers accurately by indicating that the absolute value of  $-15$  is greater than the absolute value of  $-5$ , and that  $-5$  is greater than  $-15$  (6.NS.C.7(x), 6.NS.C.7(z)). The student uses an accurate vertical number line to show the placement of rational numbers compared to 0 and each other (MP4). Although the student accurately reproduces the number line in Part C and shows that  $-15$  is “further down the # line” than  $-5$ , the student never indicates which negative number is closer to 20 (no credit for MP3). The explanation provided shows an understanding of absolute value, but includes an incorrect mathematical statement (“ $-5$  would be equal to 5”), which shows a lack of attention to precision (no credit for MP6).

Total Awarded Points: 3 out of 5

### Absolute Value Task

One week during the winter, the temperature ranged from  $-5^{\circ}\text{F}$  to  $-15^{\circ}\text{F}$ .

- a. Draw a number line or thermometer to represent the high and low temperatures in that week. Include 0 in your model.



- b. Complete each inequality using  $<$  or  $>$ .

$$|-15| \quad \bigcirc \quad |-5|$$


$$-15 \quad \bigcirc \quad -5$$



## Absolute Value Task

1/15/15

- c. Skiing is possible when the temperature is at or below  $20^{\circ}\text{F}$  or  $-5^{\circ}\text{F}$  or  $-15^{\circ}\text{F}$  closer to  $20^{\circ}\text{F}$ ? Justify your answer using mathematical language. You may use one of the inequalities from part b to support your justification.


  $-5^{\circ}$  is close to  $20^{\circ}\text{F}$  because in "Negative terms" the lesser number is closer to  $0^{\circ}$ .

- d. Tess and Jayla discuss absolute value

Tess says  $|-5| = -5$ .

Jayla says  $|-5| = 5$ .

Who is correct? Use the definition of absolute value to explain your reasoning.

 Jayla is correct because absolute value is the same number just positive.

Anchor 7                                      Litho 00146200108

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

Total Practice Points: 2            (MP3, MP6)

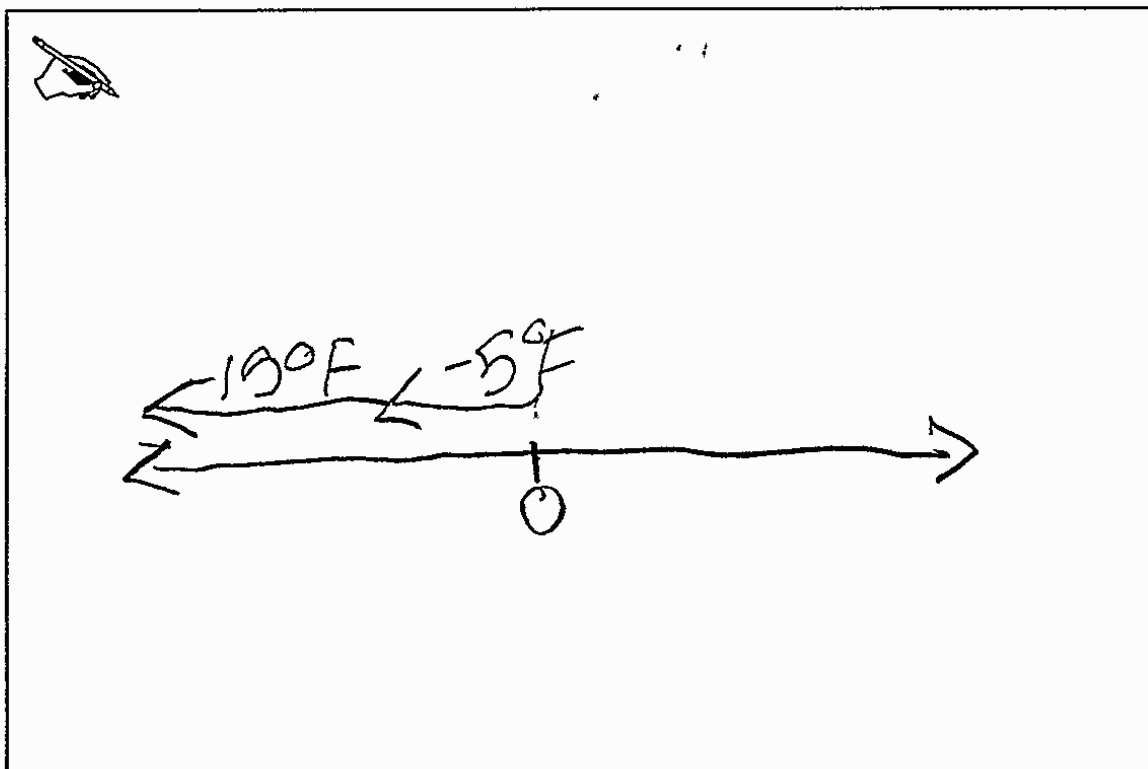
The student does not compare the absolute value of  $-15$  to the absolute value of  $-5$  (no credit for 6.NS.C.7(x)); however, the student does accurately indicate that  $-5$  is greater than  $-15$  (6.NS.C.7(z)). The student does not use an accurate thermometer to show the placement of rational numbers compared to 0 and each other, as the student's thermometer shows the negative values increasing as they move farther away from 0 (no credit for MP4). The argument to support the correct answer in Part C is sufficient (" $-5^{\circ}$  is close to  $20^{\circ}\text{F}$  because in Negative terms the lesser number is closer to  $0^{\circ}$ ") (MP3). The student also uses sufficient precision when explaining why Jayla is correct in Part D ("absolute value is the same number Just positive") (MP6).

Total Awarded Points: 3 out of 5

## Absolute Value Task

One week during the winter, the temperature ranged from  $-5^{\circ}\text{F}$  to  $-15^{\circ}\text{F}$ .

- a. Draw a number line or thermometer to represent the high and low temperatures in that week. Include 0 in your model.



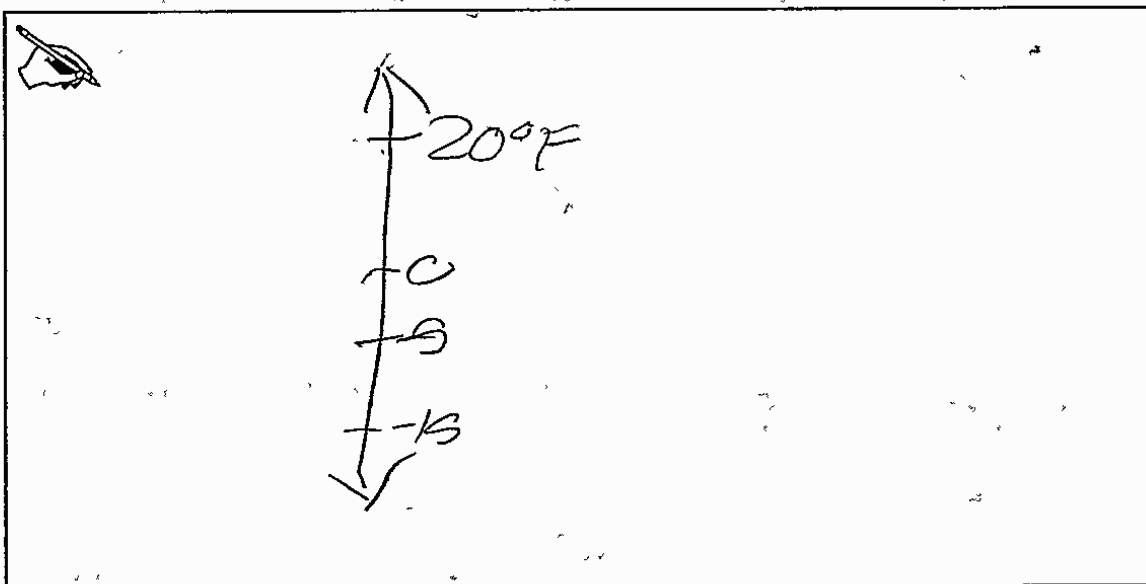
- b. Complete each inequality using  $<$  or  $>$ .

$$|-15| \quad \text{?} \quad |-5|$$

$$-15 \quad \text{?} \quad -5$$

## Absolute Value Task

- c. Skiing is possible when the temperature is at or below  $20^{\circ}\text{F}$ . Is  $-5^{\circ}\text{F}$  or  $-15^{\circ}\text{F}$  closer to  $20^{\circ}\text{F}$ ? Justify your answer using mathematical language. You may use one of the inequalities from part b to support your justification.

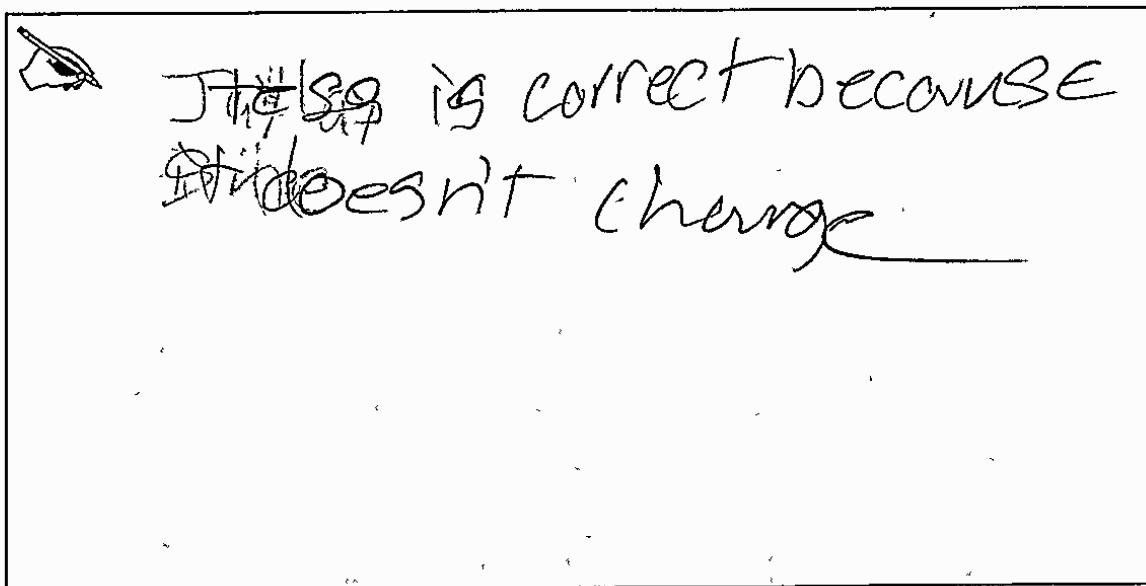


- d. Tess and Jayla discuss absolute value.

Tess says  $|-5| = -5$ .

Jayla says  $|-5| = 5$ .

Who is correct? Use the definition of absolute value to explain your reasoning.



Anchor 8                                  Litho 00266200114

Total Content Points: 1            (6.NS.C.7(x))

Total Practice Points: 1           (MP4)

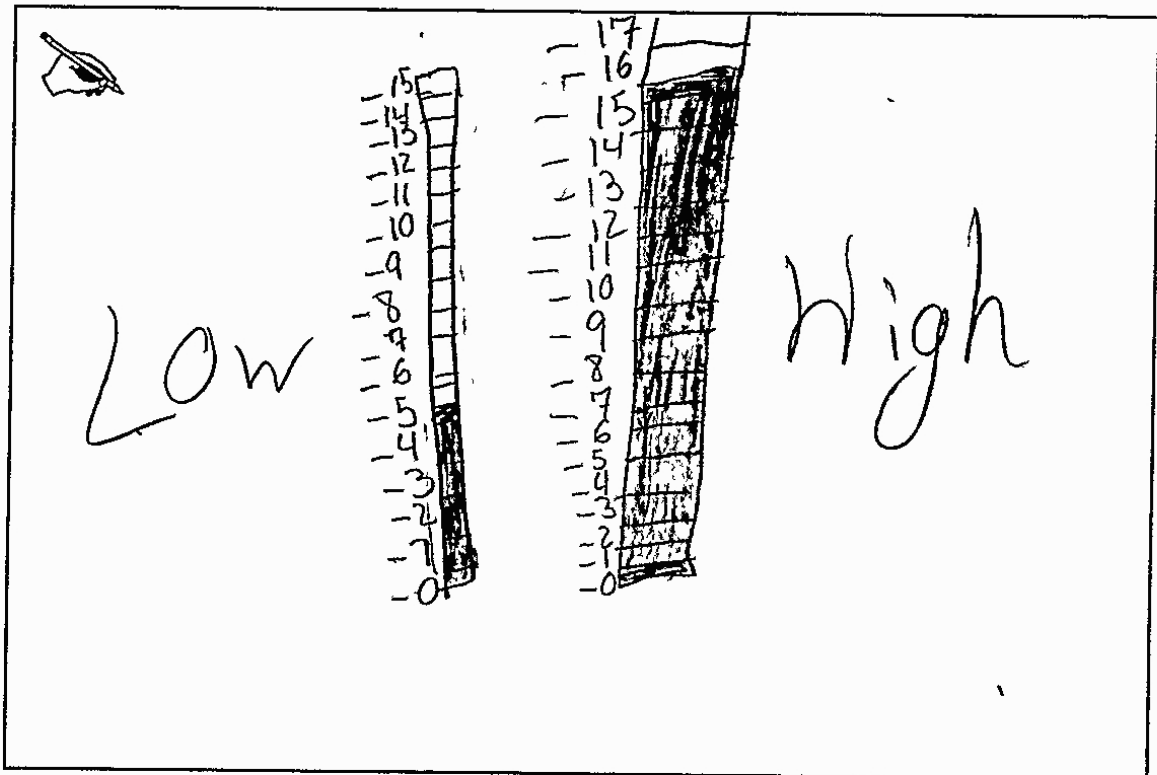
The student indicates that the absolute value of  $-15$  is greater than the absolute value of  $-5$  (6.NS.C.7(x)). However, the student incorrectly indicates that  $-15$  is greater than  $-5$  (no credit for 6.NS.C.7(z)). The student provides an incomplete number line in Part A, but does provide an accurate number line to show the placement of rational numbers compared to 0 and to each other in Part C (MP4). The number line shown in Part C is not used to support the correct answer, as the student does not actually state whether  $-5$  or  $-15$  is closer to 20 (no credit for MP3). The answer given in Part D is incorrect, and the language used lacks precision (“it doesn’t change”) (no credit for MP6).

Total Awarded Points: 2 out of 5

### Absolute Value Task

One week during the winter, the temperature ranged from  $-5^{\circ}\text{F}$  to  $-15^{\circ}\text{F}$ .

- a. Draw a number line or thermometer to represent the high and low temperatures in that week. Include 0 in your model.



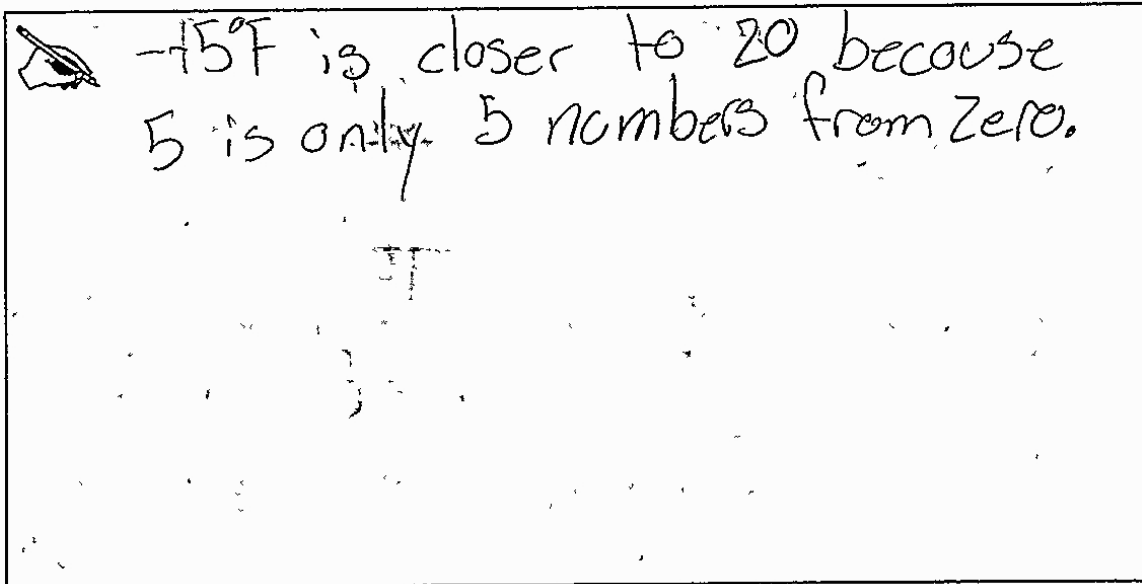
- b. Complete each inequality using  $<$  or  $>$ .

$$|-15| \quad \text{O} \quad |-5|$$

$$-15 \quad \text{O} \quad -5$$

## Absolute Value Task

- c. Skiing is possible when the temperature is at or below  $20^{\circ}\text{F}$ . Is  $-5^{\circ}\text{F}$  or  $-15^{\circ}\text{F}$  closer to  $20^{\circ}\text{F}$ ? Justify your answer using mathematical language. You may use one of the inequalities from part b to support your justification.

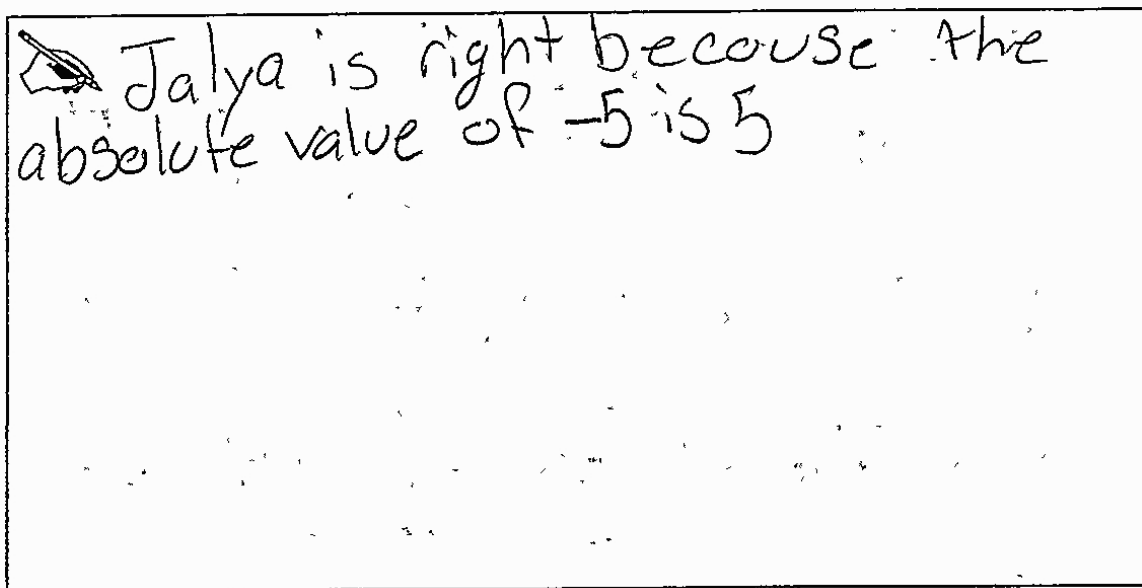


- d. Tess and Jayla discuss absolute value

Tess says  $|-5| = -5$ .

Jayla says  $|-5| = 5$ .

Who is correct? Use the definition of absolute value to explain your reasoning.



Anchor 9

Litho 00336200105

Total Content Points: 1 (6.NS.C.7(x))

Total Practice Points: 0

The student compares rational numbers accurately by indicating that the absolute value of  $-15$  is greater than the absolute value of  $-5$  (6.NS.C.7(x)). However, the student incorrectly compares  $-5$  and  $-15$  (no credit for 6.NS.C.7(z)). The number line shown in Part A is incorrect, and does not show the placement of rational numbers compared to 0 or each other (no credit for MP4). The answer in Part C is incorrect, and the explanation indicates a lack of understanding of negative numbers (no credit for MP3). The student does not use correct mathematical reasoning when explaining why Jayla is correct in Part D, as there is no indication that absolute value is always positive, only that the specific absolute value of  $-5$  is 5 (no credit for MP6).

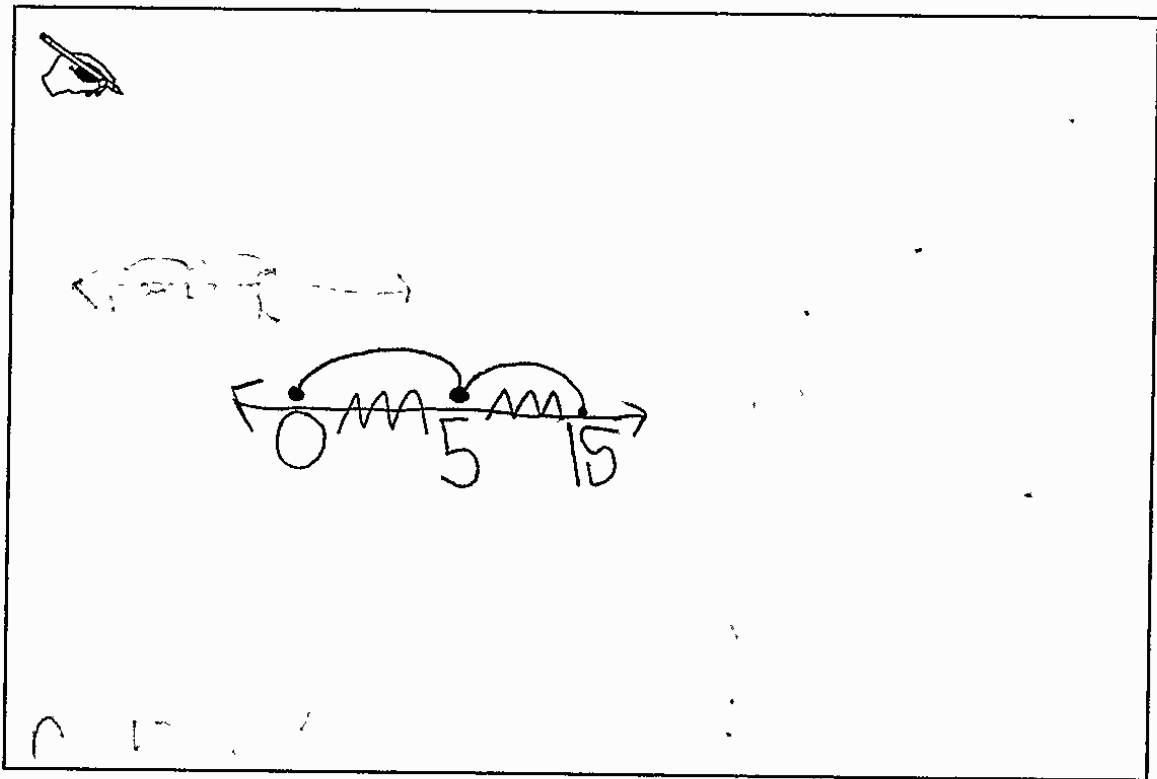
Total Awarded Points: 1 out of 5



### Absolute Value Task

One week during the winter, the temperature ranged from  $-5^{\circ}\text{F}$  to  $-15^{\circ}\text{F}$ .

- a. Draw a number line or thermometer to represent the high and low temperatures in that week. Include 0 in your model.



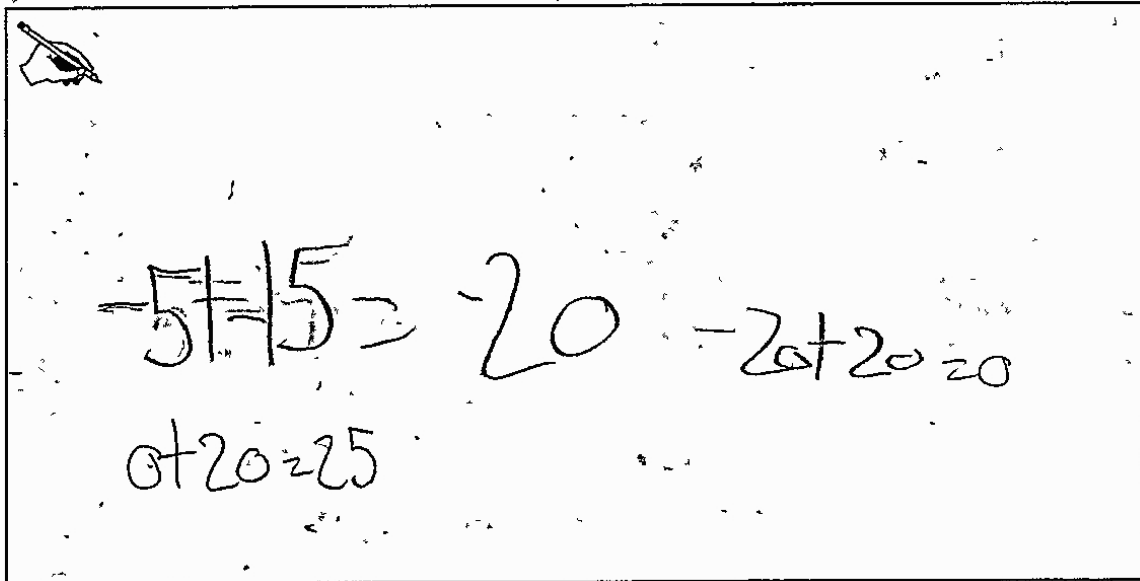
- b. Complete each inequality using  $<$  or  $>$ .

$$|-15| \quad \text{---} \quad |-5|$$

$$-15 \quad \text{---} \quad -5$$

## Absolute Value Task

- c. Skiing is possible when the temperature is at or below  $20^{\circ}\text{F}$ . Is  $-5^{\circ}\text{F}$  or  $-15^{\circ}\text{F}$  closer to  $20^{\circ}\text{F}$ ? Justify your answer using mathematical language. You may use one of the inequalities from part b to support your justification



Handwritten student work for part c:

$$-5 + 15 = 20$$

$$-20 + 20 = 0$$

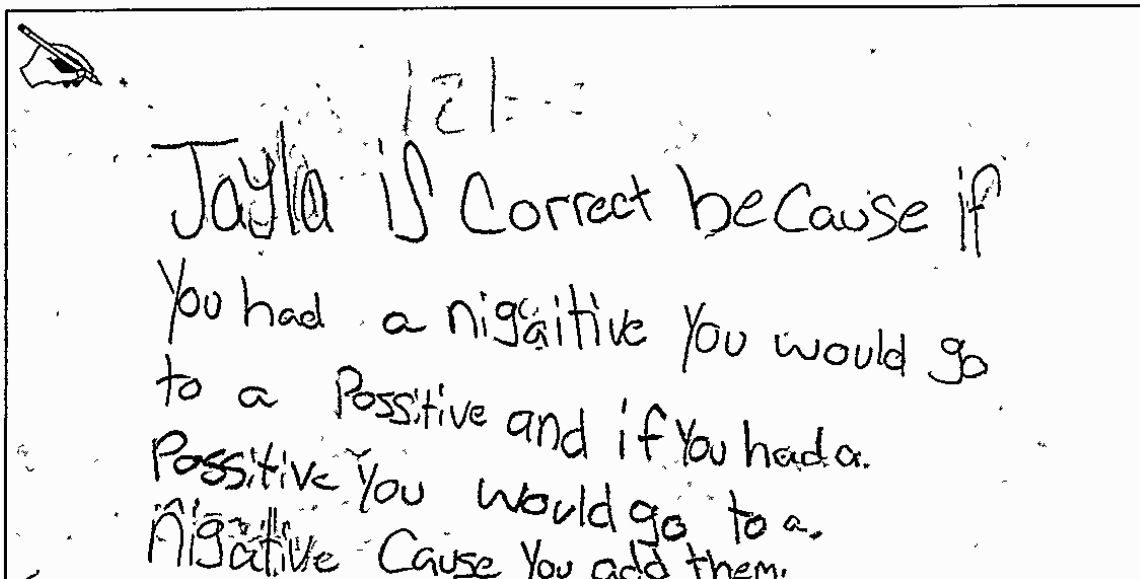
$$0 + 20 = 25$$

- d. Tess and Jayla discuss absolute value

Tess says  $|-5| = -5$ .

Jayla says  $|-5| = 5$ .

Who is correct? Use the definition of absolute value to explain your reasoning.



Handwritten student work for part d:

Jayla is correct because if you had a negative you would go to a positive and if you had a positive you would go to a negative cause you add them.

Anchor 10

Litho 00396200105

Total Content Points: 0

Total Practice Points: 0

The student incorrectly indicates that the absolute value of  $-15$  is equal to the absolute value of  $-5$ , and that  $-15$  is greater than  $-5$  (no credit for 6.NS.C.7(x), no credit for 6.NS.C.7(z)). The number line shown in Part A is incomplete; it does not show any negative numbers, including the high and low temperatures (no credit for MP4). The correct answer is not given in Part C (no credit for MP3). The response indicates a lack of understanding of absolute value when explaining why Jayla is correct in Part D, and makes incorrect mathematical claims (no credit for MP6).

Total Awarded Points: 0 out of 5