CRAVEN
COMMUNITY COLLEGE

TABE

MATH - D

Unit - 1

Lesson - 4

|ABSOLUTE VALUE |

Distance from Zero

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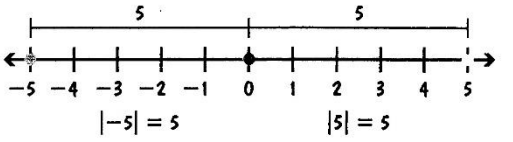
Lesson 4 Absolute Value

6.NS.7.c – Medium, 6.NS.7.d – Medium

The **absolute value** of a number is its distance from zero on a number line. You can think of absolute value as the **magnitude** of the number without regard to its sign. The absolute value of a number is written using the symbols | |. Numbers and their opposites have the same absolute value.



A comparison of the absolute values of a set of numbers may differ from a comparison of the set of numbers. For example, while −$30 is less than −$20, the debt of $30 represented by −$30 is greater than a debt of $20 represented by –$20 because $|-30| > |-20|$.

Example **Which is greater, −1.875 or 1.25? Which number has the greater absolute value?**

1) Compare the two numbers:

$-1.875 < 1.25$

2) Compare the absolute value of the two numbers:

$|-1.875| = 1.875$

$|1.25| = 1.25$

$1.875 > 1.25$

So, 1.25 is greater than −1.875, but the absolute value of −1.875 is greater than the absolute value of 1.25.

1. How do the numbers −4 and 3 compare? How do their absolute values compare?

   A. –4 is greater than 3, but 3 has the greater absolute value.

   B. 3 is greater than −4, but −4 has the greater absolute value.

   C. −4 is greater than 3, and −4 has the greater absolute value.

   D. 3 is greater than −4, and 3 has the greater absolute value.

Strategy

To find the absolute value of negative numbers, drop the negative sign from the number.

1. **B** 3 appears to the left of −4 on the number line, so it has a greater value, but $|-4| = 4$ and $|3| = 3$, so the absolute value of −4 is greater than the absolute value of 3.

Practice

Read each question. Select the correct answer.

1 Megan is hiking in Death Valley. Along her hike she sees a sign that indicates that she is "157 feet below sea level." What is the elevation of the sign relative to sea level? How far up or down must Megan hike from the sign to reach sea level?

A. −157 feet; 157 feet up

B. −157 feet; 157 feet down

C. 157 feet; 157 feet up

D. 157 feet; 157 feet down

2 Which of the following pairs of numbers has the same absolute value?

A. −2, 20

B. $-\frac{3}{8}$, 0.375

C. 0, 2

D. −5, −50

3 Richard is about to write a check to pay for groceries in the amount of $80.20. When he subtracts the amount of the check from his account balance, he sees that his new balance is –$18.40. Rather than overdraw his account, Richard asks the cashier to remove some items. What is the minimum value of the items that the cashier must remove in order for Richard to pay without overdrawing his account?

A. −$80.20

B. −$18.40

C. $80.20

D. $18.40

4 Sean's account balance is −$47. What is the amount of his debt?

A. .−$47

B. 0

C. $47

D. $94

5 Which number values for p and q have the following properties?

$p > q$ and $|p| < |q|$

A. $p = -7$ and $q = 5$

B. $p = 7$ and $q = 5$

C. $p = 5$ and $q = -7$

D. $p = 7$ and $q = -5$

6 Jessica and Brianna use their debit cards to make purchases. Jessica's account shows a transaction of −$19.99, while Brianna's shows −$17.50. Which of the following statements is true?

A. Jessica spent more money because $|-\$19.99| > |-\$17.50|$.

B. Jessica spent more money because $-\$19.99 > -\$17.50$.

C. Brianna spent more money because $|-\$17.50| < |-\$19.99|$.

D. Brianna spent more money because $\$17.50 < \$19.99$.

7 On Saturday, the change in temperature was 5°F. On Sunday the change in temperature was −12°F. Which of the following statements are true?

A. The temperature change on Saturday was greater than the temperature change on Sunday because $5 > -12$.

B. The temperature change on Sunday was greater than the temperature change on Saturday because $5 < -12$.

C. The temperature change on Saturday was greater than the temperature change on Sunday because $|5| > |-12|$.

D. The temperature change on Sunday was greater than the temperature change on Saturday because $|-12| > |5|$.

8 Which statement is true?

A. $|5| > |-5|$

B. $|5| < |-5|$

C. $|5| = |-5|$

D. $5 = -5$

9 The change in Laurie's elevation is −79 feet. What distance did she dive?

A. −79 feet

B. 0 feet

C. 79 feet

D. 158 feet

10 Which of the following pairs of numbers have the same absolute value?

A. −4, 40

B. $-\frac{1}{2}$, 0.75

C. $-\frac{3}{2}$, 1.5

D. −4.75, 4.57

11 In the first round of a game, the change in Gabe's score was 175. In the second round of the game, the change in Gabe's score was −185. In which round did Gabe's score change the most?

A. Round 1 because $175 > -185$

B. Round 1 because $|175| > |-185|$

C. Round 2 because $-185 > 175$

D. Round 2 because $|-185| > |175|$

12 How do the numbers −3 and 5 compare? How do their absolute values compare?

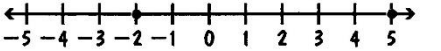
A. −3 is greater than 5, but 5 has the greater absolute value.

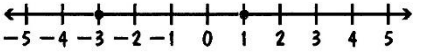
B. 5 is greater than −3, but −3 has the greater absolute value.

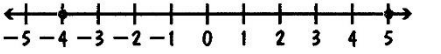
C. −3 is greater than 5, and −3 has the greater absolute value.

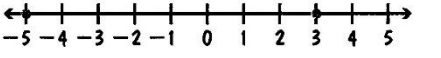
D. 5 is greater than −3, and 5 has the greater absolute value.

13 Which number line shows the greatest change between values?

A. 

B. 

C. 

D. 

Practice 4 Absolute Value

6.NS.7.c – Medium, 6.NS.7.d – Medium

1 Mount Everest is 8,848 meters relative to sea level. Challenger Deep is −10,994 meters relative to sea level. Which point is farther from sea level?

A. Mount Everest because
$8{,}848 \text{ m} > -10{,}994 \text{ m}$

B. Challenger Deep because
$-10{,}994 \text{ m} < 8{,}848 \text{ m}$

C. Mount Everest because
$|8{,}848 \text{ m}| > |-10{,}994 \text{ m}|$

D. Challenger Deep because
$|-10{,}994 \text{ m}| > |8{,}848 \text{ m}|$

2 Which pair of numbers has the same absolute value?

A. $-3, \frac{1}{3}$ B. $\frac{1}{2}, 2$

C. $-\frac{1}{4}, 0.25$ D. $0, 10$

3 How do the numbers −6 and −15 compare? How do their absolute values compare?

A. $-6 > -15$, but $|-6| < |-15|$

B. $-6 > -15$, and $|-6| > |-15|$

C. $-15 > -6$, but $|-15| < |-6|$

D. $-15 > -6$, and $|-15| > |-6|$

4 Before paying for a DVD, Jeremy's bank account had a balance of $12.64. After paying for the DVD, his account had a balance of −$5.31. How much did the DVD cost?

A. $7.33 B. $10.62

C. $17.95 D. $25.38

5 The temperature on Tuesday was 11°F. The temperature on Wednesday was −5°F. What was the change in temperature over the two days?

A. 5°F B. 6°F

C. 11°F D. 16°F

6 The change in Marshawn's elevation is −254 feet. The change in Keira's elevation is 158 feet. Who experiences the greater change in elevation?

A. Marshawn because
$-254 \text{ ft} > 158 \text{ ft}$

B. Marshawn because
$|-254 \text{ ft}| > |158 \text{ ft}|$

C. Keira because
$158 \text{ ft} > -254 \text{ ft}$

D. Keira because
$|158 \text{ ft}| > |-254 \text{ ft}|$

7 Which values for p and q have the following properties?

$$p < q \text{ and } |p| > |q|$$

A. $p = -2$ and $q = 3$

B. $p = 2$ and $q = -3$

C. $p = -3$ and $q = 2$

D. $p = 3$ and $q = -2$

8 One way to write longitude is to use negative numbers for longitudes west of the Prime Meridian. The longitude of Istanbul, Turkey is 28.98° and the longitude of Halifax, Nova Scotia is −63.58°. Which city is farther from the Prime Meridian?

A. Istanbul because $28.98° > -63.58°$

B. Halifax because $-63.58° > 28.98°$

C. Halifax because
$|-63.58°| > |28.98°|$

D. Istanbul because
$|28.98°| > |-63.58°|$

9 Brandon's altimeter reads –36 meters. How far below sea level is Brandon?

A. −36 m B. 0 m

C. 36 m D. 72 m

10 Vicki's account shows a transaction of $-\$57.21$, and Emma's account shows a transaction of $-\$48.93$. Which of the following statements is true?

A. Vicki spent more money because $|-\$57.21| > |-\$48.93|$.

B. Vicki spent more money because $-\$57.21 > -\$48.93$.

C. Emma spent more money because $|-\$48.93| > |-\$57.21|$.

D. Emma spent more money because $-\$48.93 > -\$57.21$.

11 Which pair of numbers has the same absolute value?

A. $-\frac{1}{7}$, 0.17 B. $-\frac{1}{2}$, 5

C. -3.14, 4.13 D. $-\frac{6}{5}$, 1.2

12 Which is greater, -19.17 or 14.28? Which number has the greater absolute value?

A. $-19.17 > 14.28$, but 14.28 has the greater absolute value.

B. $14.28 > -19.17$, but -19.17 has the greater absolute value.

C. $-19.17 > 14.28$, and -19.17 has the greater absolute value.

D. $14.28 > -19.17$, and 14.28 has the greater absolute value.

13 Which statement is true?

A. $0.457 = |-0.457|$

B. $|0.457| < |-0.457|$

C. $|0.457| > |-0.457|$

D. $|0.457| = -0.457$

14 Which point is the farthest from zero on a number line?

A. 13 B. -22

C. -9 D. 17

15 The speed limit on a highway is 70 miles per hour. Which speed is farthest from the speed limit?

A. 83 mph B. 75 mph

C. 66 mph D. 59 mph

16 Mike's bank account has a balance of $-\$69$. Steven's bank account has a balance of $-\$27$. Who has the most debt?

A. Mike because $|-\$69| > |-\$27|$

B. Mike because $-\$69 > -\$27$

C. Steven because $|-\$27| > |-\$69|$

D. Steven because $-\$27 > -\$69$

17 While encountering turbulence, a plane drops 33 feet below cruising altitude. How far up or down must the plane change altitude to return to its cruising altitude?

A. 33 ft down B. 33 ft up

C. 66 ft down D. 66 ft up

18 On Monday, Robert deposited \$116 in his bank account. On Friday, Robert made a \$285 purchase with his debit card from the same account. Which of the following statements is true?

A. The change to the account balance was greater on Monday than on Friday because $\$116 > -\$285$.

B. The change to the account balance was greater on Friday than on Monday because $\$116 < -\$285$.

C. The change to the account balance was greater on Monday than on Friday because $|\$116| > |-\$285|$.

D. The change to the account balance was greater on Friday than on Monday because $|\$116| < |-\$285|$.

19 Golf is scored relative to par. José shot a round of two under par. Raoul shot a round of four over par. Who shot closer to par?

A. José because $|-2| < |4|$

B. José because $-2 > 4$

C. Raoul because $4 > -2$

D. Raoul because $|4| < |-2|$

20 Chad is on a hill 45 meters above sea level. Jackie is diving 70 meters below sea level. Who is farther from sea level?

A. Chad because $45\text{ m} > -70\text{ m}$

B. Jackie because $|-70\text{ m}| > |45\text{ m}|$

C. Jackie because $-70\text{ m} > 45\text{ m}$

D. Chad because $|45\text{ m}| > |-70\text{ m}|$

Math-D Lesson-4 Key

Lesson 4 Absolute Value

(6.NS.7.c, 6.NS.7.d)

1. A. An elevation below sea level is represented by a negative number. To reach sea level from a negative elevation, you must hike up.

2. B. Find the absolute value for each set of numbers. Since $\frac{3}{8} = 0.375$, $\left|-\frac{3}{8}\right| = |0.375|$

3. D. Find the absolute value of the amount that Richard would have overdrawn his account. $|-\$18.40| = \$18.40$ to bring the account to zero.

4. C. Because debts are represented as negative numbers, to find the value of his debt, find the absolute value of the balance in his account; $|-\$47| = \$47$.

5. C. For $|p| < |q|$ when $p > q$, q must be a negative number whose absolute value is greater than the absolute value of p.

6. A. Convert the money spent to the absolute value of the transaction. Since $|-\$19.99| > |-\$17.50|$, Jessica spent more money.

7. D. To compare the magnitude of the temperature change, find the absolute value of each change in temperature. $|5| = 5$ and $|-12| = 12$. Therefore, Sunday had the greatest change in temperature because $12 > 5$.

8. C. The absolute values of opposite numbers are equivalent because the numbers lie the same distance from 0 on the number line.

9. C. Distance would be represented by the absolute value. $|-79| = 79$. Though the words *down* and *dive* indicate a decrease in elevation, you do not need the negative sign when describing the magnitude of the dive.

10. C. Convert $-\frac{3}{2}$ to its decimal form of -1.5. -1.5 and 1.5 are opposite numbers, so they have the same absolute value.

11. D. The word *change* implies a movement in score either up or down. Therefore, to compare the changes take the absolute value of the change for each round. 185 is greater than 175.

12. D. 5 appears to the right of -3 on a number line, so 5 is greater than -3. The absolute value of 5 is also greater than the absolute value of -3, because the absolute value of 5 is 5 and the absolute value of -3 is 3.

13. C. The distance between -4 and 5 is 9.

Math-D Practice-4 Key

Practice 4 Absolute Value

pp. 8–9 (6.NS.7.c, 6.NS.7.d)

1. D. To compare the magnitude, determine the absolute value of each elevation. $|8{,}848\text{ m}| = 8{,}848\text{ m}$ and $|-10{,}994\text{ m}| = 10{,}994\text{ m}$. Therefore, Challenger Deep is farther from sea level.

2. C. Find the absolute value for each set of numbers. Because $\frac{1}{4} = 0.25$, $|-\frac{1}{4}| = |0.25|$.

3. A. -6 is farther to the right on a number line than -15, so it is greater. $|-6| = 6$ and $|-15| = 15$, so $|-15|$ is greater than $|-6|$.

4. C. Add the absolute value of each number to determine the cost of the DVD. $|\$12.64| = \$12.64$ and $|-\$5.31| = \$5.31$; $\$12.64 + \$5.31 = \$17.95$.

5. D. Add the absolute value of each number to determine the change in temperature. $|11°\text{F}| = 11°\text{F}$ and $|-5°\text{F}| = 5°\text{F}$; $11°\text{F} + 5°\text{F} = 16°\text{F}$.

6. B. To compare the changes, take the absolute value of the change for each hiker: 254 is greater than 158.

7. C. For $|p| > |q|$ when $p < q$, p must be a negative number whose absolute value is greater than the absolute value of q.

8. C. Find the absolute value of each longitude to determine which city is farther from the Prime Meridian. $|-63.58°| > |28.98°|$, so Halifax is farther from the Prime Meridian.

9. C. Distance is represented by the absolute value: $|-36\text{ m}| = 36\text{ m}$.

10. A. Use the absolute values of the transactions. Because $|-\$57.21| > |-\$48.93|$, Vicki spent more money.

11. D. Convert $-\frac{6}{5}$ to its decimal form of -1.2. Because -1.2 and 1.2 are opposite numbers, they have the same absolute value.

12. B. 14.28 appears farther to the right on a number line than -19.17, so it has a greater value. $|-19.17| = 19.17$, so $|-19.17|$ is greater than the $|14.28|$.

13. A. The absolute value of a number shows its distance from 0 on a number line.

14. B. To compare the magnitude, determine the absolute value of each point. $|13| = 13$, $|-22| = 22$, $|-9| = 9$, and $|17| = 17$. Therefore, -22 is farthest from 0 on a number line.

15. A. To compare the magnitude, determine the absolute value of the difference of the speeds to the speed limit. $|83 - 70| = 13$, $|75 - 70| = 5$, $|66 - 70| = 4$, $|59 - 70| = 11$. Therefore, 83 mph is the farthest from the speed limit.

16. A. Debts are represented as negative numbers. To determine who has the most debt, find the absolute value of each account balance.

17. B. An elevation below cruising altitude is represented by a negative number. To reach cruising altitude from a negative elevation, you must go up.

18. D. To compare the magnitude, find the absolute value of each change in Robert's bank account. $|\$116| = \$116$ and $|-\$285| = \$285$. There was a greater change to the balance of Robert's bank account on Friday because $\$116 < \$285$.

19. A. Find the absolute value of each score to determine who shot closer to par. $|-2| < |4|$, so José shot closer to par.

20. B. To compare the magnitude, determine the absolute value of each elevation. $|45\text{ m}| = 45\text{ m}$ and $|-70\text{ m}| = 70\text{ m}$. Therefore, Jackie is farther from sea level.