NAME _____ DATE _____ PERIOD _____

2-1 Rational Numbers on the Number Line *(Pages 68–72)*

A **number line** is a visual representation of the numbers from **negative infinity** to **positive infinity**, which means it extends indefinitely in two directions. The number line consists of **negative numbers** on its left, zero in the middle, and **positive numbers** on its right. You can **graph** a number on the number line by drawing a point on the place on the number line that corresponds to the given number. For example, to graph -5 on the number line, you would place a point on the tick mark that is five places to the left of zero. -5 is called the **coordinate** of this point. The **absolute value**, or distance from zero on the number line, of -5 is 5 because -5 is 5 units away from zero, $|-5| = 5$.

The numbers on the number line can be grouped into different categories. The **natural numbers** are the numbers in the set {1, 2, 3, 4, 5, ...}. The three dots in the set signify that the set continues in this pattern indefinitely. The **whole numbers** are the numbers {0, 1, 2, 3, 4, ...}. **Integers** are the whole numbers and their opposites {..., -2, -1, 0, 1, 2, ...}. A **rational number** is any number that can be expressed as a fraction whose denominator is not equal to zero. For example, $-\frac{2}{3}$, $\frac{4}{5}$, $\frac{30}{10}$, and $\frac{9}{2}$ are all rational numbers. The rational numbers can also be expressed in decimal form. More specifically, the decimal equivalent of any rational number will terminate or will repeat. If the decimal repeats it should be written with bar notation. Notice that $-\frac{2}{3} = 0.\overline{6}$, $\frac{4}{5} = 0.8$, $\frac{30}{10} = 3$, and $\frac{9}{2} = 4.5$.

Examples

a. Name the set of numbers graphed.

The graph shows the set: {−4, −3, 0, 1, 3}.

b. Find the absolute value.

$|10|$

10 is ten units from zero in the positive direction. Therefore, $|10| = 10$.

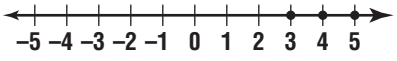
Practice

Name the set of numbers graphed.

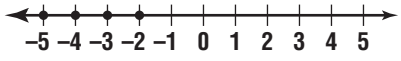
1.

2.

3.



4.



Graph each set of numbers on a number line.

5. {integers from -2 to 6, inclusive}

6. $\{-4, -3, -2, -1\}$

7. {integers less than 1 but greater than -4}

8. {integers greater than 2}

9. {integers less than or equal to 3}

10. {integers less than $-4 + (-1)$}

11. **Standardized Test Practice** Which number shows the absolute value of -30?

A $|-30| = -30$ **B** $|-30| = 30$ **C** $|-30| = \frac{1}{30}$ **D** $|-30| = -\frac{1}{30}$

Answers: **1.** {3, 2, 1, 0, −1, −2} **2.** {−1, 0, 1, 2, 3} **3.** {3, 4, 5,...} **4.** {−2, −3, −4, −5,...} **5–10.** See Answer Key. **11.** B