

MODULE 1 Integers



ESSENTIAL QUESTION

How can you use integers to solve real-world problems?

EXAMPLE 1

James recorded the temperature at noon in Fairbanks, Alaska, over a week in January.

Day	Mon	Tues	Wed	Thurs	Fri
Temperature	3	2	7	-3	-1

Graph the temperatures on the number line, and then list the numbers in order from least to greatest.

Graph the temperatures on the number line.

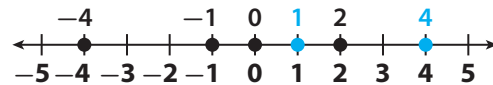


Read from left to right to list the temperatures in order from least to greatest.

The temperatures listed from least to greatest are -3, -1, 2, 3, 7.

EXAMPLE 2

Graph -4, 0, 2, and -1 on the number line. Then use the number line to find each absolute value.

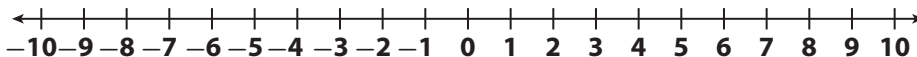


A number and its opposite are the same distance from 0 on the number line. The absolute value of a negative number is its opposite.

$$|-4| = 4 \quad |0| = 0 \quad |2| = 2 \quad |-1| = 1$$

EXERCISES

1. Graph 7, -2, 5, 1, and -1 on the number line. (Lesson 1.1)



List the numbers from least to greatest. (Lesson 1.2)

2. 4, 0, -2, 3 _____ 3. -3, -5, 2, -2 _____

Compare using < or >. (Lesson 1.2)

4. 4 ○ 1 5. -2 ○ 2 6. -3 ○ -5 7. -7 ○ 2

Find the opposite and absolute value of each number. (Lessons 1.1, 1.3)

8. 6 _____ 9. -2 _____

Key Vocabulary

- absolute value (*valor absoluto*)
- inequality (*desigualdad*)
- integers (*enteros*)
- negative numbers (*números negativos*)
- opposites (*opuestos*)
- positive numbers (*números positivos*)

ESSENTIAL QUESTION

How do you find and use the greatest common factor of two whole numbers? How do you find and use the least common multiple of two numbers?

Key Vocabulary
 greatest common factor (GCF) (*máximo común divisor (MCD)*)
 least common multiple (LCM) (*mínimo común múltiplo (mcm)*)

EXAMPLE 1

Use the Distributive Property to rewrite $32 + 24$ as a product of their greatest common factor and another number.

- A. List the factors of 24 and 32. Circle the common factors.

24: ① ② 3 ④ 6 ⑧ 12 24

32: ① ② ④ ⑧ 16 32

- B. Rewrite each number as a product of the GCF and another number.

24: 8×3

32: 8×4

- C. Use the Distributive Property and your answer above to rewrite $32 + 24$ using the GCF and another number.

$$32 + 24 = 8 \times 3 + 8 \times 4$$

$$32 + 24 = 8 \times (3 + 4)$$

$$32 + 24 = 8 \times 7$$

EXAMPLE 2

On Saturday, every 8th customer at Adam’s Bagels will get a free coffee. Every 12th customer will get a free bagel. Which customer will be the first to get a free coffee and a free bagel?

- A. List the multiples of 8 and 12. Circle the common multiples.

8: 8 16 ②④ 32 40 ④⑧

12: 12 ②④ 36 ④⑧

- B. Find the LCM of 8 and 12.

The LCM is 24. The 24th customer will be the first to get a free coffee and a free bagel.

EXERCISES

1. Find the GCF of 49 and 63 (*Lesson 2-1*) _____

Rewrite each sum as a product of the GCF of the addends and another number. (*Lesson 2-1*)

2. $15 + 45 =$ _____ 3. $9 + 27 =$ _____

4. Find the LCM of 9 and 6 (*Lesson 2-2*) _____



ESSENTIAL QUESTION

How can you use rational numbers to solve real-world problems?

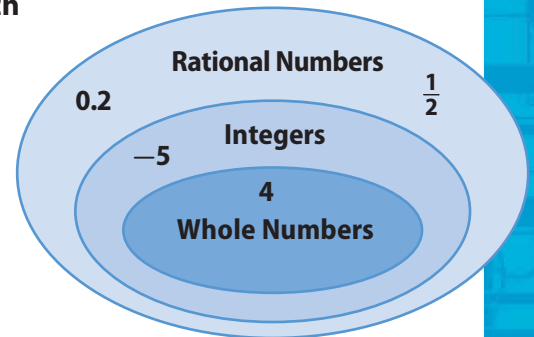
Key Vocabulary

rational number (*número racional*)

Venn diagram (*diagrama de Venn*)

EXAMPLE 1

Use the Venn diagram to determine in which set or sets each number belongs.



- A. $\frac{1}{2}$ belongs in the set of rational numbers.
- B. -5 belongs in the sets of integers and rational numbers.
- C. 4 belongs in the sets of whole numbers, integers, and rational numbers.
- D. 0.2 belongs in the set of rational numbers.

EXAMPLE 2

Order $\frac{2}{5}$, 0.2 , and $\frac{4}{15}$ from greatest to least.

Write the decimal as an equivalent fraction. $0.2 = \frac{2}{10} = \frac{1}{5}$

Find equivalent fractions with 15 as the common denominator. $\frac{2 \times 3}{5 \times 3} = \frac{6}{15}$ $\frac{1 \times 3}{5 \times 3} = \frac{3}{15}$ $\frac{4}{15} = \frac{4}{15}$

Order fractions with common denominators by comparing the numerators. $6 > 4 > 3$ $\frac{6}{15} > \frac{4}{15} > \frac{3}{15}$

The numbers in order from greatest to least are, $\frac{2}{5}$, $\frac{4}{15}$, and 0.2 .

EXERCISES

Classify each number by indicating in which set or sets it belongs.

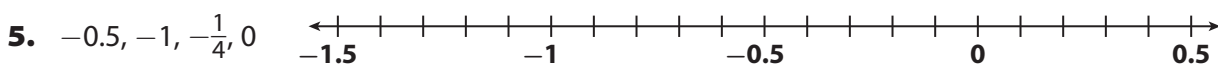
(Lesson 2.1)

- 1. 8 _____
- 2. 0.25 _____

Find the absolute value of each rational number. (Lesson 2.2)

- 3. $|3.7|$ _____
- 4. $|\frac{-2}{3}|$ _____

Graph each set of numbers on the number line and order the numbers from greatest to least. (Lesson 2.1, 2.3)



Unit 1 Performance Tasks

1. **CAREERS IN MATH** **Climatologist** Each year a tree is alive, it adds a layer of growth, called a tree ring, between its core and its bark. A climatologist measures the width of tree rings of a particular tree for different years:

Year	1900	1910	1920	1930	1940
Width of ring (in mm)	$\frac{14}{25}$	$\frac{29}{50}$	$\frac{53}{100}$	$\frac{13}{20}$	$\frac{3}{5}$

The average temperature during the growing season is directly related to the width of the ring, with a greater width corresponding to a higher average temperature.

- a. List the years in order of increasing ring width.

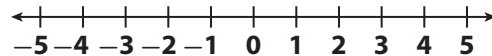
- b. Which year was hottest? How do you know?

- c. Which year was coldest? How do you know?

2. A parking garage has floors above and below ground level. For a scavenger hunt, Gaia's friends are given a list of objects they need to find on the third and fourth level below ground, the first and fourth level above ground, and ground level.

- a. If ground level is 0 and the first level above ground is 1, which integers can you use to represent the other levels where objects are hidden? Explain your reasoning.

- b. Graph the set of numbers on the number line.



- c. Gaia wants to start at the lowest level and work her way up. List the levels in the order that Gaia will search them.

- d. If she takes the stairs, how many flights of stairs will she have to climb? How do you know?



Selected Response

1. What is the opposite of
- -9
- ?

(A) 9
 (B) $-\frac{1}{9}$
 (C) 0
 (D) $\frac{1}{9}$

2. Kyle is currently 60 feet above sea level. Which correctly describes the opposite of Kyle's elevation?

(A) 60 feet below sea level
 (B) 60 feet above sea level
 (C) 6 feet below sea level
 (D) At sea level

3. What is the absolute value of 27?

(A) -27
 (B) 0
 (C) 3
 (D) 27

4. In Albany it is
- -4°F
- , in Chicago it is
- -14°F
- , in Minneapolis it is
- -11°F
- , and in Toronto it is
- -13°F
- . In which city is it the coldest?

(A) Albany
 (B) Chicago
 (C) Minneapolis
 (D) Toronto

5. Which shows the integers in order from greatest to least?

(A) 18, 4, 3, -2 , -15
 (B) -2 , 3, 4, -15 , 18
 (C) -15 , -2 , 3, 4, 18
 (D) 18, -15 , 4, 3, -2

6. Joanna split three pitchers of water equally among her eight plants. What fraction of a pitcher did each plant get?

(A) $\frac{1}{8}$ of a pitcher
 (B) $\frac{1}{3}$ of a pitcher
 (C) $\frac{3}{8}$ of a pitcher
 (D) $\frac{8}{3}$ of a pitcher

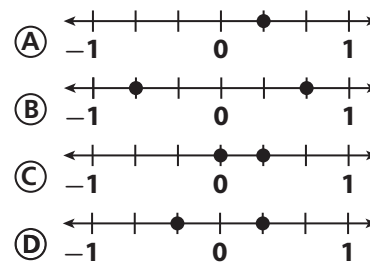
7. Which set or sets does the number
- -22
- belong to?

(A) Whole numbers only
 (B) Rational numbers only
 (C) Integers and rational numbers only
 (D) Whole numbers, integers, and rational numbers

8. Carlos swam to the bottom of a pool that is 12 feet deep. What is the opposite of Carlos's elevation relative to the surface?

(A) -12 feet (C) 12 feet
 (B) 0 feet (D) $\frac{1}{12}$ foot

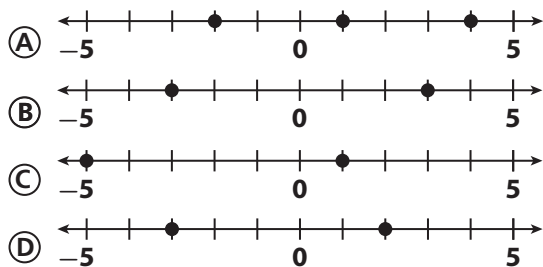
9. Which number line shows
- $\frac{1}{3}$
- and its opposite?



10. Which of the following shows the numbers in order from least to greatest?

(A) $-\frac{2}{3}$, $-\frac{3}{4}$, 0.7, 0
 (B) 0.7, 0, $-\frac{2}{3}$, $-\frac{3}{4}$
 (C) $-\frac{2}{3}$, $-\frac{3}{4}$, 0, 0.7
 (D) $-\frac{3}{4}$, $-\frac{2}{3}$, 0, 0.7

11. Which number line shows an integer and its opposite?



12. Which is another way to write $42 + 63$?

- (A) $7 \times (6 + 7)$ (C) $7 \times 6 \times 9$
- (B) 7×15 (D) $7 + 6 + 9$

13. What is the LCM of 9 and 15?

- (A) 30 (C) 90
- (B) 45 (D) 135

14. What is the GCF of 40 and 72?

- (A) 2 (C) 8
- (B) 4 (D) 12

Mini-Task

15. Stella is recording temperatures every day for 5 days. On the first day, Stella recorded a temperature of 0°F .

- a. On the second day, the temperature was 3°F above the temperature on the first day. What was the temperature on the second day? _____
- b. On the third day, it was 4°F below the temperature of the first day. What was the temperature? _____
- c. The temperature on the fourth day was the opposite of the temperature on the second day. What was the temperature?

d. The temperature on the fifth day was the absolute value of the temperature on the fourth day. What was the temperature? _____

e. Write the temperatures in order from least to greatest. _____

f. What is the difference in temperature between the coldest day and the warmest day? _____

16. Marco is making mosaic garden stones using red, yellow, and blue tiles. He has 45 red tiles, 90 blue tiles, and 75 yellow tiles. Each stone must have the same number of each color tile. What is the greatest number of stones Marco can make? _____

a. How many of each color tile will Marco use in each stone?

b. How can Marco use the GCF to find out how many tiles he has in all?

