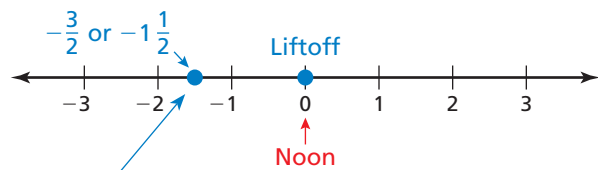


B.3 Fractions on the Number Line

Essential Question How can you use a number line to order positive and negative fractions?

1 ACTIVITY: Extending Your Project

On the number line for “A Day in the Life of an Astronaut” from Activity B.1, add the following events. Represent each using a fraction or a mixed number.



Sample:

- a. Radio Transmission: 10:30 A.M. b. Space Walk: 7:30 P.M.



- c. Physical Exam: 4:30 A.M. d. Photograph Taken: 3:30 A.M.

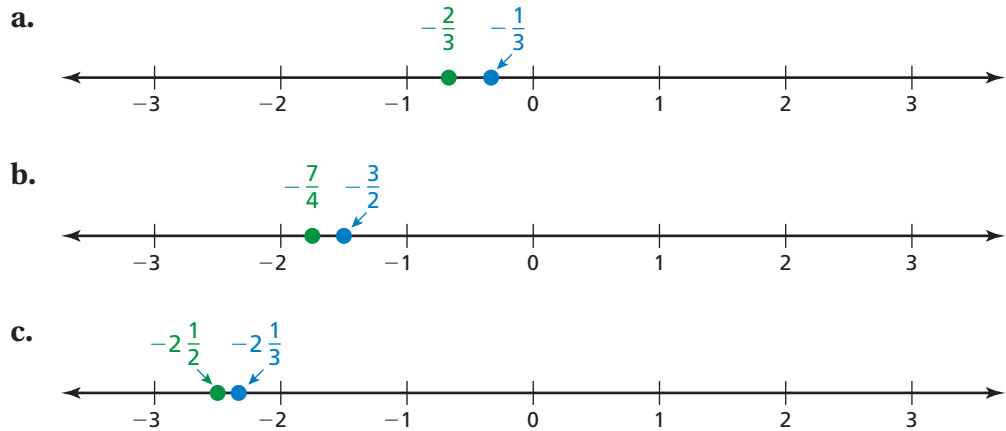


- e. Float in the Cabin: 6:20 P.M. f. Eat Dinner: 8:40 P.M.



2 ACTIVITY: Fractions on a Number Line

Work with a partner. Find a fraction or a mixed number that is between the two numbers. The number must be greater than the **green number** and less than the **blue number**.



3 ACTIVITY: Fractions on a Number Line

Work with a partner. As an airplane's altitude increases, the temperature outside the airplane decreases. The temperature will decrease until the airplane reaches an altitude of about 36,000 feet. The rate at which the temperature drops is $3\frac{3}{5}^{\circ}\text{F}$ per 1000 feet.

- The temperature outside an airplane is 5°F . What will the temperature be if the airplane rises 1000 feet? Show both temperatures on a number line.
- RESEARCH** Find the altitudes at which airplanes usually fly. Draw a diagram that shows the temperatures at these altitudes.



What Is Your Answer?

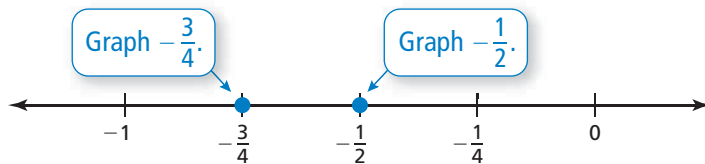
- IN YOUR OWN WORDS** How can you use a number line to order positive and negative fractions?
- Draw a number line. Label three points between -2 and -1 .

Practice

Use what you learned about fractions on a number line to complete Exercises 3–6 on page A26.

EXAMPLE 1 Comparing Fractions

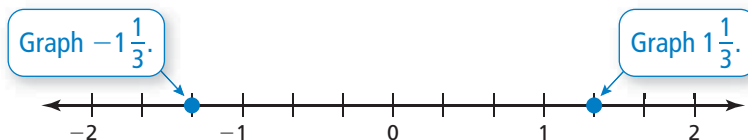
Which is greater, $-\frac{1}{2}$ or $-\frac{3}{4}$?



∴ $-\frac{1}{2}$ is to the right of $-\frac{3}{4}$. So, $-\frac{1}{2}$ is greater.

EXAMPLE 2 Comparing Mixed Numbers

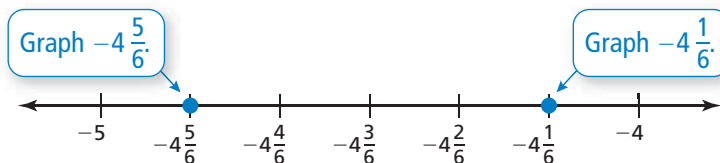
a. Which is greater, $1\frac{1}{3}$ or $-1\frac{1}{3}$?



Any positive number is greater than *any* negative number.

∴ So, $1\frac{1}{3}$ is greater.

b. Which is greater, $-4\frac{5}{6}$ or $-4\frac{1}{6}$?



∴ $-4\frac{1}{6}$ is to the right of $-4\frac{5}{6}$. So, $-4\frac{1}{6}$ is greater.

On Your Own

Now You're Ready
Exercises 7–14

Which number is greater? Explain.

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

2. $\frac{4}{5}$, $-\frac{3}{2}$

3. $-\frac{1}{7}$, $-\frac{4}{7}$

4. $-\frac{3}{4}$, $-\frac{5}{8}$

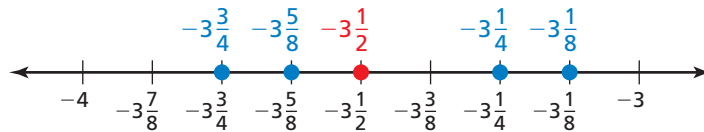
5. $-4\frac{1}{5}$, $-4\frac{4}{5}$

6. $-1\frac{2}{3}$, $-1\frac{5}{6}$

EXAMPLE 3 Finding a Median

Find the median of $-3\frac{1}{2}$, $-3\frac{3}{4}$, $-3\frac{1}{8}$, $-3\frac{1}{4}$, and $-3\frac{5}{8}$.

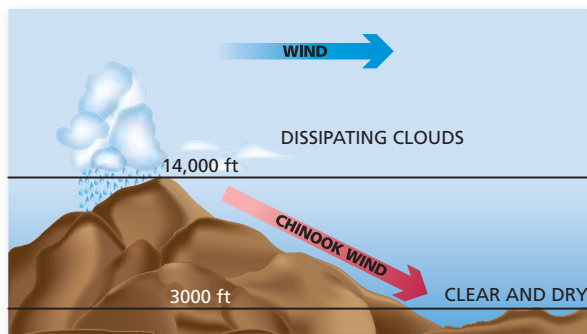
Graph the numbers on a number line.



∴ The middle value is $-3\frac{1}{2}$. So, the median is $-3\frac{1}{2}$.

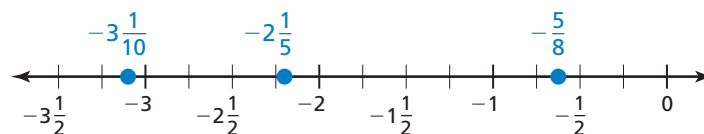
EXAMPLE 4 Real-Life Application

A *Chinook wind* is a warm mountain wind that can cause huge temperature changes. The table shows three of the biggest temperature drops ever recorded after a Chinook wind occurred. On which date did the temperature drop the fastest? Explain.



Date	Temperature change
November 10, 1911	$-\frac{5}{8}$ °F per minute
January 10, 1911	$-3\frac{1}{10}$ °F per minute
January 22, 1943	$-2\frac{1}{5}$ °F per minute

Graph the numbers on a number line.



∴ $-3\frac{1}{10}$ is farthest to the left. So, the temperature dropped the fastest on January 10, 1911.

On Your Own

Find the median of the data.

Now You're Ready
Exercises 17–20

7. $-\frac{1}{2}, -1\frac{1}{4}, -\frac{7}{8}, -\frac{1}{8}, -1$ 8. $-2\frac{1}{10}, -2\frac{3}{5}, -2\frac{1}{2}, -2\frac{7}{10}, -2\frac{4}{5}$

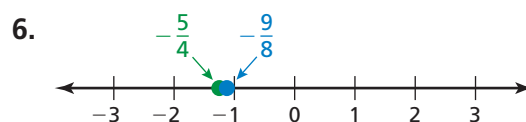
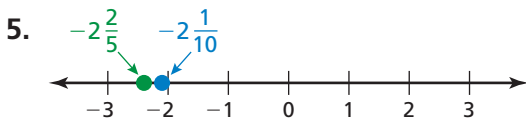
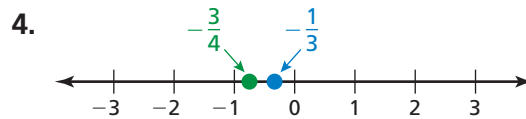
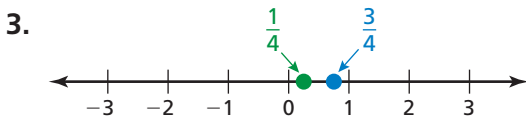
9. **WHAT IF?** In Example 4, a temperature change of $-3\frac{2}{5}$ °F per minute is recorded. How does this temperature change compare with the other temperature changes? Explain.

Vocabulary and Concept Check

- NUMBER SENSE** Which statement is *not* true?
 - On a number line, $-2\frac{1}{6}$ is to the left of $-2\frac{2}{3}$.
 - $-2\frac{2}{3}$ is less than $-2\frac{1}{6}$.
 - $-2\frac{1}{6}$ is greater than $-2\frac{2}{3}$.
 - On a number line, $-2\frac{2}{3}$ is to the left of $-2\frac{1}{6}$.
- REASONING** Explain how to find a fraction or a mixed number that is between two numbers on a number line.

Practice and Problem Solving

Find a fraction or a mixed number that is between the two numbers.



Which number is greater? Explain.

1 7. $-\frac{2}{3}$, $\frac{1}{4}$

8. $-\frac{1}{2}$, $-\frac{1}{6}$

9. $-\frac{15}{4}$, $-\frac{7}{2}$

10. $\frac{5}{8}$, $-\frac{3}{5}$

2 11. $-3\frac{1}{3}$, $-3\frac{2}{3}$

12. $-4\frac{2}{5}$, $4\frac{3}{10}$

13. $-1\frac{3}{4}$, $-1\frac{5}{6}$

14. $-2\frac{2}{3}$, $-2\frac{1}{2}$

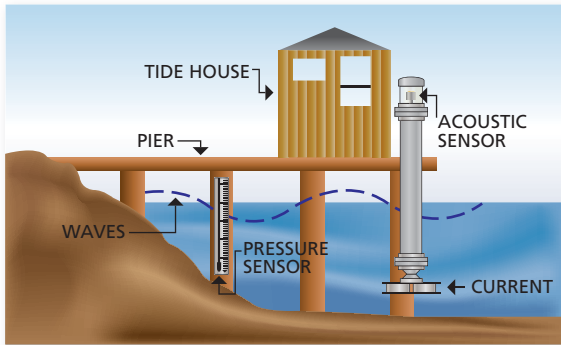


15. **SAND DOLLARS** In rough water, a small sand dollar burrows $-\frac{1}{2}$ centimeter into the sand. A larger sand dollar burrows $-1\frac{1}{4}$ centimeters into the sand. Which sand dollar burrowed farther?

16. **TEMPERATURE** The temperature in a freezer drops $2\frac{1}{2}^{\circ}\text{C}$ each hour. At noon, the temperature is 10°C .
- Use a number line to graph the temperature at each hour from 1:00 P.M. to 8:00 P.M.
 - At which hour does the temperature reach the freezing point? Explain.

Find the median of the data.

17. $-1\frac{1}{2}, -1\frac{3}{8}, -1\frac{5}{8}, -1\frac{1}{8}, -1\frac{1}{4}$
18. $-1, -\frac{2}{3}, -\frac{1}{6}, -\frac{5}{6}, -\frac{1}{2}$
19. $-2\frac{2}{5}, 2\frac{1}{5}, -2\frac{3}{10}, -2\frac{3}{5}, -2\frac{1}{10}$
20. $-1\frac{1}{4}, -1\frac{1}{2}, 1\frac{1}{4}, -1\frac{1}{8}, -1\frac{3}{8}$



21. **LOW TIDE** The lowest daily water level is recorded for seven straight days at a tide station. On which days is the water level higher than on the previous day? On which days is it lower?

Day	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Water level of the day (feet)	$-\frac{3}{25}$	$-\frac{7}{20}$	$-\frac{27}{50}$	$-\frac{13}{20}$	$-\frac{16}{25}$	$-\frac{53}{100}$	$-\frac{1}{3}$

22. **PUZZLE** Order the fractions and mixed numbers from least to greatest. Use the code to form a phrase.

$-1\frac{1}{2}: \text{D}$	$-1\frac{1}{3}: \text{D}$	$-\frac{1}{3}: \text{E}$	$-2\frac{1}{4}: \text{E}$	$-\frac{2}{3}: \text{E}$	$-2\frac{1}{2}: \text{E}$	$-2\frac{2}{3}: \text{N}$
$-\frac{1}{4}: \text{N}$	$-1\frac{1}{4}: \text{O}$	$-1\frac{2}{3}: \text{O}$	$-\frac{3}{4}: \text{R}$	$-1\frac{3}{4}: \text{R}$	$-2\frac{1}{3}: \text{V}$	$-\frac{1}{2}: \text{V}$

23. **PALINDROME** Order the absolute values of the fractions and mixed numbers in Exercise 22 from least to greatest. Use the code to form another phrase.

24. **Number Sense** What integer values of x make the inequality $-\frac{3}{x} < -\frac{x}{3}$ true?



Fair Game Review

what you learned in previous grades & lessons

Tell which decimal is greater. (*Skills Review Handbook*)

25. 1.2, 1.1 26. 3.5, 3.18 27. 0.32, 0.61 28. 16.5, 1.67

29. **MULTIPLE CHOICE** Which is the solution of $4x - 6 < 26$? (*Section 8.4*)

- (A) $x < 5$ (B) $x < 8$ (C) $x < 32$ (D) $x < 128$