LESSON 38

• Fractions and Mixed Numbers on a Number Line

Power Up

facts Power Up D

count aloud Count by 7s from 7 to 84.

mental math

a. **Number Sense:** Le purchased 5 dozen eggs. How many eggs is that?

b. **Estimation:** Round 615 to the nearest hundred. Then add 800. What is the answer?

c. **Number Sense:** One CD case weighs 70 grams. Ten CD cases weigh how many grams?

d. **Time:** Twenty-four hours is one day. How many hours is 5 days?

e. **Percent:** 50% of 80¢

f. **Percent:** 25% of 80¢

g. **Percent:** 10% of 80¢

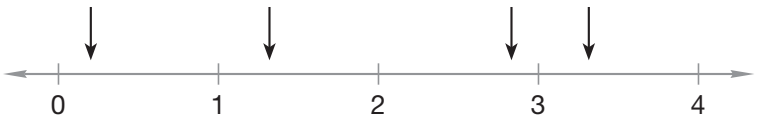
h. **Calculation:** 6 × 6, − 6, ÷ 6, + 1, − 6

problem solving Choose an appropriate problem-solving strategy to solve this problem. Belinda wrote a multiplication problem and then erased one of the factors and one of the digits in the product. She gave it to Laurel as a problem-solving exercise. Copy Belinda's multiplication problem and find the missing digits for Laurel.

$$\begin{array}{r} \_\_ \\ \times\ 8 \\ \hline \_6 \end{array}$$

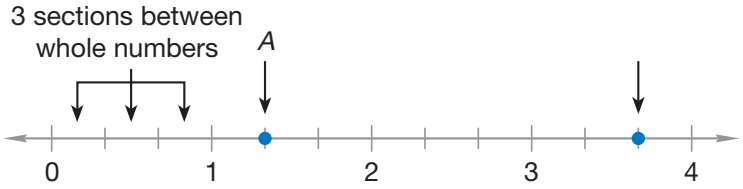
New Concept

A number line is made up of a series of points. The points on the line represent numbers. On the following number line, whole numbers are labeled. However, there are many numbers on the line that are not labeled. We mark some unlabeled numbers with arrows:



Many of the unlabeled points on a number line can be named with fractions and **mixed numbers.** A mixed number is a whole number and a fraction together, like $1\frac{1}{2}$ (one and one half), for example.

To identify a fraction or mixed number on a number line, we need to count the divisions between the whole numbers. On the number line below, the distance between every two whole numbers has been divided into three sections (or into thirds). Thus, each small section is one third ($\frac{1}{3}$). (Be careful to count the *sections* of the number line and not the marks that separate the sections.)



A point on a number line is named by its distance from zero. The location of the point marked by arrow *A* is given by the whole number 1 plus the length of one section. The number for that point is $1\frac{1}{3}$. The point marked with arrow *B* is the whole number 3 plus the length of two sections. The number for point *B* is $3\frac{2}{3}$.

When reading from number lines with sections smaller than 1, follow these steps:

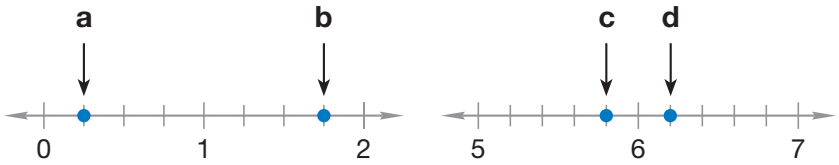
Step 1: Find the whole-number distance from zero up to (but not past) the point to be named. This is the whole-number part of the answer.

Step 2: Count the number of sections between whole numbers. This number is the denominator of the fraction.

Step 3: Then count the number of sections past the whole number to the point being named. This is the numerator of the fraction.

Example 1

Name the fraction or mixed number marked by each arrow on these number lines:



Point **a** is between 0 and 1, so it is named by a fraction and not by a mixed number. The distance between whole numbers on this number line is divided into fourths. Point **a** is one section from zero, which is $\frac{1}{4}$.

The distance from zero to point **b** is 1 plus the length of three sections, or $1\frac{3}{4}$.

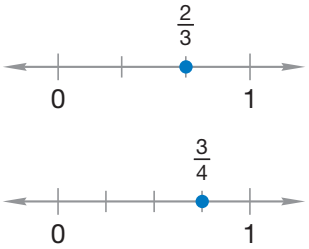
The distance from zero to point **c** is 5 plus a fraction. The distance between whole numbers on this number line is divided into fifths. Point **c** is four sections from 5, which is $5\frac{4}{5}$.

The distance from zero to point **d** is 6 plus the length of one section, or $6\frac{1}{5}$.

Example 2

Ra'Shawn walked $\frac{2}{3}$ of a mile. D'Neese walked $\frac{3}{4}$ of a mile. Who walked farther?

Here we show two number lines. On one number line the fraction $\frac{2}{3}$ is graphed. On the other number line $\frac{3}{4}$ is graphed.



Refer to these number lines to compare the fractions $\frac{2}{3}$ and $\frac{3}{4}$.

$$\frac{2}{3} \bigcirc \frac{3}{4}$$

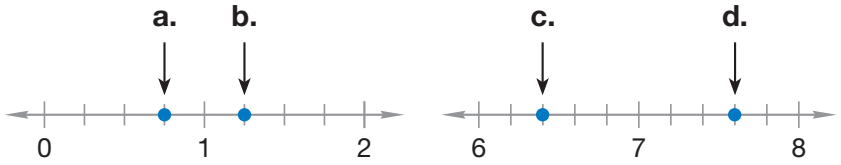
Both $\frac{2}{3}$ and $\frac{3}{4}$ are greater than 0 but less than 1. Since numbers to the right on the number line are greater than numbers to the left, we see that $\frac{3}{4}$ is greater than $\frac{2}{3}$.

$$\frac{2}{3} < \frac{3}{4}$$

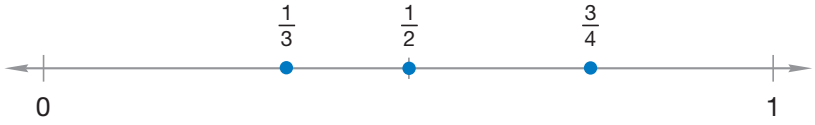
D'Neese walked farther than Ra'Shawn.

Lesson Practice

Connect Name the fraction or mixed number marked by each arrow on these number lines:



Three fractions are graphed on the number line below. Refer to the number line to compare the fractions in problems **e–g.**



e. $\frac{1}{3} \bigcirc \frac{1}{2}$ **f.** $\frac{1}{2} \bigcirc \frac{3}{4}$ **g.** $\frac{3}{4} \bigcirc \frac{1}{3}$

Written Practice

Distributed and Integrated

*1. (31) **Represent** Draw a pair of horizontal parallel line segments. Make the upper segment longer than the lower segment.

2. (Inv. 2) Kione scored $\frac{1}{4}$ of the team's 28 points. How many points did Kione score?

Formulate For problems **3–6,** write an equation and find the answer.

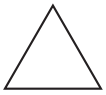
3. (21) Tickets to the matinee were $15 each. Mr. Rodriquez bought four tickets. What was the total cost of the tickets?

4. (35) The used-car dealer bought a car for $725 and sold it for $1020. How much profit did the dealer make on the car? Use a subtraction formula.

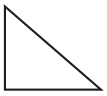
5. (21) In two hours the 3 boys picked a total of 1347 cherries. If they share the cherries evenly, then each boy will get how many cherries?

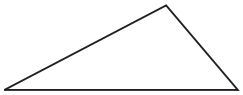
6. (35) How many years were there from 1950 to 1989?

*7. (36) **Multiple Choice** Which triangle has three acute angles?

A 

B 

C 

D 

8. (30, 37) **Represent** Draw a circle and shade $\frac{3}{4}$ of it. What decimal part of the circle is shaded?

***9.** (28) How many days are in a leap year?

10. (32) A stop sign has the shape of an octagon. An octagon has how many sides?

11. (6) $3647 + 92 + 429$

12. (9) $3518 - 1853$

***13.** (15) $4 \times 6 \times 8 \times 0$

14. (26) $3518 \div 10$

15. (10, 13) $\$4.76 + \$12 + \$0.97 + w = \$20$

16. (13) $\$100 - \$87.23$

17. (29) 786×900

18. (34) $\$63.18 \div 9$

19. (24, 29) $375 \times (640 \div 8)$

***20.** (24) Compare: $(3 \times 5) \times 7 \bigcirc 3 \times (5 \times 7)$

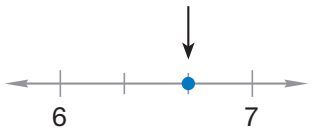
***21.** (32) **Multiple Choice** Every four-sided polygon is which of the following?

A square **B** rectangle **C** quadrilateral **D** rhombus

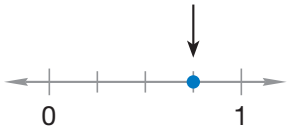
22. (1) **Conclude** What are the next three terms in this counting sequence?

…, 1800, 1900, 2000, ____, ____, ____, …

23. (38) **Connect** To what mixed number is the arrow pointing?



24. (38) **Connect** To what fraction is the arrow pointing?



25. It is 9:45 a.m. What time will it be in 4 hours?
(28)

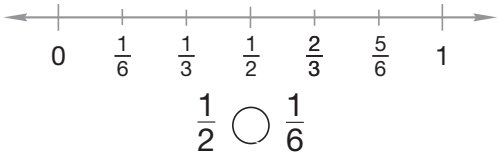
26. Round 649 to the nearest hundred.
(33)

27. If the divisor is 6 and the quotient is 3, then what is the dividend?
(20)

***28.** **Conclude** **a.** Are all squares congruent?
(32)

b. Are all squares similar?

29. Refer to the number line below to complete the comparison:
(38)



$\frac{1}{2} \bigcirc \frac{1}{6}$

30. Use data from the table to answer the questions that follow.
(9, 33)

Tall Buildings in North America

Building	Location	Stories
Two Liberty Place	Philadelphia, PA	58
One Post Office Square	Boston, MA	40
Water Tower Place	Chicago, IL	74
Calpine Center	Houston, TX	34
101 Montgomery Street	San Francisco, CA	29

a. Which two buildings have a combined height that is the same as Water Tower Place?
(6)

b. How many stories taller is Two Liberty Place than 101 Montgomery Street?
(9)

c. **Justify** Explain how an estimate can be used to compare the height of Two Liberty Place to the height of 101 Montgomery Street.
(33)

Early Finishers
Real-World Connection

Ted ran $1\frac{1}{3}$ miles. Describe how to draw a number line from 0 to 2 that shows $1\frac{1}{3}$. Then draw the number line, and label $1\frac{1}{3}$.