Applications

1. Cheryl, Rita, and four of their friends go to a movie and share equally a 48-ounce bag of popcorn and three 48-inch licorice laces. Find the fraction of popcorn each gets and the fraction of licorice each gets.

2. The Lappans buy three large sandwich wraps to serve at a picnic. Nine people in all will be at the picnic. Show three different ways to cut the sandwiches so that each person gets an equal share.

3. Three neighbors are sharing a rectangular strip of land for a garden. They divide the land into 24 equal-sized pieces. What fraction of the land does each person get if they share it equally? Write the answer in more than one way.

For Exercises 4–7, decide whether the statement is _correct_ or _incorrect_. Explain your reasoning in words or by drawing pictures.

4. $\frac{1}{3} = \frac{4}{12}$

5. $\frac{4}{6} = \frac{2}{3}$

6. $\frac{2}{5} = \frac{1}{3}$

7. $\frac{2}{5} = \frac{5}{10}$

For Exercises 8 and 9, draw fraction strips to show that the two fractions are equivalent.

8. $\frac{2}{5}$ and $\frac{6}{15}$

9. $\frac{1}{9}$ and $\frac{2}{18}$

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10. Write an explanation to a friend telling how to find a fraction that is equivalent to $\frac{3}{5}$. You can use words and pictures to help explain.

11. When you save or download a file, load a program, or open a page on the Internet, a status bar is displayed on the computer screen to let you watch the progress. Use the fraction strips shown to find three fractions that describe the status of the work in progress.

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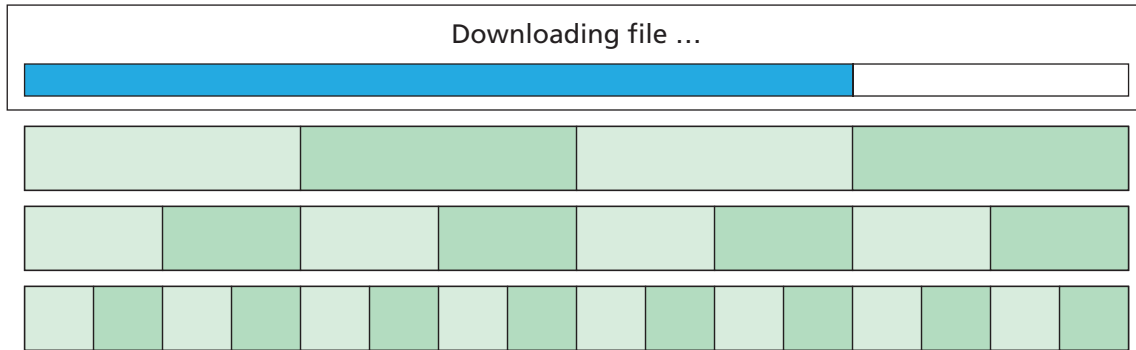
Compare each pair of fractions in Exercises 12–23 using benchmarks and other strategies. Then copy the fractions, and insert the *less than* (<), *greater than* (>), or *equals* (=) symbol.

12. $\frac{8}{10} \blacksquare \frac{3}{8}$ **13.** $\frac{2}{3} \blacksquare \frac{4}{9}$ **14.** $\frac{3}{5} \blacksquare \frac{5}{12}$ **15.** $\frac{1}{3} \blacksquare \frac{2}{3}$

16. $\frac{3}{4} \blacksquare \frac{3}{5}$ **17.** $\frac{3}{2} \blacksquare \frac{7}{6}$ **18.** $\frac{8}{12} \blacksquare \frac{6}{9}$ **19.** $\frac{9}{10} \blacksquare \frac{10}{11}$

20. $\frac{3}{12} \blacksquare \frac{7}{12}$ **21.** $\frac{5}{6} \blacksquare \frac{5}{8}$ **22.** $\frac{3}{7} \blacksquare \frac{6}{14}$ **23.** $\frac{4}{5} \blacksquare \frac{7}{8}$

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24. Find a fraction between each pair of fractions.

a. $\frac{1}{8}$ and $\frac{1}{4}$ **b.** $\frac{1}{6}$ and $\frac{1}{12}$ **c.** $\frac{1}{6}$ and $\frac{2}{6}$ **d.** $\frac{1}{4}$ and $\frac{2}{5}$

Between which two benchmarks $(0, \frac{1}{2}, 1, 1\frac{1}{2}, \text{ and } 2)$ does each fraction in Exercises 25–33 fall? Tell which is the nearer benchmark.

25. $\frac{3}{5}$ **26.** $1\frac{2}{6}$ **27.** $\frac{12}{10}$

28. $\frac{2}{18}$ **29.** $1\frac{8}{10}$ **30.** $1\frac{1}{10}$

31. $\frac{12}{24}$ **32.** $\frac{9}{6}$ **33.** $1\frac{12}{15}$
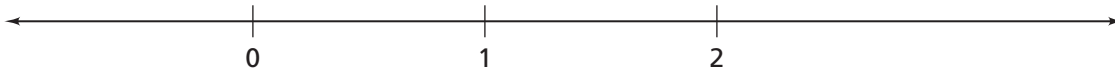
34. Describe, in writing or with pictures, how $\frac{7}{3}$ compares to $2\frac{1}{3}$.

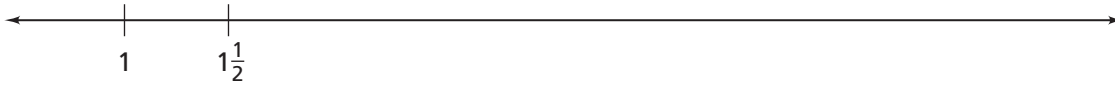**35.** **Multiple Choice** Which fraction is the greatest?

A. $\frac{7}{6}$ **B.** $\frac{9}{8}$ **C.** $\frac{13}{12}$ **D.** $\frac{14}{15}$

36. Multiple Choice On a number line from 0 to 10, where is $\frac{13}{3}$ located?

    F. between 0 and 1   **G.** between 4 and 5

   **H.** between 5 and 6   **J.** between 6 and 7

37. Copy the number line below. Locate and label marks representing $\frac{9}{10}$, $\frac{11}{10}$, $2\frac{3}{10}$, and $2\frac{5}{10}$. For each point you mark, give two other fractions that are equivalent to the fraction given.

$$\longleftarrow \overset{\underset{\displaystyle 0}{|}}{} \quad\quad \overset{\underset{\displaystyle 1}{|}}{} \quad\quad \overset{\underset{\displaystyle 2}{|}}{} \longrightarrow$$

38. Copy the number line below. Locate and label marks representing $2\frac{1}{4}$, $1\frac{9}{10}$, and $\frac{15}{4}$.

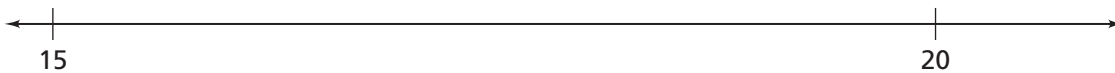$$\longleftarrow \overset{\underset{\displaystyle 1}{|}}{} \quad \overset{\underset{\displaystyle 1\frac{1}{2}}{|}}{} \longrightarrow$$

39. Copy the number line below. Locate and label a fraction represented by each point described.

$$\longleftarrow \overset{\underset{\displaystyle 1}{|}}{} \quad\quad \overset{\underset{\displaystyle 1\frac{1}{2}}{|}}{} \longrightarrow$$
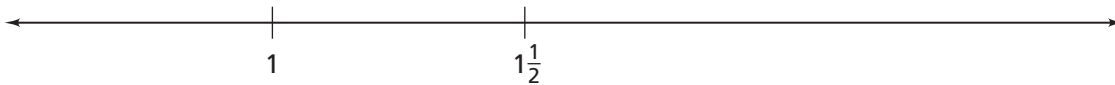
    a. a point close to but greater than 1

    b. a point close to but less than $1\frac{1}{2}$

    c. a point close to but greater than $1\frac{1}{2}$

    d. a point close to but less than 2

40. Copy the number line below. Locate and label marks representing 16, $15\frac{1}{2}$, $19\frac{1}{2}$, and $20\frac{1}{4}$.

$$\longleftarrow \overset{\underset{\displaystyle 15}{|}}{} \quad\quad\quad\quad\quad\quad\quad\quad\quad \overset{\underset{\displaystyle 20}{|}}{} \longrightarrow$$

41. Copy and complete the table.

Fraction	$\frac{5}{3}$	■	■	$\frac{19}{6}$	$\frac{37}{4}$	■
Mixed Number	■	$2\frac{4}{5}$	$9\frac{3}{7}$	■	■	$6\frac{2}{3}$

42. Kelly and Sean work together to clean a section of highway that is $\frac{10}{3}$ miles long. Write this distance as a mixed number.

43. The Chess Club is cleaning a very littered section of highway. Each day the members clean $1\frac{3}{4}$ miles of highway. After four days of hard work, Lakeisha says they have cleaned $\frac{28}{4}$ miles of highway. Glenda says they have cleaned 7 miles of roadway. Who is right? Why?

44. Change each mixed number into an improper fraction.

 a. $1\frac{2}{3}$ **b.** $6\frac{3}{4}$ **c.** $9\frac{7}{9}$ **d.** $4\frac{2}{7}$

45. Change each improper fraction into a mixed number.

 a. $\frac{22}{4}$ **b.** $\frac{10}{6}$ **c.** $\frac{17}{5}$ **d.** $\frac{36}{8}$

Connections

For Exercises 46 and 47, write a fraction to describe how much pencil is left, compared to a new pencil. Measure from the left edge of the eraser to the point of the pencil.

46.

47.

48. These bars represent trips that Ms. Axler took in her job this week.

300 km [   ]

180 km [   ]

200 km [   ]

a. Copy each bar and shade in the distance Ms. Axler traveled after going one third of the total distance for each trip.

b. How many kilometers had Ms. Axler traveled when she was at the one-third point in each trip? Explain your reasoning.

49. Multiple Choice Find the least common multiple of the following numbers: 3, 4, 5, 6, 10, and 15.

A. 1   **B.** 15   **C.** 60   **D.** 54,000

50. Use what you found in Exercise 49. Write the fractions in equivalent form, all with the same denominator.

$\dfrac{1}{3}$ $\dfrac{1}{4}$ $\dfrac{1}{5}$ $\dfrac{1}{6}$ $\dfrac{1}{10}$ $\dfrac{1}{15}$

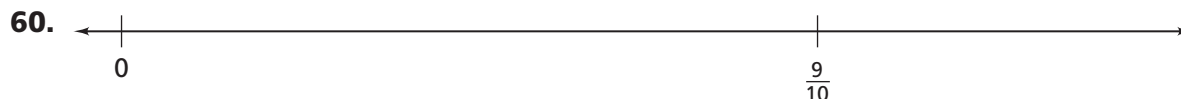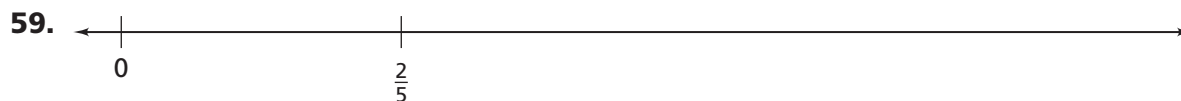**Find the greatest common factor of each pair of numbers.**

51. 12 and 48   **52.** 6 and 9
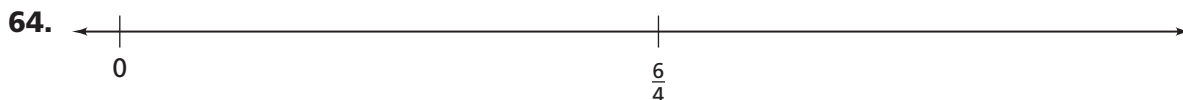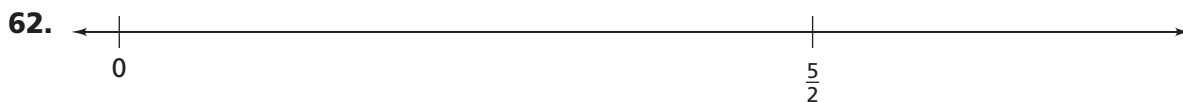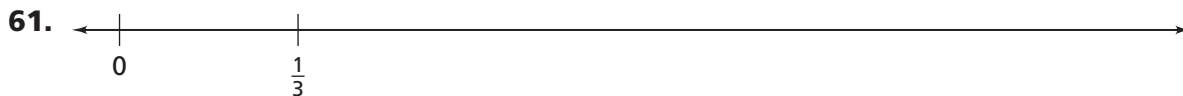
53. 24 and 72   **54.** 18 and 45

Use your answers from Exercises 51–54 to write a fraction equivalent to each fraction given.

55. $\dfrac{12}{48}$ **56.** $\dfrac{6}{9}$ **57.** $\dfrac{24}{72}$ **58.** $\dfrac{18}{45}$

Extensions

For Exercises 59–64, copy each number line. Estimate and mark where the number 1 would be.

59.

0               $\dfrac{2}{5}$

60.

0                                  $\dfrac{9}{10}$

61.

0    $\frac{1}{3}$

62.

0                                    $\frac{5}{2}$

63.

0                                    $\frac{3}{4}$

64.

0                          $\frac{6}{4}$

For Exercises 65–67, find every fraction with a denominator less than 50 that is equivalent to the given fraction.

65. $\frac{3}{15}$ **66.** $\frac{8}{3}$ **67.** $1\frac{4}{6}$

68. Use the information in *Did You Know?* after Problem 2.2 to figure out how to name the sums below with a single fraction. (Your strips might be helpful.) Explain your reasoning.

a. $\frac{1}{2} + \frac{1}{4} = \blacksquare$ **b.** $\frac{1}{12} + \frac{1}{6} = \blacksquare$ **c.** $\frac{1}{4} + \frac{1}{6} + \frac{1}{12} = \blacksquare$

69. A *unit fraction* is a fraction with 1 in the numerator. Find a set of unit fractions whose sum equals each of the following. Try to find more than one answer for each.

a. $\frac{7}{8}$ **b.** $\frac{7}{12}$

70. Find five fractions between $\frac{8}{10}$ and $\frac{5}{4}$.

71. Does $\frac{4}{5}, \frac{17}{23},$ or $\frac{51}{68}$ represent the greatest part of a whole? Explain your reasoning.

72. Copy the number line below. Locate and label marks representing $0, \frac{3}{4}, \frac{1}{8},$ and $2\frac{2}{3}$.

1        $1\frac{1}{4}$