CALCULATORS

Using a Calculator to Multiply and Divide Fractions

To multiply or divide two fractions or mixed numbers, enter the expression as you did when working with whole numbers in Chapter 1, but use the [a b/c] key to enter the fractions or mixed numbers. The result will be given to you in simplified form.

For example, to multiply $\frac{5}{8} \cdot \frac{6}{11}$, press the keys

[5] [a b/c] [8] [×] [6] [a b/c] [1] [1].

Then press [=]. The display will read 15/44 which means $\frac{15}{44}$.

Similarly, to divide $2\frac{1}{2} \div 1\frac{4}{5}$, press the keys

[2] [a b/c] [1] [a b/c] [2] [÷] [1] [a b/c] [4] [a b/c] [5].

Then press [=]. The display will read 1 ⌟7/18 which means $1\frac{7}{18}$.

Completion Example Answers

5. $\frac{14}{5} \cdot \frac{35}{4} = \frac{2 \cdot 7 \cdot 5 \cdot 7}{5 \cdot 2 \cdot 2} = \frac{49}{2}$ or $24\frac{1}{2}$ **12.** $\frac{46}{15} \div \frac{6}{5} = \frac{46}{15} \cdot \frac{5}{6} = \frac{2 \cdot 23 \cdot 5}{3 \cdot 5 \cdot 2 \cdot 3} = \frac{23}{9}$ or $2\frac{5}{9}$

Margin Exercise Answers

1. $\frac{55}{12}$ or $4\frac{7}{12}$ **2.** $\frac{25}{32}$ **3.** $\frac{77}{4}$ or $19\frac{1}{4}$ **4.** $-\frac{7}{3}$ or $-2\frac{1}{3}$ **5.** 14 **6.** 12 **7.** $-\frac{5}{2}$ or $-2\frac{1}{2}$

8. 226 ft^2 **9.** $15\frac{2}{5}$ in.^{2} **10.** $\frac{16}{25}$ **11.** $\frac{7}{5}$ or $1\frac{2}{5}$ **12.** $\frac{42}{19}$ or $2\frac{4}{19}$ **13.** 9 shelves

3.4 Exercises

Concept Check

Fill-in-the-Blank. Complete each sentence using information found in this section.

1. A/An _____ number is the sum of a whole number and a proper fraction.
2. When multiplying or dividing with mixed numbers, change each mixed number into a/an _____ fraction.
3. The mixed number $5\frac{1}{3}$ is equal to the improper fraction _____.
4. The reciprocal of $2\frac{1}{3}$ is _____.
5. To divide by $1\frac{1}{2}$ multiply by _____.
6. When multiplying or dividing mixed numbers, the answer can be written as a mixed number or a/an _____.

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

7. When multiplying or dividing with mixed numbers, the answer should always be simplified, if possible.

8. Multiplication or division with mixed numbers can be accomplished by changing the mixed numbers to improper fractions.

9. The mixed number $4\frac{1}{5}$ is equal to $\frac{9}{5}$.

10. The reciprocal of $7\frac{2}{5}$ is $\frac{5}{37}$.

Practice

Multiply and reduce to lowest terms. Write your answer in mixed number form. See Examples 1 through 7.

1. $\frac{2}{3}\cdot 3\frac{1}{4}$

2. $\frac{3}{5}\cdot 4\frac{1}{6}$

3. $4\frac{1}{3}\cdot\frac{2}{13}$

4. $2\frac{2}{7}\cdot\frac{3}{16}$

5. $\left(2\frac{4}{5}\right)\left(1\frac{1}{7}\right)$

6. $\left(2\frac{1}{3}\right)\left(3\frac{1}{4}\right)$

7. $5\frac{1}{3}\left(2\frac{1}{2}\right)$

8. $4\frac{1}{5}\left(1\frac{1}{3}\right)$

9. $\left(1\frac{3}{5}\right)\left(-1\frac{1}{4}\right)$

10. $\left(-2\frac{1}{4}\right)\left(3\frac{1}{9}\right)$

11. $\left(9\frac{1}{3}\right)3\frac{3}{4}$

12. $\left(11\frac{1}{4}\right)\left(2\frac{2}{15}\right)$

13. $\left(-6\frac{2}{3}\right)\left(-5\frac{1}{7}\right)$

14. $\left(-12\frac{1}{2}\right)\left(-3\frac{1}{3}\right)$

15. $4\frac{3}{8}\cdot 2\frac{4}{5}$

16. $6\frac{3}{8}\cdot 2\frac{2}{17}$

17. $5\frac{1}{4}\cdot 1\frac{1}{7}$

18. $2\frac{1}{6}\cdot 1\frac{5}{13}$

19. $\left(-4\frac{3}{4}\right)\left(-2\frac{1}{5}\right)\left(1\frac{1}{7}\right)$

20. $\left(6\frac{3}{16}\right)\left(-2\frac{1}{11}\right)\left(-5\frac{3}{5}\right)$

21. $1\frac{3}{32}\cdot 1\frac{1}{7}\cdot 1\frac{1}{25}$

22. $1\frac{5}{16}\cdot 1\frac{1}{3}\cdot 1\frac{1}{5}$

23. $1\frac{3}{7}\cdot 1\frac{5}{35}\cdot 4\frac{10}{15}$

24. $2\frac{9}{12}\cdot 2\frac{4}{9}\cdot 1\frac{18}{42}$

25. $-\frac{5}{8}\cdot 2\frac{3}{5}\cdot 5\frac{1}{3}$

26. $-4\frac{4}{24}\cdot 1\frac{12}{36}\cdot\frac{9}{15}$

27. $1\frac{1}{3}\cdot 18\cdot 3\frac{1}{2}\cdot 1\frac{18}{36}$

28. $2\frac{1}{2}\cdot 1\frac{4}{7}\cdot 21\cdot 2\frac{6}{33}$

29. $\frac{17}{100}\cdot\frac{27}{34}\cdot 2\frac{7}{9}\cdot 6$

30. $9\frac{3}{8}\cdot\frac{16}{36}\cdot 9\cdot\frac{7}{25}$

31. Find $\frac{3}{7}$ of 42.

32. Find $\frac{5}{9}$ of 54.

33. Find $-\frac{7}{9}$ of -15.

34. Find $-\frac{1}{6}$ of -22.

35. Find $\frac{5}{6}$ of $-3\frac{11}{15}$.

36. Find $\frac{11}{12}$ of $-1\frac{6}{11}$.

Divide and reduce to lowest terms. Write your answer in mixed number form. See Examples 10 through 12.

37. $3\frac{1}{2} \div \frac{7}{8}$

38. $3\frac{5}{7} \div \frac{2}{7}$

39. $4\frac{1}{3} \div \frac{5}{6}$

40. $2\frac{3}{10} \div \frac{3}{5}$

41. $5\frac{1}{4} \div 3\frac{1}{2}$

42. $6\frac{2}{3} \div 4\frac{4}{9}$

43. $6\frac{3}{5} \div 2\frac{1}{10}$

44. $\left(6\frac{3}{4}\right) \div 4\frac{1}{2}$

45. $3\frac{1}{10} \div 2\frac{1}{2}$

46. $\left(2\frac{1}{7}\right) \div 2\frac{1}{17}$

47. $7\frac{1}{5} \div 3$

48. $4\frac{1}{5} \div 3$

49. $7\frac{1}{3} \div 4$

50. $6\frac{5}{6} \div 2$

51. $-3 \div 4\frac{1}{5}$

52. $-2 \div 6\frac{5}{6}$

53. $4\frac{5}{8} \div \frac{1}{4}$

54. $\left(6\frac{3}{11}\right) \div \left(\frac{3}{4}\right)$

55. $\left(7\frac{1}{3}\right) \div \left(\frac{1}{4}\right)$

56. $4\frac{1}{5} \div 3\frac{1}{3}$

57. $1\frac{1}{32} \div 2\frac{3}{4}$

58. $2\frac{1}{17} \div 1\frac{1}{4}$

59. $1\frac{11}{14} \div 2\frac{2}{7}$

60. $13\frac{1}{7} \div 4\frac{2}{11}$

61. $1\frac{7}{8} \div 5$

62. $2\frac{4}{5} \div 7$

63. $2\frac{2}{49} \div \left(-3\frac{3}{14}\right)$

64. $1\frac{29}{55} \div \left(-3\frac{5}{24}\right)$

65. $\left(-1\frac{1}{32}\right) \div \left(-3\frac{2}{3}\right)$

66. $\left(-10\frac{2}{7}\right) \div \left(-4\frac{1}{2}\right)$

Applications

Solve.

67. You are planning a trip of 615 miles (round trip), and you know that your car gets an average of $27\frac{1}{3}$ miles per gallon of gas. You also know that your gas tank holds $15\frac{1}{2}$ gallons of gas.

a. How many gallons of gas will you use on this trip?

b. If the gas you buy costs $4 per gallon, how much should you plan to spend on this trip for gas?

68. You just drove your car 450 miles and used 20 gallons of gas. You know that the gas tank on your car holds $16\frac{1}{2}$ gallons of gas.

a. What is the most number of miles you can drive on one tank of gas?

b. If the gas you buy costs $4 per gallon, what would you pay to fill one-half of your tank?

69. If you drive your car to work $6\frac{3}{10}$ miles one way each weekday (5 days a week), how many miles do you drive each week going to and from work?

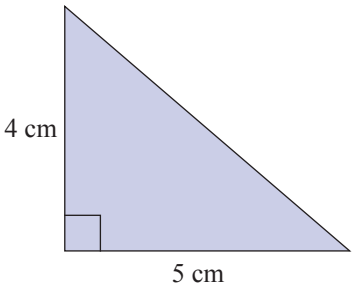
70. Clea can copy edit an average of $6\frac{3}{4}$ pages per hour. Approximately how many pages will she have copy edited after 36 hours?

71. A cookie recipe makes 8 dozen cookies and calls for $2\frac{1}{2}$ cups of flour. You only want to make 2 dozen cookies for yourself.

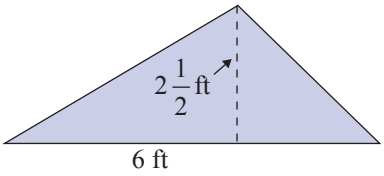
a. What fraction of the entire recipe will you be making?

b. How many cups of flour will you need to make 2 dozen cookies?

72. A right triangle is a triangle with one right angle (measure 90°). The two sides that form the right angle are called legs, and they are perpendicular to each other. The longest side is called the hypotenuse. The legs can be treated as the base and height of the triangle. Find the area of the right triangle shown here.



73. Find the area of the triangle in the figure shown here.



74. Find the area of a rectangle that has sides of length $5\frac{7}{8}$ meters and $4\frac{1}{2}$ meters.

75. The perimeter of a square can be found by multiplying the length of one side by 4. The area can be found by squaring the length of one side. The length of one side of a square is $8\frac{2}{3}$ inches.

a. Find the perimeter of the square.

b. Find the area of the square.

76. A serving of Rice Krispies cereal is $1\frac{1}{4}$ cups. One box of Rice Krispies cereal contains approximately $19\frac{1}{3}$ cups of cereal. How many servings of cereal are in a box?

77. The area of a small garden is $35\frac{3}{4}$ square feet. The width of the garden is $5\frac{1}{2}$ feet. What is the length of the garden?

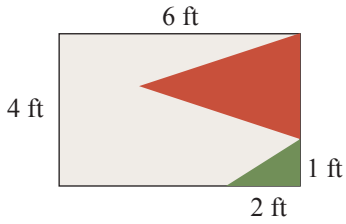
78. It takes Barry $2\frac{1}{4}$ hours to detail a car. If he worked 27 hours during the week, how many cars did he detail?

79. Silver Lake, Colorado, had a record-setting snowstorm in April of 1921. The snow fell continuously for $32\frac{1}{2}$ hours and accumulated 95 inches of snow. What was the average accumulation of snow per hour during this snow storm?[1]

80. According to building codes for the state of Washington, the maximum height of a step in a staircase is $7\frac{3}{4}$ inches. If a staircase is $116\frac{1}{4}$ inches high and is built using the maximum step height, how many steps are in the staircase?

1 Source: NOAA.gov

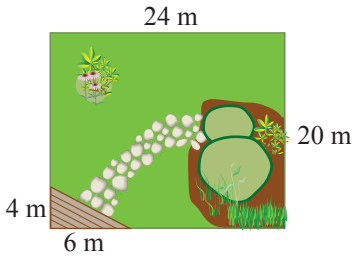
81. A flag is in the shape of a rectangle that is 4 feet by 6 feet with a right triangle in one corner. The right triangle is 1 foot high and 2 feet long.



a. If the triangle is green and the rest of the flag is red and tan, what is the area of the part that is green?

b. What is the area of the flag that is red and tan?

82. Paul's yard is in the shape of a rectangle that is 20 meters wide and 24 meters long. In one corner of his yard, Paul has a triangular area that is covered by a wooden deck. This triangular area is 4 meters high and 6 meters long. The rest of the yard is grass and flower gardens.



a. What is the area of Paul's wooden deck?

b. What is the area of the yard that is covered in grass and flower gardens?

Writing & Thinking

83. Suppose the product of $5\frac{7}{10}$ and some other number is $10\frac{1}{2}$. Answer the following questions without doing any calculations.

a. Do you think that this other number is more than 1 or less than 1? Why?

b. Find the other number.

84. Suppose that a fraction between 0 and 1, such as $\frac{1}{2}$ or $\frac{2}{3}$, is multiplied by some other number. Give brief discussions and several examples in answering each of the following questions.

a. If the other number is a positive fraction, will this product always be smaller than the other number?

b. If the other number is a positive whole number, will this product always be smaller than the other number?

c. If the other number is a negative number (integer or fraction), will this product ever be smaller than the other number?

85. Give an example of two mixed numbers being divided, and then explain the steps you used.

86. Compare and contrast multiplying two mixed numbers and dividing two mixed numbers.