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5-9 Dividing Fractions - Practice and Problem Solving

Find the reciprocal of each number.

13. $\frac{1}{10}$

Since $\frac{1}{10} \times \frac{10}{1} = 1$, the reciprocal of $\frac{1}{10}$ is $\frac{10}{1}$ or 10.

15. $\frac{7}{9}$

Since $\frac{7}{9} \times \frac{9}{7} = 1$, the reciprocal of $\frac{7}{9}$ is $\frac{9}{7}$.

17. 1

Since $1 \times 1 = 1$, the reciprocal of 1 is 1.

Divide. Write in simplest form.

19. $\frac{1}{2} \div \frac{2}{3}$

$$\frac{1}{2} \div \frac{2}{3} = \frac{1}{2} \times \frac{3}{2}$$
$$= \frac{1 \times 3}{2 \times 2}$$
$$= \frac{3}{4}$$

21. $\frac{3}{4} \div \frac{9}{10}$

$$\frac{3}{4} \div \frac{9}{10} = \frac{3}{4} \times \frac{10}{9}$$
$$= \frac{\overset{1}{\cancel{3}} \times \overset{5}{\cancel{10}}}{\underset{2}{\cancel{4}} \times \underset{3}{\cancel{9}}}$$
$$= \frac{5}{6}$$

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23. $2 \div \frac{3}{5}$

$$2 \div \frac{3}{5} = \frac{2}{1} \times \frac{5}{3}$$
$$= \frac{2 \times 5}{1 \times 3}$$
$$= \frac{10}{3} \text{ or } 3\frac{1}{3}$$

25. $8 \div \frac{4}{7}$

$$8 \div \frac{4}{7} = \frac{8}{1} \times \frac{7}{4}$$
$$= \frac{\overset{2}{\cancel{8}} \times 7}{1 \times \underset{1}{\cancel{4}}}$$
$$= 14$$

27. $\frac{5}{6} \div 5$

$$\frac{5}{6} \div 5 = \frac{5}{6} \times \frac{1}{5}$$
$$= \frac{\overset{1}{\cancel{5}} \times 1}{6 \times \underset{1}{\cancel{5}}}$$
$$= \frac{1}{6}$$

29. $\frac{8}{9} \div 4$

$$\frac{8}{9} \div 4 = \frac{8}{9} \times \frac{1}{4}$$
$$= \frac{\overset{2}{\cancel{8}} \times 1}{9 \times \underset{1}{\cancel{4}}}$$
$$= \frac{2}{9}$$

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31. **MEASUREMENT** Jamar has a piece of plywood that is $\frac{8}{9}$ yard long. He wants to cut this into 3 equal-size pieces to use as small shelves in his bedroom. What will be the length of each of these shelves?

$$\frac{8}{9} \div 3 = \frac{8}{9} \times \frac{1}{3}$$
$$= \frac{8 \times 1}{9 \times 3}$$
$$= \frac{8}{27}$$

Each shelf will be $\frac{8}{27}$ yd long.

33. **MEASUREMENT** A piece of string is to be cut into equal-size pieces. If the length of the string is $\frac{11}{12}$ foot long and each piece is to be $\frac{1}{24}$ foot long, how many pieces can be cut?

$$\frac{11}{12} \div \frac{1}{24} = \frac{11}{12} \times \frac{24}{1}$$
$$= \frac{11 \times \cancel{24}^{2}}{\cancel{12}_{1} \times 1}$$
$$= 22$$

22 pieces can be cut.

CRAFTS Refer to the following information.

To tie-dye one T-shirt, $\frac{3}{8}$ of a cup of dye is needed. The table shows the number of cups of each color of dye in Mr. Nielson's art class.

Amount of Dye	
Color	**Number of Cups**
red	12
orange	$\frac{3}{4}$
yellow	2
green	$2\frac{5}{6}$
blue	8
purple	$5\frac{1}{2}$
black	6

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35. Mr. Nielson has three classes. For each class, he wants to use the same amount of red dye. How many T-shirts can be made using only the color red for each class?

$12 \div 3 = 4;$

$$4 \div \frac{3}{8} = \frac{4}{1} \div \frac{3}{8} = \frac{4}{1} \times \frac{8}{3}$$

$$= \frac{32}{3} \text{ or } 10\frac{2}{3}$$

10 shirts can be made using only red dye.

ALGEBRA Use the order of operations to evaluate each expression if $a = \frac{2}{3}$, $b = \frac{3}{4}$, and $c = \frac{1}{2}$.

37. $b \div c - a$

$$b \div c - a = \frac{3}{4} \div \frac{1}{2} - \frac{2}{3}$$

$$= \frac{3}{4} \times \frac{2}{1} - \frac{2}{3}$$

$$= \frac{3 \times \overset{1}{\cancel{2}}}{\underset{2}{\cancel{4}} \times 1} - \frac{2}{3}$$

$$= \frac{3}{2} - \frac{2}{3}$$

$$= \frac{3 \times 3}{2 \times 3} - \frac{2 \times 2}{3 \times 2}$$

$$= \frac{9}{6} - \frac{4}{6}$$

$$= \frac{5}{6}$$

39. $c \div b + a$

$$c \div b + a = \frac{1}{2} \div \frac{3}{4} + \frac{2}{3}$$

$$= \frac{1}{2} \times \frac{4}{3} + \frac{2}{3}$$

$$= \frac{1 \times \overset{2}{\cancel{4}}}{\underset{1}{\cancel{2}} \times 3} + \frac{2}{3}$$

$$= \frac{2}{3} + \frac{2}{3}$$

$$= \frac{4}{3} \text{ or } 1\frac{1}{3}$$

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41. **FIND THE DATA** Refer to the Data File on pages 16-19. Choose some data and write a real-world problem in which you would divide fractions.

See students' work.

43. **FIND THE ERROR** Raul and Tom are solving $\frac{8}{9} \div 4$. Who is correct? Explain your reasoning.

Raul		Tom
$\frac{8}{9} \div 4 = \frac{8}{9} \times \frac{4}{1}$ $= \frac{32}{9}$ or $3\frac{5}{9}$		$\frac{8}{9} \div 4 = \frac{8}{9} \times \frac{1}{4}$ $= \frac{8}{36}$ or $\frac{2}{9}$

Tom; To divide by 4, multiply by the reciprocal, which is $\frac{1}{4}$.

CHALLENGE Simplify each expression. Then, write one or two sentences describing each result

45. $\frac{a}{b} \div \frac{c}{b}$

$\frac{a}{c}$; Sample answer: if the denominators of two fractions are the same, then the quotient of the first fraction divided by the second fraction will be a fraction whose numerator is the numerator of the first fraction and whose denominator is the numerator of the second fraction.

47. In cooking, 1 drop is equal to $\frac{1}{6}$ of a dash. If a recipe calls for $\frac{2}{3}$ of a dash, which expression would give the number of drops that are needed?

A $\frac{1}{6} + \frac{2}{3}$

B $\frac{1}{6} - \frac{2}{3}$

C $\frac{1}{6} \times \frac{2}{3}$

D $\frac{2}{3} \div \frac{1}{6}$

D $\frac{2}{3} \div \frac{1}{6}$

Multiply. Write in simplest form

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49. $2\frac{2}{5} \times 3\frac{1}{3}$

$$2\frac{2}{5} \times 3\frac{1}{3} = \frac{12}{5} \times \frac{10}{3}$$
$$= \frac{\overset{4}{\cancel{12}} \times \overset{2}{\cancel{10}}}{\underset{1}{\cancel{5}} \times \underset{1}{\cancel{3}}}$$
$$= \frac{8}{1} \text{ or } 8$$

51. $3\frac{3}{7} \times 2\frac{3}{8}$

$$3\frac{3}{7} \times 2\frac{3}{8} = \frac{24}{7} \times \frac{19}{8}$$
$$= \frac{\overset{3}{\cancel{24}} \times 19}{7 \times \underset{1}{\cancel{8}}}$$
$$= \frac{57}{7}$$
$$= 8\frac{1}{7}$$

53. **VOLUNTEERING** According to a survey, 9 in 10 teens volunteer at least once a year. Of these, about $\frac{1}{3}$ help clean up their communities. What fraction of teens volunteer by helping clean up their communities?

$$\frac{9}{10} \times \frac{1}{3} = \frac{\overset{3}{\cancel{9}} \times 1}{10 \times \underset{1}{\cancel{3}}}$$
$$= \frac{3}{10}$$

$\frac{3}{10}$ of teens help by cleaning up their communities.

PREREQUISITE SKILL Write each mixed number as an improper fraction. Then find the reciprocal of each.

55. $1\frac{2}{3}$

$$1\frac{2}{3} = \frac{(1 \times 3) + 2}{3} = \frac{5}{3}$$

Since $\frac{5}{3} \times \frac{3}{5} = 1$, the reciprocal of $\frac{5}{3}$ is $\frac{3}{5}$.

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57. $4\frac{1}{2}$

$4\frac{1}{2}=\frac{(4\times 2)+1}{2}=\frac{9}{2}$

Since $\frac{9}{2}\times\frac{2}{9}=1$, the reciprocal of $\frac{9}{2}$ is $\frac{2}{9}$.

59. $6\frac{4}{5}$

$6\frac{4}{5}=\frac{(6\times 5)+4}{5}=\frac{34}{5}$

Since $\frac{34}{5}\times\frac{5}{34}=1$, the reciprocal of $\frac{34}{5}$ is $\frac{5}{34}$.