CHAPTER

3 Multiplying and Dividing Fractions and Decimals

Lesson 3.1   Dividing Fractions

Express each improper fraction as a mixed number in simplest form.

1. $\dfrac{18}{5}$

2. $\dfrac{27}{6}$

3. $\dfrac{34}{9}$

Express each mixed number as an improper fraction.

4. $4\dfrac{1}{6}$

5. $5\dfrac{2}{7}$

6. $9\dfrac{3}{8}$

Find each product in simplest form.

7. $\dfrac{2}{7} \times \dfrac{4}{9}$

8. $\dfrac{12}{17} \times \dfrac{34}{3}$

9. $\dfrac{15}{8} \times \dfrac{64}{9}$

Divide. Draw a model to help you.

Example

$5 \div \dfrac{1}{3}$

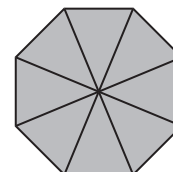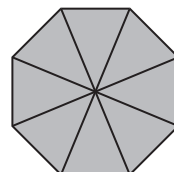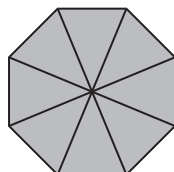$= \underline{\quad 5 \quad} \times \underline{\quad 3 \quad}$

$= \underline{\quad 15 \quad}$

Dividing by $\dfrac{1}{3}$ is the same as multiplying by 3.

10. $3 \div \dfrac{1}{8} = \underline{\qquad} \times \underline{\qquad}$

$= \underline{\qquad}$

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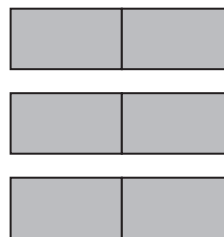**11.** $7 \div \dfrac{1}{6} = $ _____ × _____   **12.** $8 \div \dfrac{1}{5}$

= _____

Solve. Draw a model to find each quotient.

Example

Joshua cuts 3 strings into a number of equal pieces. Each piece is $\dfrac{1}{2}$ of a string. Into how many pieces does Joshua cut the 3 strings?

Number of halves in 3 wholes = __3__ ÷ __$\frac{1}{2}$__

= __3__ × __2__

= __6__

Joshua cuts the string into __6__ pieces.

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13. A jar contains 6 liters of water. It is poured equally into some bottles. Each bottle contains $\dfrac{1}{7}$ liter of water. How many bottles are there?

Number of bottles = _____ ÷ _____

= _____ × _____

= _____
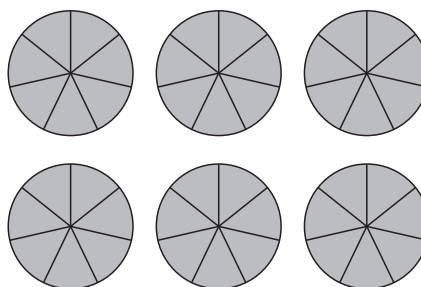
There are _____ bottles.

14. George cut 7 tiles into pieces that were each $\dfrac{1}{9}$ of a tile. Into how many pieces did George cut the 7 tiles?

Divide. Express the quotient in simplest form.

Example

$6 \div \dfrac{3}{4}$

$= \dfrac{\underline{6}}{} \times \dfrac{\underline{4}}{\underline{3}}$

$\dfrac{3}{4}$ $\dfrac{3}{4}$ $\dfrac{3}{4}$ $\dfrac{3}{4}$ $\dfrac{3}{4}$ $\dfrac{3}{4}$ $\dfrac{3}{4}$ $\dfrac{3}{4}$

$= \dfrac{\underline{24}}{\underline{3}}$

$= \underline{8}$

> Dividing by $\dfrac{3}{4}$ is the same as multiplying by $\dfrac{4}{3}$.

15. $4 \div \dfrac{2}{3}$

$\dfrac{2}{3}$ $\dfrac{2}{3}$ $\dfrac{2}{3}$ $\dfrac{2}{3}$ $\dfrac{2}{3}$ $\dfrac{2}{3}$

$= \underline{} \times \underline{}$

$= \underline{}$

$= \underline{}$
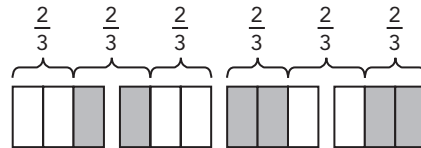
16. $9 \div \dfrac{6}{7} = \underline{} \times \underline{}$

$= \underline{}$

$= \underline{}$

17. $10 \div \dfrac{4}{11}$

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Solve. Draw a model to find each quotient.

Example

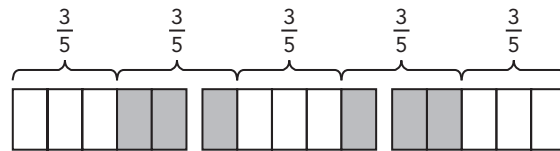A faucet can fill $\frac{3}{5}$ of a container in a minute. If water flows out of the faucet at the same rate, how long will it take the faucet to fill 3 such containers?

$$\frac{3}{5} \quad \frac{3}{5} \quad \frac{3}{5} \quad \frac{3}{5} \quad \frac{3}{5}$$

Number of three-fifths in 3 wholes = $\underline{\quad 3 \quad}$ ÷ $\underline{\quad \frac{3}{5} \quad}$

$$= \underline{\quad 3 \quad} \times \underline{\quad \frac{5}{3} \quad}$$

$$= \underline{\quad \frac{15}{3} \quad}$$

$$= \underline{\quad 5 \quad}$$

It will take the faucet $\underline{\quad 5 \quad}$ minutes to fill the 3 containers.

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18. A gardener uses $\frac{5}{8}$ of a pail of water to water a plot of land. How many similar plots of land can the gardener water with 5 such pails of water?

$$\frac{5}{8} \quad \frac{5}{8} \quad \frac{5}{8} \quad \frac{5}{8} \quad \frac{5}{8} \quad \frac{5}{8} \quad \frac{5}{8} \quad \frac{5}{8}$$
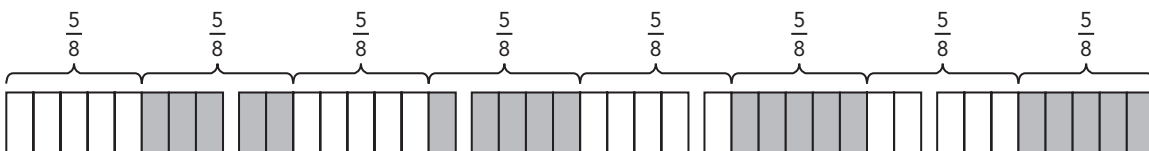
Number of five-eighths in 5 wholes = $\underline{\qquad}$ ÷ $\underline{\qquad}$

$$= \underline{\qquad} \times \underline{\qquad}$$

$$= \underline{\qquad}$$

$$= \underline{\qquad}$$

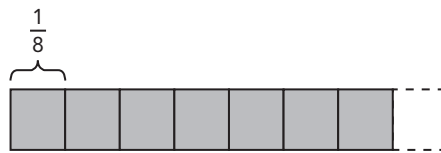The gardener can water $\underline{\qquad}$ similar plots of land with 5 such pails of water.

19. Alex is painting some sculptures. He uses $\frac{4}{9}$ of a tube of paint for each sculpture.
How many similar sculptures can he paint with 12 such tubes of paint?

Divide. Express the quotient in simplest form.

Example

$\frac{7}{8} \div \frac{1}{8}$

$$= \frac{\frac{7}{8}}{} \times \frac{\frac{8}{1}}{}$$

$$= \frac{\frac{56}{8}}{}$$

$$= \frac{7}{}$$

$\frac{1}{8}$

Dividing by $\frac{1}{8}$ is the same as multiplying by $\frac{8}{1}$.

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20. $\dfrac{6}{7} \div \dfrac{2}{7}$

$\overbrace{}^{\frac{2}{7}}$

$= \dfrac{6}{7} \times \dfrac{7}{2}$

$= \underline{\hphantom{xxxxx}}$

$= \underline{\hphantom{xxxxx}}$

21. $\dfrac{3}{8} \div \dfrac{3}{16}$

$= \underline{\hphantom{xxxx}} \times \underline{\hphantom{xxxx}}$

$= \underline{\hphantom{xxxx}}$

$= \underline{\hphantom{xxxx}}$
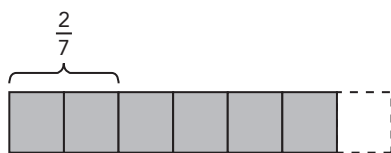
22. $\dfrac{1}{3} \div \dfrac{2}{3}$

Solve. Show your work.

Example

A rod is $\dfrac{5}{9}$ meter long. William cuts the rod into shorter pieces, each $\dfrac{1}{9}$ meter long.

Into how many pieces has William cut the rod?
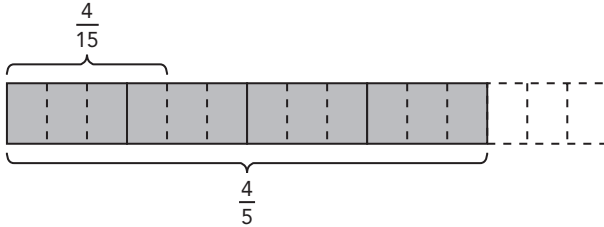
$\overbrace{}^{\frac{1}{9}}$

Number of one-ninths in five-ninths $= \dfrac{5}{9} \div \dfrac{1}{9}$

$= \dfrac{5}{9} \times \dfrac{9}{1}$

$= \dfrac{45}{9}$

$= 5$

William cuts the rod into _____5_____ pieces.

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23. A rectangle has an area of $\frac{4}{5}$ square meter. The width of the rectangle is $\frac{4}{15}$ meter. What is its length?

Number of four-fifteenths in four-fifths = _____ ÷ _____

= _____ × _____

= _____

= _____

The length of the rectangle is _____ meters.

24. Ben has $\frac{5}{16}$ of a pizza left. He cuts it into equal pieces, each $\frac{5}{48}$ of the whole pizza. Into how many pieces has Ben cut the pizza?
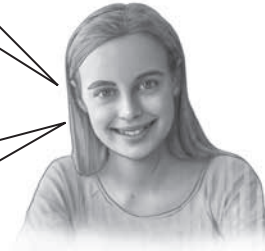
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Find each quotient. Write your answer in simplest form.

Example

$\dfrac{3}{8} \div \dfrac{5}{2}$

$= \dfrac{\dfrac{3}{8}}{} \times \dfrac{\dfrac{2}{5}}{}$

$= \dfrac{\dfrac{3}{4}}{} \times \dfrac{\dfrac{1}{5}}{}$

$= \dfrac{\dfrac{3}{20}}{}$

Dividing by $\dfrac{5}{2}$ is the same as multiplying by $\dfrac{2}{5}$.

Divide a numerator and a denominator by the common factor, 2.

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25. $\dfrac{5}{16} \div \dfrac{7}{4}$

$= \underline{} \times \underline{}$ Rewrite as a multiplication expression.

$= \underline{} \times \underline{}$ Divide a numerator and a denominator by their common factor.

$= \underline{}$

26. $\dfrac{9}{11} \div \dfrac{6}{5}$ **27.** $\dfrac{6}{10} \div \dfrac{3}{2}$

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Find each quotient. Write your answer in simplest form.

┌─── *Example* ───┐

$\dfrac{3}{4} \div 3\dfrac{1}{2}$

$= \dfrac{\frac{3}{4}}{} \div \dfrac{\frac{7}{2}}{}$ Write $3\dfrac{1}{2}$ as an improper fraction.

$= \dfrac{\frac{3}{4}}{} \times \dfrac{\frac{2}{7}}{}$ Rewrite as a multiplication expression.

$= \dfrac{\frac{3}{2}}{} \times \dfrac{\frac{1}{7}}{}$ Divide a numerator and a denominator by the common factor, 2.

$= \dfrac{\frac{3}{14}}{}$

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28. $\dfrac{2}{5} \div 1\dfrac{2}{5}$

$= \underline{\hspace{1.5cm}} \div \underline{\hspace{1.5cm}}$ Write $1\dfrac{2}{5}$ as an improper fraction.

$= \underline{\hspace{1.5cm}} \times \underline{\hspace{1.5cm}}$ Rewrite as a multiplication expression.

$= \underline{\hspace{1.5cm}} \times \underline{\hspace{1.5cm}}$ Divide a numerator and a denominator by their commmon factor.

$= \underline{\hspace{1.5cm}}$

29. $\dfrac{6}{7} \div 1\dfrac{4}{7}$ **30.** $\dfrac{5}{8} \div 3\dfrac{3}{4}$

Find each quotient. Write your answer in simplest form.

Example

$1\frac{5}{6} \div 2\frac{1}{2}$

$= \underline{\quad\frac{11}{6}\quad} \div \underline{\quad\frac{5}{2}\quad}$ Express both mixed numbers as improper fractions.

$= \underline{\quad\frac{11}{6}\quad} \times \underline{\quad\frac{2}{5}\quad}$ Rewrite as a multiplication expression.

$= \underline{\quad\frac{11}{6}\quad} \times \underline{\quad\frac{1}{5}\quad}$ Divide a numerator and a denominator by the common factor, 2.

$= \underline{\quad\frac{11}{15}\quad}$

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31. $3\frac{2}{9} \div 5\frac{1}{3}$

$= \underline{\quad\quad\quad} \div \underline{\quad\quad\quad}$ Express both mixed numbers as improper fractions.

$= \underline{\quad\quad\quad} \times \underline{\quad\quad\quad}$ Rewrite as a multiplication expression.

$= \underline{\quad\quad\quad} \times \underline{\quad\quad\quad}$ Divide a numerator and a denominator by their commmon factor.

$= \underline{\quad\quad\quad}$

32. $1\frac{5}{8} \div 2\frac{3}{4}$ **33.** $4\frac{1}{2} \div 5\frac{1}{6}$