Name _____ Date _____

Multiplying and Dividing Fractions

To multiply two fractions, multiply the numerators and multiply the denominators.

Example 1   Find $\dfrac{2}{5} \cdot \dfrac{3}{8}$.

$\dfrac{2}{5} \cdot \dfrac{3}{8} = \dfrac{2 \cdot 3}{5 \cdot 8}$ Multiply the numerators.
            Multiply the denominators.

$= \dfrac{\overset{1}{\cancel{2}} \cdot 3}{8 \cdot \underset{4}{\cancel{8}}}$ Divide out common factors.

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

Example 2   Find $5\dfrac{1}{2} \cdot \dfrac{3}{4}$.

$5\dfrac{1}{2} \cdot \dfrac{3}{4} = \dfrac{11}{2} \cdot \dfrac{3}{4}$ Rewrite $5\dfrac{1}{2}$ as $\dfrac{11}{2}$.

$= \dfrac{11 \cdot 3}{2 \cdot 4}$ Multiply the numerators.
          Multiply the denominators.

$= \dfrac{33}{8}$, or $4\dfrac{1}{8}$ Simplify.

Two numbers whose product is 1 are **reciprocals**. To write the reciprocal of a number, write the number as a fraction. Then invert the fraction. Every number except 0 has a reciprocal.

To divide a number by a fraction, multiply the number by the reciprocal of the fraction.

Example 3   Find $\dfrac{3}{7} \div \dfrac{5}{6}$.

$\dfrac{3}{7} \div \dfrac{5}{6} = \dfrac{3}{7} \cdot \dfrac{6}{5}$ Multiply by the reciprocal of $\dfrac{5}{6}$, which is $\dfrac{6}{5}$.

$= \dfrac{3 \cdot 6}{7 \cdot 5}$ Multiply.

$= \dfrac{18}{35}$ Simplify.

Example 4   Find $8 \div 2\dfrac{1}{3}$.

$8 \div 2\dfrac{1}{3} = 8 \div \dfrac{7}{3}$ Rewrite $2\dfrac{1}{3}$ as $\dfrac{7}{3}$.

$= 8 \cdot \dfrac{3}{7}$ Multiply by the reciprocal of $\dfrac{7}{3}$, which is $\dfrac{3}{7}$.

$= \dfrac{8 \cdot 3}{7}$ Multiply.

$= \dfrac{24}{7}$, or $3\dfrac{3}{7}$ Simplify.

Practice

Check your answers at BigIdeasMath.com.

Write the reciprocal of the number.

1. $\dfrac{3}{8}$ **2.** 7 **3.** -12 **4.** $-\dfrac{6}{5}$

Evaluate.

5. $\dfrac{3}{4} \cdot \dfrac{1}{6}$ **6.** $\dfrac{3}{10} \cdot \dfrac{2}{3}$ **7.** $\dfrac{4}{9} \cdot \dfrac{2}{9}$ **8.** $\dfrac{5}{8} \cdot \dfrac{7}{12}$

9. $4 \cdot \dfrac{3}{16}$ **10.** $3\dfrac{1}{2} \cdot \dfrac{6}{7}$ **11.** $1\dfrac{7}{20} \cdot 2\dfrac{4}{5}$ **12.** $\dfrac{1}{10} \cdot 10$

13. $\dfrac{1}{6} \div \dfrac{1}{2}$ **14.** $\dfrac{7}{8} \div \dfrac{7}{8}$ **15.** $\dfrac{9}{10} \div \dfrac{3}{5}$ **16.** $\dfrac{3}{4} \div \dfrac{5}{8}$

17. $18 \div \dfrac{2}{3}$ **18.** $7\dfrac{1}{2} \div 2\dfrac{1}{10}$ **19.** $6\dfrac{3}{7} \div 3$ **20.** $1\dfrac{3}{25} \div \dfrac{1}{5}$

21. **AREA** Find the area of a rectangular court that is $21\dfrac{3}{5}$ meters long and $13\dfrac{3}{4}$ meters wide.

22. **CARPENTRY** How many $1\dfrac{1}{4}$-foot pieces can you cut from a piece of wood that is 20 feet long?