Name _____ Date _____

Multiplying and Dividing Fractions

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

Multiplying Fractions

$\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$, where $b, d \neq 0$

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

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

$= \frac{1}{\cancel{2}} \cdot \frac{2 \cdot 3}{8 \cdot \cancel{8}}{}_{4}$ Divide out common factors.

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

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

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

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

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

Dividing Fractions

$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{a \cdot d}{b \cdot c}$, where $b, c, d \neq 0$

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

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

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

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

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

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

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

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

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

Practice

Check your answers at BigIdeasMath.com.

Write the reciprocal of the number.

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

Evaluate.

5. $\frac{3}{4} \cdot \frac{1}{6}$ $\frac{1}{8}$
6. $\frac{3}{10} \cdot \frac{2}{3}$ $\frac{1}{5}$
7. $\frac{4}{9} \cdot \frac{2}{9}$ $\frac{8}{81}$
8. $\frac{5}{8} \cdot \frac{7}{12}$ $\frac{35}{96}$
9. $4 \cdot \frac{3}{16}$ $\frac{3}{4}$
10. $3\frac{1}{2} \cdot \frac{6}{7}$ 3
11. $1\frac{7}{20} \cdot 2\frac{4}{5}$ $\frac{189}{50}$, or $3\frac{39}{50}$
12. $\frac{1}{10} \cdot 10$ 1
13. $\frac{1}{6} \div \frac{1}{2}$ $\frac{1}{3}$
14. $\frac{7}{8} \div \frac{7}{8}$ 1
15. $\frac{9}{10} \div \frac{3}{5}$ $\frac{3}{2}$, or $1\frac{1}{2}$
16. $\frac{3}{4} \div \frac{5}{8}$ $\frac{6}{5}$, or $1\frac{1}{5}$
17. $18 \div \frac{2}{3}$ 27
18. $7\frac{1}{2} \div 2\frac{1}{10}$ $\frac{25}{7}$, or $3\frac{4}{7}$
19. $6\frac{3}{7} \div 3$ $\frac{15}{7}$, or $2\frac{1}{7}$
20. $1\frac{3}{25} \div \frac{1}{5}$ $\frac{28}{5}$, or $5\frac{3}{5}$

21. **AREA** Find the area of a rectangular court that is $21\frac{3}{5}$ meters long and $13\frac{3}{4}$ meters wide. 297 m^2

22. **CARPENTRY** How many $1\frac{1}{4}$-foot pieces can you cut from a piece of wood that is 20 feet long? 16