Algebra 2-3: Multiplying Algebraic Fractions

Warm-Up

Determine whether or not the following are reciprocals. **Show** why or why not.

1. $1\frac{2}{5}$ & $\frac{5}{7}$ **yes!**

$\frac{7}{5}$

$\frac{7}{5} \cdot \frac{5}{7} = \frac{35}{35} = 1$

2. .3 & $\frac{10}{3}$ **yes**

$\frac{3}{10} \cdot \frac{10}{3} = \frac{30}{30} = 1$

Give the reciprocal.

3. $\frac{-1}{10} \rightarrow \frac{10}{-1}$

4. .25

$\frac{25}{100} = \frac{1}{4} \rightarrow \frac{4}{1}$

5. $\frac{x}{-5} \rightarrow \frac{-5}{x}$

6. $\frac{m}{n} \rightarrow \frac{n}{m}$

Vocabulary	Definition	Example
Multiply Fractions	1) Change Mixed number to improper 2) Multiply across 3) Reduce it	Ex] $\frac{2}{3} \cdot \frac{3}{10} = \frac{6 \div 6}{30 \div 6} = \boxed{\frac{1}{5}}$

$1\frac{3}{7} = \frac{10}{7}$

Example Problems

Multiply and simplify if possible.

1. $\dfrac{1}{2} \cdot \dfrac{2}{5}$

$$\dfrac{2 \div 2}{10 \div 2} = \boxed{\dfrac{1}{5}}$$

or

$$\dfrac{1}{\cancel{2}} \cdot \dfrac{\cancel{2}^{1}}{5} = \boxed{\dfrac{1}{5}}$$

2. $\dfrac{2}{3} \cdot \dfrac{x}{8}$

$$\dfrac{2x \div 2}{24 \div 2} = \dfrac{1x}{12}$$

or

$$\dfrac{2}{3} \cdot \dfrac{x}{\cancel{8}_{4}} = \boxed{\dfrac{x}{12}}$$

3. $\dfrac{2x}{3} \cdot \dfrac{6}{x}$

$$\dfrac{12x}{3x} = \dfrac{4}{1} = \boxed{4}$$

or

$$\dfrac{2\cancel{x}}{3} \cdot \dfrac{6}{\cancel{x}} = \dfrac{4}{1} = \boxed{4}$$

Simplify.

4. $\dfrac{5t}{3tb}$ $\dfrac{5}{3b}$

$$\dfrac{5\cancel{t}}{3\cancel{t}b} = \dfrac{5}{3b}$$

5. $\dfrac{24a^2}{8}$ $3a^2$

$$\dfrac{\overset{3}{\cancel{24}}a^2}{\underset{1}{\cancel{8}}} = \dfrac{3a^2}{1}$$

6. $\dfrac{5000x}{2000xy}$ $\dfrac{5}{2y}$

$$\dfrac{\cancel{5000}x}{\cancel{2000}xy} = \dfrac{5}{2y}$$

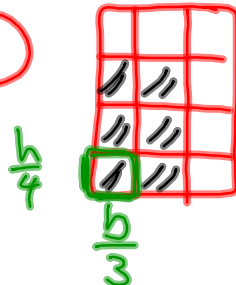7. The largest rectangle has a length, x and a width y. All small rectangles are the same size.

$A = \ell \cdot w$
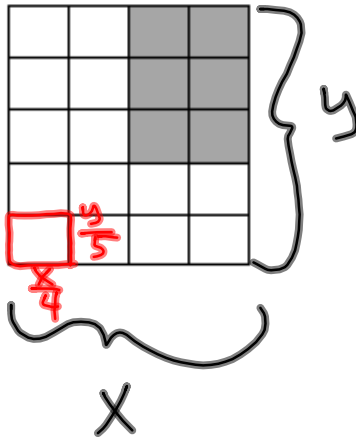
$\frac{x}{4} \cdot \frac{y}{5} = \boxed{\frac{xy}{20}}$

a. Find the area of each small rectangle. _____

b. Find the area of the shaded region in terms of x and y.

$\frac{3xy}{10}$

y

$\frac{y}{5}$

$\frac{x}{4}$

x

Area of 1 small

$\frac{xy}{20} \cdot \frac{6}{1} = \frac{\overset{\div 2}{6xy}}{\underset{\div 2}{20}} = \boxed{\frac{3xy}{10}}$

$\frac{x}{4} = \frac{1}{4}x$

③

$\frac{b}{4}$

$\frac{b}{3}$

b

h

$A = b \cdot h$

$\frac{h}{4} \cdot \frac{b}{3} = \frac{hb}{12} \cdot \frac{6}{1}$

$= \frac{6hb}{12} = \frac{hb}{2}$

a) $\frac{bh}{2}$ or $\frac{1}{2}bh$

b)