

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

## Fraction Review

A *fraction* is a ratio of two integers. The top term is referred to as the *numerator*, and the bottom as the *denominator*, so the fraction  $\frac{3}{4}$  has a numerator of 3 and a denominator of 4.

### Multiplication

To multiply fractions, multiply the numerators and multiply the denominators. After multiplying, be sure to simplify if possible. When multiplying by an integer, simply place it over 1 and multiply as before.

rule: $\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$
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$$\text{ex: } \frac{3}{2} \cdot \frac{3}{5} = \frac{9}{10}$$

$$\text{ex: } \frac{2}{5} \cdot \frac{9}{8} = \frac{18}{40} = \frac{9 \cdot 2}{20 \cdot 2} = \frac{9}{20}$$

$$\text{ex: } 3 \cdot \frac{4}{5} = \frac{3}{1} \cdot \frac{4}{5} = \frac{12}{5}$$

### Division

To divide fractions, just multiply by the *reciprocal*. (The *reciprocal* of a fraction  $\frac{a}{b}$  is  $\frac{b}{a}$ . The reciprocal of an integer  $a$  is  $\frac{1}{a}$ .)

rule: $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c}$
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$$\text{ex: } \frac{3}{2} \div \frac{3}{5} = \frac{3}{2} \cdot \frac{5}{3} = \frac{15}{6} = \frac{3 \cdot 5}{3 \cdot 2} = \frac{5}{2}$$

$$\text{ex: } \frac{3}{4} \div 2 = \frac{3}{4} \cdot \frac{1}{2} = \frac{3}{8}$$

$$\text{ex: } \frac{\frac{6}{7}}{\frac{2}{3}} = \frac{6}{7} \cdot \frac{3}{2} = \frac{18}{14} = \frac{9 \cdot 2}{7 \cdot 2} = \frac{9}{7}$$

### Addition and Subtraction

In order to add or subtract fractions, the fractions must first have *common denominators*. (Fractions have *common denominators* if they have the same denominator.) If two fractions have common denominators, they can be added by adding their numerators while keeping the denominator the same.

rule: $\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$	$\frac{a}{c} - \frac{b}{c} = \frac{a-b}{c}$
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$$\text{ex: } \frac{2}{5} + \frac{4}{5} = \frac{6}{5}$$

$$\text{ex: } \frac{7}{6} - \frac{17}{6} = \frac{-10}{6} = -\frac{5 \cdot 2}{3 \cdot 2} = -\frac{5}{3}$$

$$\text{ex: } \frac{3}{4} + \frac{5}{6} = \frac{\boxed{3} \cdot \boxed{3}}{\boxed{4} \cdot \boxed{3}} + \frac{\boxed{5} \cdot \boxed{2}}{\boxed{6} \cdot \boxed{2}} = \frac{\boxed{9}}{\boxed{12}} + \frac{\boxed{10}}{\boxed{12}} = \frac{19}{12}$$

$$\text{ex: } \frac{3}{5} - \frac{4}{15} = \frac{\boxed{3} \cdot \boxed{3}}{\boxed{5} \cdot \boxed{3}} - \frac{\boxed{4} \cdot \boxed{1}}{\boxed{15} \cdot \boxed{1}} = \frac{\boxed{9}}{\boxed{15}} - \frac{\boxed{4}}{\boxed{15}} = \frac{5}{15} = \frac{5}{5 \cdot 3} = \frac{1}{3}$$

Practice Problems:

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

7.  $\frac{\frac{1}{2}}{8}$

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

8.  $\frac{1}{3} \div \frac{8}{9}$

3.  $\frac{9}{5} \cdot \frac{10}{21}$

9.  $\frac{3}{4} + \frac{1}{2}$

4.  $\frac{3}{4} \div \frac{2}{5}$

10.  $4 + \frac{3}{5}$

5.  $6 \div \frac{1}{3}$

11.  $\frac{1}{5} - \frac{8}{3}$

6.  $\frac{2}{5} \div \frac{5}{8}$

12.  $\frac{21}{4} - 3 + \frac{5}{6}$

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Solutions: 1.  $\frac{3}{10}$  2.  $\frac{8}{15}$  3.  $\frac{6}{7}$  4.  $\frac{15}{8}$  5. 18 6.  $\frac{16}{25}$  7.  $\frac{1}{16}$  8.  $\frac{3}{8}$  9.  $\frac{5}{4}$  10.  $\frac{23}{5}$  11.  $-\frac{37}{15}$  12.  $\frac{37}{12}$