Math 9 – Unit 1: Real Numbers Name: Mr. Hagen

Lesson #2: Multiplying and Dividing Fractions Date: Nov. 13, 2017

Much of Mathematics is learning the rules. These next few lessons have rules. Follow them and you will succeed.

Multiplying Fractions:

The process to multiplying fractions is straight-forward:

1. Multiply the numerators together
2. Multiply the denominators together
3. Reduce to lowest terms.

Examples:

a) $\frac{2}{3}\times\frac{4}{5}$

$= \frac{8}{15}$

b) $\frac{-8}{5}\times\frac{15}{4}$

$= \frac{-120}{20}$ ÷20

$= \frac{-6}{1} = -6$

c) $\frac{-4}{3}\times\frac{2}{7}\times\frac{-5}{3}$

$= \frac{40}{63}$

Typically, the hardest part is reducing. There is another way to approach multiplying fractions. First reduce ANY numerator with ANY denominator (this is sometimes called cross reducing). Let's look at example two again, but this time reduce first.

$\frac{-8}{5}\times\frac{15}{4}$

$= \frac{-6}{1}$

$= -6$

Another! $\frac{6}{7}\times\frac{21}{12}$

$= \frac{3}{2}$

An big one! $\frac{7}{5}\times\frac{8}{3}\times\frac{9}{14}\times\frac{25}{4}$

$= \frac{30}{2} = 15$

NOTE: You may reduce first or last, it does not matter, but you must always reduce

Dividing Fractions:

The process to dividing has one extra step done BEFORE the multiplying steps. We need to change the division to a multiplication, so instead of dividing by a fraction, we multiply by the reciprocal. This means to flip the fraction to the right of the division sign. Once this is done, you now have a multiplication question and can follow the steps from above.

Examples:

a) $\frac{4}{5} \div \frac{3}{7}$

$= \frac{4}{5} \times \frac{7}{3}$

$= \frac{28}{15}$

b) $\frac{9}{4} \div \frac{8}{3}$ (note: you may be tempted to reduce, but not yet!)

$= \frac{9}{4} \times \frac{3}{8}$

$= \frac{27}{32}$

c) $\frac{6}{11} \div \frac{-3}{2}$

$= \frac{6}{11} \times \frac{-2}{3}$

$= \frac{-4}{11}$

d) $\frac{5}{9} \div \frac{6}{7} \div \frac{12}{14}$

$= \frac{5}{9} \times \frac{7}{6} \times \frac{14}{12}$

$= \frac{490 \div 2}{648 \div 2}$

$= \frac{245}{324}$

Application: A chemist is measuring the acid needed for an experiment. If she has $2\frac{1}{5}$ cylinders (or $\frac{11}{5}$) and she needs $\frac{1}{10}$ of a cylinder for each experiment, how many experiments can she do?

has needs

$\frac{11}{5} \div \frac{1}{10}$

$= \frac{11}{5} \times \frac{10}{1}$

$= \frac{22}{1}$

∴ She can do 22 experiments with the acid she has.