Name: _____ Date: _____

FRACTIONS AND ALGEBRA
N-GEN MATH® 7

Our ability to work with fractions and some basic algebra will be key to our success in this unit. Let's review some basic **one-step equations**.

***Exercise* #1:** Solve each of the following basic equations. Check your answers.

(a) $3x = 15$ (b) $-8c = 24$ (c) $4y = 48$

(d) $\frac{x}{7} = 4$ (e) $\frac{y}{10} = \frac{3}{2}$ (f) $\frac{d}{12} = \frac{3}{4}$

In *Exercise* #1 (e) and (f) we were solving for values of variables to make two fractions equal. Let's explore the idea of equal fractions more.

***Exercise* #2:** Consider the two equal fractions $\frac{3}{4}$ and $\frac{6}{8}$.

(a) Convert each of the fractions to decimal form using long division to show they are equal.

$4\overline{)\,3.0}$ $8\overline{)\,6.0}$

(b) Find the cross products of the circled numbers below. What's true about them?

$$\frac{3}{4} = \frac{6}{8}$$

COMPARING FRACTIONS WITH CROSS PRODUCTS

If two fractions $\frac{a}{b}$ and $\frac{c}{d}$ are equal then their cross products are equal, i.e. $a \cdot d = b \cdot c$.

***Exercise* #3:** Determine if each of the following statements of equality are true or false by comparing cross products.

(a) $\frac{4}{3}=\frac{12}{9}$ (b) $\frac{5}{7}=\frac{10}{12}$ (c) $\frac{4}{6}=\frac{6}{9}$

In this unit we will be solving many equations where a fraction is equal to another fraction. In some cases, like *Exercise* #1 (e) and (f), we can simply multiply both sides of the equation by a number to solve. But, we can take advantage of cross products being equal using a method known as **cross multiplying**.

***Exercise* #4:** Use **cross multiplication** to rewrite each of the following equations so they do not contain any fractions. Then, solve the equations.

(a) $\frac{x}{4}=\frac{9}{12}$ (b) $\frac{5}{c}=\frac{20}{8}$ (c) $\frac{y}{5}=\frac{14}{10}$

You may have noticed that since each of the answers in *Exercise* #4 were integers, their solutions could have been determined by thinking about **equivalent fractions**. But this becomes much more difficult if the answers are fractions themselves.

***Exercise* #5:** Consider the equation $\frac{6}{x}=\frac{15}{2}$.

(a) Solve this equation using the method of cross multiplication to remove the fractions.

(b) Check your solution to (a) by substituting it into the original equation.

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FRACTIONS AND ALGEBRA
N-GEN MATH® 7 HOMEWORK

FLUENCY

1. Test to see whether each equality statement is true by using the cross products test. Show the products that lead to your TRUE/FALSE answer.

   (a) $\frac{12}{20} = \frac{3}{5}$ (b) $\frac{16}{6} = \frac{24}{9}$ (c) $\frac{10}{4} = \frac{15}{5}$

2. Given the two fractions $\frac{3}{8}$ and $\frac{9}{24}$ do the following:

   (a) Show that the fractions are equal using the cross products method.

   (b) Convert each fraction into a decimal by doing the long division below:

   $8\overline{)3.0}$ $24\overline{)9.0}$

   What do you notice?

3. Solve each of the following one-step equations without cross multiplying.

   (a) $8x = 56$ (b) $\frac{c}{7} = 5$ (c) $\frac{y}{16} = \frac{9}{4}$

4. Solve each equation by cross multiplying. In each case your answer will be an integer.

(a) $\frac{x}{14}=\frac{3}{6}$ (b) $\frac{16}{y}=\frac{8}{5}$ (c) $\frac{15}{10}=\frac{c}{4}$

5. Solve each equation by cross multiplying. Express your answers as fractions in simplest form. Write any improper fractions as mixed numbers.

(a) $\frac{x}{5}=\frac{2}{12}$ (b) $\frac{8}{t}=\frac{6}{5}$ (c) $\frac{13}{7}=\frac{y}{4}$

USING YOUR MATH

6. In a coin jar the ratio of dimes to pennies is 3 to 8. The number of pennies in the jar is 32. Answer the following questions based on this ratio.

(a) Why can't the number of dimes be 10?

(b) Solve the following equation to find out the number of dimes, d:

$$\frac{d}{32}=\frac{3}{8}$$