Name: _____ Date: Sept 3 Hour: 7th

Unit 1 Day 11: Equations with Rational (Fractional) Coefficients

Focus Question: How can I get rid of rational coefficients?

A. Multiplying Fractions

1. When you're multiplying fractions you, __multiply across__

2. Multiply the following:

a) $\dfrac{2}{3} \times \dfrac{3}{4} = \dfrac{6}{12}$ or $\boxed{\dfrac{1}{2}}$

b) $\dfrac{7}{9} \times \dfrac{2}{3} = \boxed{\dfrac{14}{27}}$

c) $\dfrac{8}{9} \times \dfrac{1}{4} = \dfrac{8 \div 4}{36 \div 4} = \boxed{\dfrac{2}{9}}$

d) $\dfrac{4}{10} \times \dfrac{1}{2} = \boxed{\dfrac{1}{5}}$

e) $\dfrac{1}{5} \times 8 = \boxed{\dfrac{8}{5}}$

f) $\dfrac{2}{10} \times 5 = \dfrac{10}{10}$ or $\boxed{1}$

g) $3 \times \dfrac{7}{8} = \boxed{\dfrac{21}{8}}$

B. Deciding what to multiply by

1. **When you are solving an equation with rational coefficients, you have to decide what number to multiply with to eliminate the fraction.** When there is only 1 fraction, the choice is pretty easy. For each number below, decide what whole number you would multiply by in order to eliminate the fraction.
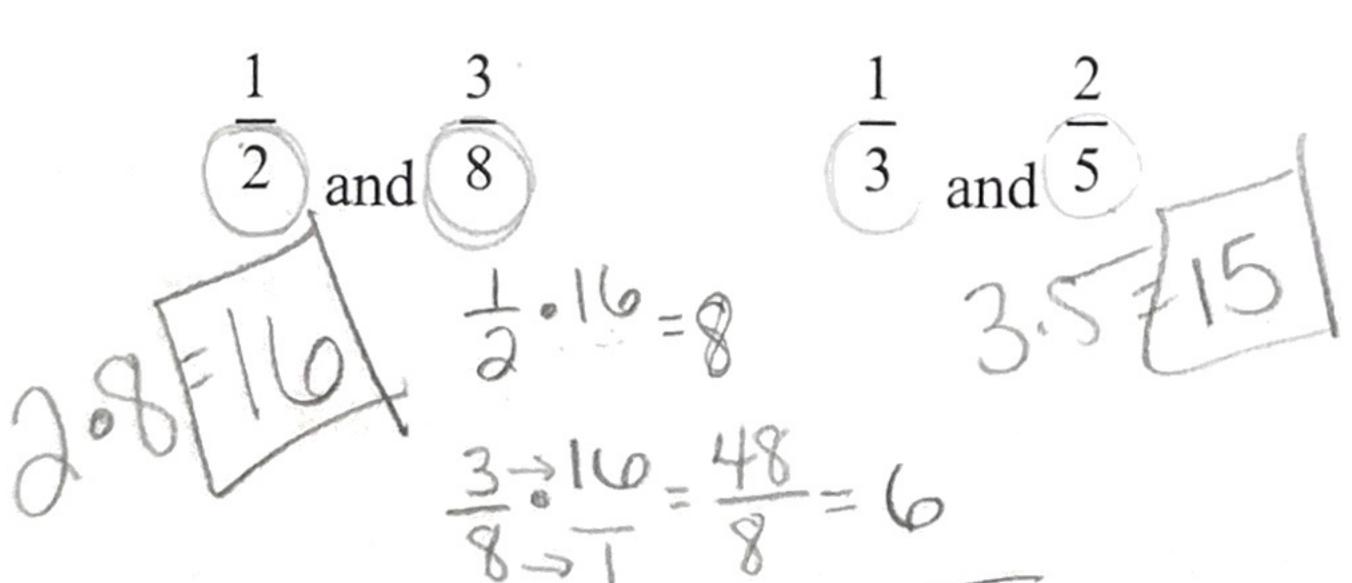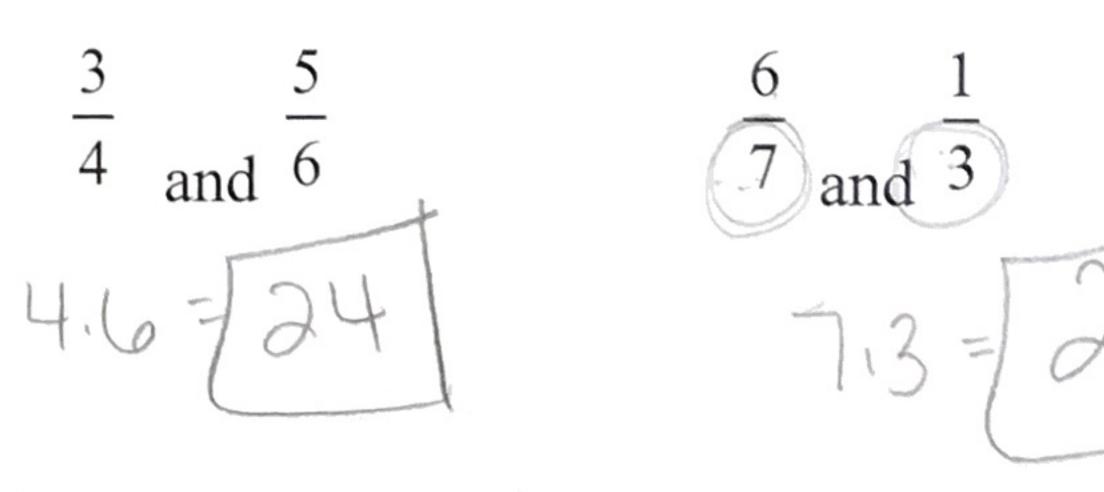
$\dfrac{1}{4} \cdot \mathbf{4}$ $\dfrac{2}{3} \cdot \mathbf{3}$ $\dfrac{-5}{7} \cdot \mathbf{7}$ $\dfrac{-3}{5} \cdot \mathbf{5}$

$7. \dfrac{x}{7} = 2 \cdot 7$

2. Which part is more important when trying to eliminate fractions? Why?

★ **The denominator bc it is causing the fraction**

3. When there is more than 1 fraction, you must find a number that will get rid of both denominators. This number is called a common multiple. Decide what number to multiply by in order to eliminate both fractions.

$\dfrac{6 \to 21}{7 \to 1} = \dfrac{126}{7} = 18$

$\dfrac{1}{2}$ and $\dfrac{3}{8}$

$2 \cdot 8 = \boxed{16}$ $\dfrac{1}{2} \cdot 16 = 8$

$\dfrac{3 \to 16}{8 \to 1} = \dfrac{48}{8} = 6$

$\dfrac{1}{3}$ and $\dfrac{2}{5}$

$3 \cdot 5 = \boxed{15}$

$\dfrac{3}{4}$ and $\dfrac{5}{6}$

$4 \cdot 6 = \boxed{24}$

$\dfrac{6}{7}$ and $\dfrac{1}{3}$

$7 \cdot 3 = \boxed{21}$

4. True or false: $2 + 4 = 6$ __True__

If you multiply only the 2 by a number (let's say 3), is $2(3) + 4 = 6$ __False__

$\dfrac{6 + 4}{10} \neq 6$

If you multiply only the 2 and the 4 by a number (let's say 3), is $2(3) + 4(3) = 6$ __False__

$6 + 12$

18

If you multiply ALL terms in the problem by a numbers (let's say 3), is 2(3) + 4(3) = 6(3) __True__

6 + 12 = 18

So if you decide to multiply one term of an equation by a number, you must multiply __ALL__ terms.

A. Solve each of the following equations with rational coefficients

Together:

1) $\frac{1}{3}x + \frac{3}{4} = 5$

2) $\frac{6}{4}x + \frac{15}{4} = \frac{5}{8}$

Problem 1 work (left margin):

?
$\stackrel{\text{Q}}{\curlywedge}$

3·4 = 12

$12 \cdot \frac{1}{3} = \frac{12}{3}$

$\frac{12}{3} = 4$

or 4

$12 \cdot \frac{3}{4} = \frac{36}{4}$

or 9

Problem 1 main:

$$\frac{12 \cdot 1 \, x + 12 \cdot 3}{3} \quad \frac{}{4} = 12 \cdot 5$$

$4X + 9 = 60$

$\quad -9 \quad -9$

$\frac{4X}{4} = \frac{51}{4}$

$\boxed{X = 12.75}$ or $\boxed{\frac{51}{4}}$

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Problem 2 work (right margin):

?
$\stackrel{\text{Q}}{\curlywedge}$ 4·8 = 32

$\frac{32 \cdot 6}{4} = 48$

$\frac{32 \cdot 15}{4} = 120$

$\frac{32 \cdot 5}{8} = 20$

Problem 2 main:

$$\frac{32 \cdot 6X}{4} + \frac{32 \cdot 15}{4} = \frac{32 \cdot 5}{8}$$

$48X + 120 = 20$

$\quad -120 \quad -120$

$\frac{48X}{48} = \frac{-100}{48} \div 4$

$\boxed{X = -2.08\overline{3}}$ or $\boxed{\frac{-25}{12}}$

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With a Partner: (Either Rally Coach or Sage and Scribe…your choice)

A) $-\frac{6}{5}a + \frac{1}{2} = 7$

B) $\frac{1}{2}m - \frac{2}{7} = -3$

Problem A work (left margin):

?
$\stackrel{\text{Q}}{\curlywedge}$

5·2 = 10

$\frac{10 \cdot -6}{5}$

$\frac{-60}{5} = -12$

Problem A main:

$$\frac{10 \cdot -6a}{5} + \frac{10 \cdot 1}{2} = 10 \cdot 7$$

$-12a + 5 = 70$

$\quad -5 \quad -5$

$\frac{-12a}{-12} = \frac{65}{-12}$

$\boxed{a = -5.41\overline{6}}$ or $\boxed{\frac{65}{-12}}$

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