AChor/MFM2P **Name: _____**

Date: _____

Worksheet 5-5: Solving Equations with Fractions

Steps for Solving Complex Equations

1. **Simplify the equation**
   - **Eliminate fractions by multiplying with the lowest common denominator**
   - **Expand brackets by Distributive Property**
   - **Collect like terms by adding/ subtracting**
2. **Isolate the variable term by adding/ subtracting**
3. **Remove the coefficient of the variable by dividing**

Solve. **Clear Fractions by Multiplying with the Lowest Common Denominator (LCD).

1. $\frac{a}{5}-\frac{a}{6}=1$	**2.** $\frac{2x}{3}+\frac{x}{5}=1$
3. $\frac{x}{3}-\frac{3x}{2}=\frac{1}{6}-x$	**4.** $\frac{x}{2}+1=\frac{2x}{3}-3$
5. $\frac{x-2}{4}-\frac{x-7}{3}=1$	**6.** $\frac{x+1}{3}=\frac{x-1}{5}$

Answers: **1.** 30; **2.** $\frac{15}{13}$; **3.** –1; **4.** 24; **5.** 10; **6.** –4

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Equations Involving Fractions

To solve an equation involving fractions, it is often useful to transform the equation to one with whole numbers only. Multiply both sides by the lowest common denominator (LCD).

EXAMPLE 1:

$$\frac{2}{3}a + 1 = \frac{1}{2}$$

$6\left(\frac{2}{3}a\right) + 6(1) = 6\left(\frac{1}{2}\right)$ The LCD is 6.

$$4a + 6 = 3$$
$$4a = -3$$
$$a = -\frac{3}{4}$$

The solution is $-\frac{3}{4}$

EXAMPLE 2:

$$5 - \frac{k}{4} - \frac{3}{2} = \frac{k}{3} + 4 - \frac{k}{2}$$

$12\left(5 - \frac{k}{4} - \frac{3}{2}\right) = 12\left(\frac{k}{3} + 4 - \frac{k}{2}\right)$ The LCD is 12.

$$60 - 3k - 18 = 4k + 48 - 6k$$
$$-3k + 42 = -2k + 48$$
$$-3k + 2k + 42 = -2k + 2k + 48$$
$$-k + 42 - 42 = 48 - 42$$
$$-k = 6$$
$$k = -6$$

The solution is -6.

2. Solve and check.

a. $\frac{m}{2} + \frac{3m}{4} = 5$ b. $\frac{t}{3} - \frac{t}{6} = 2$ c. $\frac{2x}{3} - 8 = \frac{2x}{5}$

d. $\frac{3p}{4} - 1 = \frac{4p}{5}$ e. $\frac{t}{2} + \frac{t}{4} - \frac{t}{3} = 5$ f. $\frac{2y}{5} + 3 = \frac{y}{4}$

3. Solve and check.

a. $\frac{s}{4} + 1 = \frac{s}{3}$ b. $\frac{2w}{3} - 3 = \frac{w}{4}$ c. $\frac{x}{2} + \frac{x}{3} - \frac{x}{4} = 9$

d. $\frac{3p}{4} = 1 + \frac{p}{2}$ e. $\frac{2n}{3} - \frac{3n}{4} = 2$ f. $\frac{5x}{8} - \frac{x}{4} = 1$

4. Solve and check.

a. $\frac{3m}{5} + \frac{2}{3} = \frac{8}{3}$ b. $\frac{y+8}{10} - 2 = \frac{y-7}{5}$ c. $\frac{x+8}{8} + \frac{x-4}{6} = 5$

d. $\frac{2x+6}{4} + \frac{x+1}{3} = \frac{7}{2}$ e. $\frac{p+3}{3} - \frac{p}{4} = \frac{p-2}{5}$ f. $\frac{2q-1}{6} + \frac{q-1}{4} = \frac{17}{4}$

5. Solve and check.

a. $\frac{3c-5}{4} = \frac{5c-11}{6}$ b. $\frac{5t-3}{4} = \frac{t}{2}$ c. $\frac{3y-1}{5} - 1 = \frac{2y-4}{3}$

d. $\frac{2t}{3} - 3t + 21 = 0$ e. $\frac{m+1}{2} + \frac{m-1}{2} = 5$ f. $\frac{n+1}{2} + \frac{2n+1}{3} = 9$

Solutions

2a) $m = 4$ b) $t = 12$ c) $x = 30$ d) $p = -20$ e) $t = 12$ f) $y = -20$

3a) $s = 12$ b) $w = 7\frac{1}{5}$ c) $x = 15\frac{3}{7}$ d) $p = 4$ e) $n = -24$ f) $x = 2\frac{2}{3}$

4a) $m = 3\frac{1}{3}$ b) $y = 2$ c) $x = 16$ d) $x = 2$ e) $p = 12$ f) $q = 8$

5a) $c = 7$ b) $t = 1$ c) $y = 2$ d) $t = 9$ e) $m = 5$ f) $n = 7$