Section 4.3a – Solving Equations Involving Fractions

MPM1D
Jensen

Part 1: Do It Now

Solve the following equation:

$\frac{x}{4} = 7$

Hint: You can simplify equations involving one fraction by multiplying both sides by the denominator of the fraction.

Part 2: Solve Equations With One Fraction

You can simplify equations involving one fraction by multiplying both sides of the equation by the denominator of the fraction.

1) $6 = \frac{1}{3}(8 + x)$

Don't distribute the fraction; multiply both sides by 3 to get rid of the fraction.

2) $\frac{7(x-5)}{4} = 7$

3) $\frac{1}{6}(2x + 4) = 5$

Part 3: Solve Equations With More Than 1 Fraction

When eliminating more than 1 fraction, find the lowest common denominator of all the fractions and then multiply both sides of the equation by this value to eliminate the fractions.

4) $\frac{1}{3}(2x-5)=\frac{3}{4}(x-2)$ Find the LCD:

5) $\frac{1}{5}(7x-3)=\frac{1}{10}$ Find the LCD:

6) $-\frac{3}{4}(d+3)=\frac{4}{5}(3d-2)$ Find the LCD:

7a) $\frac{k+2}{3}=\frac{k-4}{5}$ Find the LCD:

Part 4: Cross-Multiplication

Method:

1) Multiply the numerator of the left fraction with the denominator of the right fraction. Put the product on either side of the equation.

2) Multiply the numerator of the right fraction with the denominator of the left fraction. Put the product on the other side of the equation.

3) Solve for the variable

Note: Cross-multiplication can only be used if you have two rational expressions equal to each other. If you have more than two expressions, you must clear denominators using the lowest common denominator.

You could have used the method of cross multiplication for #7

Try Using Cross-Multiplication

7b) $\frac{k+2}{3} = \frac{k-4}{5}$

Can you use cross multiplication for this question?.....

$$\frac{k+2}{3} - 7 = \frac{k-4}{5}$$

8) $\frac{5-2x}{3} = \frac{15x-7}{2}$

9) $\frac{1}{4}x + 3 = 2$

Make sure each term on both sides are multiplied by the LCD

10) $\frac{1}{5}m + \frac{2}{3} - 2 = m - \frac{2}{5}$

11) $\frac{3}{2}x + \frac{x-4}{2} = \frac{x+14}{3}$

Before homework, make sure you can solve:

a) $\frac{3}{4}(x+3)=9$

b) $\frac{x-5}{3}=\frac{x+10}{6}$

Remember the steps for solving equations:

1. Eliminate fractions by multiplying all terms by a common denominator
2. Eliminate brackets using the distributive law
3. Collect like terms on each side of the equation
4. Isolate the variable on one side of the equation
5. Solve for the variable.