Review #4

Thursday, February 1, 2024   10:27 AM

Math 9 Review – Part 4
Solving Equations with Rational Coefficients

(fraction)   *(number in front of variable)*

When an algebraic equation contains fractions (rational expressions), we will remove the denominator(s) by multiplying each term by the **lowest common denominator**.

The lowest common denominator (LCD) is the lowest common multiple that a set of fractions share.

1) See if smaller denominators divide into largest denominator.

2) if not, keep multiplying largest denom. until you find a multiple all denom.'s divide into.

Example 1: Solve the following equations. (Eliminate any denominators first.)

a) LCD = 3

$$3\left(14 = \frac{c}{3}\right)$$

$$3(14) = 3\left(\frac{c}{3}\right)$$

$$42 = \frac{3c}{3}$$

$$\boxed{42 = c}$$

b) LCD = 5

$$5\left(2 - \frac{x}{5} = 3\right)$$

$$5(2) - 5\left(\frac{x}{5}\right) = 5(3)$$

$$10 - x = 15$$
$$-10 \qquad -10$$

$$\frac{(-1)x}{-1} = \frac{5}{-1}$$

$$\boxed{x = -5}$$

c) LCD = 6

$$6\left(\frac{1}{3}a + \frac{5}{1} = \frac{1}{6}a - \frac{6}{1}\right)$$

$$6\left(\frac{1}{3}a\right) + 6(5) = 6\left(\frac{1}{6}a\right) - 6(6)$$

$$\frac{6}{3}a + 30 = \frac{6}{6}a - 36$$

$$2a + 30 = 1a - 36$$
$$-1a \qquad -1a$$

$$a + 30 = -36$$
$$-30 \qquad -30$$

$$\boxed{a = -66}$$

d)

$$10\left(\frac{x}{5} + \frac{1}{2} = \frac{3}{10}\right)$$

$$\frac{10}{1}\left(\frac{x}{5}\right) + \frac{10}{1}\left(\frac{1}{2}\right) = \frac{10}{1}\left(\frac{3}{10}\right)$$

$$\frac{10x}{5} + \frac{10}{2} = \frac{30}{10}$$

$$2x + 5 = 3$$
$$-5 \quad -5$$

$$\frac{(2)x}{2} = \frac{-2}{2}$$

$$\boxed{x = -1}$$

LCD of 5, 2, 10 is 10 because:
→ biggest is 10
→ 5 divides into 10 =
→ 2 divides into 10 =

$$LCD = 21$$

$$21\left(\frac{x+1}{3} - \frac{x-2}{7} = 1 \right) \quad \text{e)}$$

$$\frac{21}{1}\left(\frac{x+1}{3}\right) = \frac{21}{1}\left(\frac{x-2}{7}\right) = 21(1)$$

$$\frac{21x+21}{3} - \frac{21x+42}{7} = 21$$

$$\frac{21x}{3} + \frac{21}{3} - \frac{21x}{7} + \frac{42}{7} = 21$$

$$7x + 7 - 3x + 6 = 21$$

$$4x + 13 = 21$$
$$\quad -13 \quad -13$$

$$\frac{4x}{4} = \frac{8}{4}$$

$$x = 2$$

$$LCD = a$$

$$a\left(\text{g)} \ \frac{48}{a} = 6 \right)$$

$$\frac{a}{1}\left(\frac{48}{a}\right) = a(6)$$

$$\frac{48}{6} = \frac{6a}{6}$$

$$\boxed{8 = a}$$

$$\star \text{ can get rid of denominators before you expand to get rid of the brackets:}$$
$$LCD = 6$$

$$6\left(\frac{1}{2}(p+1) + \frac{1}{3}(2p+1) = 9 \right) \quad \text{f)}$$

$$\frac{6}{1}\left(\frac{1}{2}(p+1)\right) + \frac{6}{1}\left(\frac{1}{3}(2p+1)\right) = 6(9)$$

$$\frac{6}{2}(p+1) + \frac{6}{3}(2p+1) = 54$$

$$3(p+1) + 2(2p+1) = 54$$

$$3p + 3 + 4p + 2 = 54$$

$$7p + 5 = 54$$
$$\quad -5 \quad\quad -5$$

$$\frac{7p}{7} = \frac{49}{7}$$

$$\boxed{p = 7}$$

$$(x+4)\left(\text{h)} \ 2 = \frac{12}{x+4} \right) \quad LCD = x+4$$

$$(x+4)(2) = (x+4)\left(\frac{12}{x+4}\right)$$

$$2x + 8 = 12$$
$$\quad -8 \quad\quad -8$$

$$\frac{2x}{2} = \frac{4}{2}$$

$$\boxed{x = 2}$$

F & PC 10