Week 1 Monday

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D2L Grades and Coursepack

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1.1 Linear Equations

Ex: Solve $\frac{1}{4}(x+2) = \frac{1}{3}(x+3) + 6$

LCM = 4·3 = 12

$$\frac{12}{4}(x+2) = \frac{12}{3}(x+3) + 12 \cdot 6$$

$$3(x+2) = 4(x+3) + 72$$

$$3x + 6 = 4x + 12 + 72$$

$$6 - 12 - 72 = x$$

$$-78 = x$$

$$x = -78$$

Check $x = -78$: LS = −19 RS = −19 ✓

$$\{-78\}$$

Ex: Solve $0.9x - 7.7 = 0.2x$

×10:

$$10(0.9x - 7.7) = 10(0.2x)$$

$$9x - 77 = 2x$$

$$7x = 77$$

$$x = 11$$

$x = 11$

Check: $x = 11$ ✓ $\{11\}$

Ex: Solve $\frac{5}{x-3} + \frac{4}{x-2} = \frac{7}{(x-3)(x-2)}$

LCM $= (x-3)(x-2)$

$(x-3)(x-2)\left[\frac{5}{x-3} + \frac{4}{x-2}\right] = (x-3)(x-2) \cdot \frac{7}{(x-3)(x-2)}$

$\frac{5(x-3)(x-2)}{x-3} + \frac{4(x-3)(x-2)}{x-2} = 7$

$5(x-2) + 4(x-3) = 7$

$5x - 10 + 4x - 12 = 7$

$9x = 7 + 10 + 12$

$9x = 29$

$x = 29/9$

Check: $x = 29/9$ ✓

(No division by zero ✓

No $\sqrt{\text{negative}}$ ✓)

Ex: Solve $\frac{3x}{x+2} + 7 = \frac{-6}{x+2}$

LCM $= x+2$

Multiply by $x+2$:

$3x + 7(x+2) = -6$

$$3x + 7x + 14 = -6$$
$$10x = -20$$
$$x = -2$$

Check $x=-2$: LS = undefined RS = undefined

$x=-2$ is not a solution

Final Answer: No Solution

ASIDE $x=-2$ is called an "extraneous solution"

Ex: Solve for R

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$$

LCM $= RR_1R_2$

$$\frac{RR_1R_2}{R} = \frac{RR_1R_2}{R_1} + \frac{RR_1R_2}{R_2}$$

$$R_1R_2 = RR_2 + RR_1$$

$$R_1R_2 = R(R_2 + R_1)$$

$$\frac{R_1R_2}{R_2+R_1} = R$$

$$R = \frac{R_1R_2}{R_1+R_2}$$

1.2 Quadratic Equations

Solve $ax^2 + bx + c = 0$

4 Methods

I. Factoring

Ex: Solve

a) $x^2 + 7x = 0$

$x(x+7) = 0$

$x = 0$ or $x + 7 = 0$

$x = -7$

$\{0, -7\}$

b) $x^2 + 4x + 4 = 0$

$(x+2)^2 = 0$

$x = -2$

$\{-2\}$

c) $2x^2 - 3 = -5x$

$2x^2 + 5x - 3 = 0$

ac method

Mult to $2(-3) = -6$

Add to 5

$6, -1$

$2x^2 + 6x - x - 3 = 0$

$2x(x+3) - 1(x+3) = 0$

$(2x-1)(x+3) = 0$

$2x - 1 = 0$ or $x + 3 = 0$

$2x = 1$

$x = \frac{1}{2}$

$x = -3$

$\{\frac{1}{2}, -3\}$