Math 9 – Unit 3: Solving Equations

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Lesson #2: Solving with Variables on Both Side

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In many equations that you will see for the rest of your Mathematical career (may it be long and fruitful), the variable will be scattered throughout the equation, even on both sides! The goal is to collect the variables on the same side and move all the constants to the other side.

a) $5x = 4x + 7$

$-4x \quad -4x$

$x = 7$

b) $5y = 9y - 8$

$-9y \quad -9y$

$\frac{-4y}{-4} = \frac{-8}{-4}$

$y = 2$

c) $-30 + 5x = 2x$

$-5x \quad -5x$

$\frac{-30}{-3} = \frac{-3x}{-3}$

$10 = x$

d) $2w = 0.35 - 5w$

$+5w \quad +5w$

$\frac{7w}{7} = \frac{0.35}{7}$

$w = 0.05$

e) $2m + 3m = 8m - 3$

$5m = 8m - 3$

$-8m \quad -8m$

$\frac{-3m}{-3} = \frac{-3}{-3}$

$m = 1$

f) $5p - 3p = 6 - p$

$+p \quad +p$

$\frac{3p}{3} = \frac{6}{3}$

$p = 2$

g) $8y = 5y + y + 14$

$-6y \quad -5y \quad -y$

$\frac{2y}{2} = \frac{14}{2}$

$y = 7$

h) $3n = 10.1 + 9.9 - 2n$

$+2n \quad +2n$

$\frac{5n}{5} = \frac{20}{5}$

$n = 4$

i) $8k-3=4k+17$

$4k-3=17$

$\frac{4k}{4}=\frac{20}{4}$

$k=5$

j) $-10x+14=18-2x$

$-4=8x$

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

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

$-0.5=x$

$-8x=4$

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

$x=-0.5$

k) $2u+10=9-3u+11$

$5u=10$

$\frac{5u}{5}=\frac{10}{5}$

$u=2$

l) $16+3x-9=-3+8x+10$

$7+3x=7+8x$

$-5x=0$

$\frac{-5x}{-5}=\frac{0}{-5}$

$x=0$

m) $-29k-18+11=-36k-10k-177$

$-29k-7=-46k-177$

$17k=-170$

$\frac{17k}{17}=\frac{-170}{17}$

$k=-10$

check:

$-29(-10)-18+11$

$=290-18+11$

$=283$

$-36(-10)-10(-10)-177$

$=360+100-177$

$=460-177$

$=283$

n) $6x-4-2x=4x+8$

$4x-4=4x+8$

$0=12$

?

This is false, meaning there is no solution!!