8.4 Notes - Variables on Both Sides

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★ When we group variables and/or constants on the SAME side of the equation, we use BEDMAS and group.

ex: $\underbrace{4x + x}_{5x} = 30$

$\frac{5x}{5} = \frac{30}{5}$

$x = 6$

★ When we move variables and/or constants OVER THE EQUAL SIGN, we use SAMDEB!

ex: $3x + 4 = 5x$

$-3x \qquad -3x$

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

$2 = x$

OR →

$3x + 4 = 5x$

$-5x \qquad -5x$

$-2x + 4 = 0$

$-4 \qquad -4$

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

$x = 2$

★ When BOTH SIDES have their variable "stuck" inside Brackets, DISTRIBUTE the coefficient, then solve with SAMDEB.

↳ uses BEDMAS since we dont cross the = sign.

↳ Means MULTIPLY coefficient into all parts in Brackets

ex: $5(5x + 3) = 2(3x + 18)$

$25x + 15 = 6x + 36$

$-6x \qquad -6x$

$19x + 15 = 36$

$-15 \qquad -15$

$\frac{19x}{19} = \frac{21}{19}$

$x = 1\frac{2}{19}$

Final answer must be a proper fraction.

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2. $3(2.1x - 1.2) = 4(0.7x + 0.85)$

$6.3x - 3.6 = 2.8x + 3.4$

$-2.8x \qquad -2.8x$

$3.5x - 3.6 = 3.4$

$+3.6 \qquad +3.6$

$\frac{3.5x}{3.5} = \frac{7}{3.5}$

$x = 2$

CHECK: SIDES ARE SEP!

$3(2.1x - 1.2) = 4(0.7x + 0.85)$

$3(2.1(2) - 1.2) \qquad 4(0.7(2) + 0.85)$

$9 \qquad 9$ ✓

LS = RS

3. $2.6m = 10 - 1.4m$

$+1.4m \qquad +1.4m$

$\frac{4m}{4} = \frac{10}{4}$

$m = 2.5$

4. $13.8 - 0.6y = -1.1y$

$+0.6y \qquad +0.6y$

$\frac{13.8}{-0.5} = \frac{-0.5y}{-0.5}$

$-27.6 = y$

5. $\frac{2}{3}(2x - 3) = 4x$ ← SAME AS → $\frac{2(2x-3)}{3} = 4x$ (3)

$\frac{4x}{3} - 2 = 4x$

$-\frac{4}{3}x \qquad -\frac{4}{3}x$

$-2 = \frac{8}{3}x$

$\div\frac{8}{3} \qquad \div\frac{8}{3}$

$-\frac{3}{4} = x$

$\frac{2(2x-3)}{2} = \frac{12x}{2}$

$2x - 3 = 6x$

$-2x \qquad -2x$

$\frac{-3}{4} = \frac{4x}{4}$

$-\frac{3}{4} = x$

$-\frac{3}{4} = x$

$-\frac{3}{4} = x$

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Make it a COEFFICIENT in FRONT
Because its MULTIPY!!

6. $\frac{2x-5}{3}(3) = \frac{3x+1}{2}(3)$ OR $\frac{1}{3}(2x-5) = \frac{1}{2}(3x+1)$

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

$2(2x-5) = 3(3x+1)$

$4x - 10 = 9x + 3$

$-4x \quad -3 \quad -4x$

$\frac{-13}{5} = \frac{5x}{5}$

$-2\frac{3}{5} = x$

$\frac{2}{3}x - \frac{5}{3} = \frac{3}{2}x + \frac{1}{2}$

$-\frac{3}{2}x \quad +\frac{5}{3} \quad -\frac{3}{2}x \quad +\frac{5}{3}$

$-\frac{5}{6}x = \frac{13}{6}$

$\div -\frac{5}{6} \quad \div -\frac{5}{6}$

$x = -\frac{13}{5}$

$x = -2\frac{3}{5}$