Name Key
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Date_____
8R Period_____

Solving Equations by Combining Like Terms

I. Goal: To combine the like terms & then to isolate the variable

II Steps:

1) Re-arrange the like terms using the commutative property.

2) Combine the like terms (on the same side of the equal sign) by performing the operation in front of the 2nd term.

3) Eliminate the constant by using addition or subtraction.

4) Eliminate the coefficient by using multiplication or division.

5) Check :)

III. Examples: Solve

1) $8x + 3 - 2x = 63$

$8x - 2x + 3 = 63$ Commutative Property

$6x + 3 = 63$ Combine like terms

$-3 \quad -3$ Subtraction Property of Equality

$\frac{6x}{6} = \frac{60}{6}$ Division Property of Equality

$x = 10$

2) $72 = 10x + 7 + 3x$

$72 = 10x + 3x + 7$

$72 = 13x + 7$

$-7 \quad -7$

$\frac{65}{13} = \frac{13x}{13}$

$x = 5$

Check

$72 = 10x + 7 + 3x$

$72 = 10(5) + 7 + 3(5)$

$72 = 50 + 7 + 15$

$72 = 72$ ✓

3) $20 - 2y + 3 = 47$

$20 + 3 - 2y = 47$ Commutative Prop.

$23 - 2y = 47$ Combine like terms

$-23 \quad -23$ Subtraction Prop. of Equality

$\frac{-2y}{-2} = \frac{24}{-2}$ Division Prop of Equality

$y = -12$

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

$\frac{1}{3} + \frac{1}{3} + x = \frac{1}{3}$

$\Rightarrow \frac{2}{3} + x = \frac{1}{3}$

$-\frac{2}{3} \quad -\frac{2}{3}$

* don't multiply by the reciprocal

$x = -\frac{1}{3}$

Check

$\frac{1}{3} + x + \frac{1}{3} = \frac{1}{3}$

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

$\frac{1}{3} = \frac{1}{3}$ ✓

5) $-6 + 3 + \frac{x}{4} = 7$

$-3 + \frac{x}{4} = 7$ Combine like terms

$+3 \quad +3$ Addition Prop. of Equality

$\left(\frac{4}{1}\right)\left(\frac{x}{4}\right) = (10)\left(\frac{4}{1}\right)$ multiplication Prop. of Equality

$x = 40$

6) $14 = 2d + d + 10 + d$

$14 = 2d + d + d + 10$

$14 = 4d + 10$

$-10 \quad -10$

$\frac{4}{4} = \frac{4d}{4}$

$d = 1$

Check

$14 = 2d + d + 10 + d$

$14 = 2(1) + (1) + 10 + (1)$

$14 = 2 + 1 + 10 + 1$

$14 = 14$ ✓

7) $12s + 7 + 3s = 67$

$12s + 3s + 7 = 67$ Commutative Prop.

$15s + 7 = 67$ Combine like terms

$-7 \quad -7$ Subtraction Prop. of Equality

$\frac{15s}{15} = \frac{60}{15}$ Division Prop. of Equality

$s = 4$

*8) $4m - 8 - 3m = 3m + 5 - 3m$

$4m - 3m - 8 = 3m - 3m + 5$

$m - 8 = 5$

$+8 \quad +8$

$m = 13$

*9) $5x + 4 + 3x + 5x + 3 = 72$

$5x + 3x + 5x + 4 + 3 = 72$

$13x + 7 = 72$

$-7 \quad -7$

$\frac{13x}{13} = \frac{65}{13}$

$x = 5$

* 10) $6 + 2y + 1 + 10y + 3y = 60 + 5 + 2$

$6 + 1 + 2y + 10y + 3y = 60 + 5 + 2$

$7 + 15y = 67$

$-7 \quad -7$

$\frac{15y}{15} = \frac{60}{15}$

$y = 4$