**1) SOLVING EQUATIONS - MULTI-STEP**

1) Collect like terms 2) Solve the equation

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| **Example 1**  3x + 10 – 6x = 8 – 4  –3x + 10 = 4 🡨 simplify by collecting like terms  🡨 now, solve the two-step equation | **Example 2**  7x + 3 – 4x + 5x = 3 – 5 + 9 |

**VARIABLE ON BOTH SIDES**

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| Other multi-step equations have the variable on both sides. These can be a little trickier. To solve, you must have all the variable terms on one side of the equation. When eliminating an entire term from an equation, we either (+) or (-) the term. |

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| **Example 3**  8x + 8 = 2x – 4  -2x -2x 🡨 do the same to both sides and  collect your like terms  6x + 8 = – 4 🡨 now, solve the two-step equation | **Example 4**  5x – 23 = 3 – 8x |

**PRACTICE: SOLVING EQUATIONS - MULTI-STEP**

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| a. 5 + 3x + 4x = 19 | b. 15y – 6 – 10y = 9 | c. 32 – 5 = –4a – 5a |
| d. 5m + 3 – 9m + 13 = 0 | e. 6w + 8 = 4w + 18 | f. -8k – 5 = 2k + 15 |
| g. 3b – 6 = -b – 2 | h. 5 + 4d = -13 – 2d | i. 7t + 8 = 3t – 12 |
| j. 5c – 3 – 4c = 2c + 2 | k. 0 = 4x + 3 – x – 9 | l. 14 – n – 7 = 5n + 1 |

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| **APPLICATION:** Three angles are complementary (they add up to 90◦). For the diagram to the right, this can be expressed by the equation: 3x + x + x – 20 = 90. Find the value of the three angles. |

**2) SOLVING EQUATIONS - WITH BRACKETS**

**SIMPLIFY BY ADDING/SUBTRACTING POLYNOMIALS**

1) Eliminate the brackets 2) Simplify by collecting like terms 3) Solve the equation

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| Example 1  (3x + 5) + (x – 1) = -2 | Example 2  (5x – 4) – (9 – x) = -3 |

**SIMPLIFY USING DISTRIBUTIVE LAW**

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| Example 3  2(x – 4.5) +3x = 11 | Example 4  3(x + 5) = 2(x – 4) |
| Example 5  5(x – 8) = (2x – 2) + (4x + 5) | Example 6  (3x + 7 ) – 4x = 2(9 + 4x) |

**PRACTICE: SOLVING EQUATIONS – WITH BRACKETS**

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| a. 5(x + 4) = 3x + 14 | b. 5q – 6 = 2(q + 3) | | c. 4t + 3(2 – t) = 13 |
| d. u = 3(5 – u) + 1 | e. 3(r + 4) + 2(r + 5) = 32 | | f. 5(y – 3) – 3(y – 4) = 12 |
| g. 4(v + 3) = 2(v + 6) – 8 | h. 2(y – 4) = -3(y + 2) + 8 | | i. 6(3w + 4) = 10(2w – 1) |
| j. 4(m + 3) + 2(m – 3) = 3(m – 2) | | k. p – (4p + 3) = -3(p + 2) – (2p + 3) | |
| l. Polly solved the following equation. She is incorrect. Circle her two mistakes and explain why she is incorrect. | | | |
| ANSWERS: a) x=-3, b) q=4, c) t=7, d) u=4, e) r=2, f) y=7.5, g) v=-4, h) y=2, i) w=17, j) m=-4, k) p=-2, l) 2nd line: just dropped the brackets for both polynomials. Should have 3x+15 – x – 4, AND 5th line + 9 (should have subtracted 9). | | | |