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8:18 AM

3.3 multi step equ...

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3.3 Solving Multi-Step Equations

Rules:

1) Always simplify by distributing and combining like terms before undoing anything. Remember that a simplified expression has no like terms and no parenthesis or brackets.

2) Bring Variables to the same side of the equation and simplify before solving. You will have to undo the variable on one side to move it to the other side.

3) Undo by going BACKWARDS through order of operations and performing inverse operations on both sides.

Example 1: Solve and check.

A) $3x + 7 = -8$

$-7 \quad -7$

$\frac{3x}{3} = \frac{-15}{3}$

$x = -5$

ck: $3x + 7 = -8$

$3(-5) + 7 = -8$

$-15 + 7 = -8$

$-8 = -8$ ✓

B) $4y - 3 = 17$

$+3 \quad +3$

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

$y = 5$

ck: $4y - 3 = 17$

$4(5) - 3 = 17$

$20 - 3 = 17$

$17 = 17$

✓

Your Turn: 1 - 3 Page 144 Solve and Check

1) $6x - 15 = 9$

$+15 \quad +15$

$\frac{6x}{6} = \frac{24}{6}$

$x = 4$

ck: $6x - 15 = 9$

$6(4) - 15 = 9$

$24 - 15 = 9$

$9 = 9$ ✓

2) $7x - 4 = -11$

$+4 \quad +4$

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

$x = -1$

ck: $7x - 4 = -11$

$7(-1) - 4 = -11$

$-7 - 4 = -11$

✓ $-11 = -11$

3) $2y + 5 = 1$

$-5 \quad -5$

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

$y = -2$

ck: $2y + 5 = 1$

$2(-2) + 5 = 1$

$-4 + 5 = 1$

$1 = 1$ ✓

Example 2: Is 6 a solution for $2m - 3 = 13$? NO

*Check $m = 6$

$2(6) - 3 = 13$

$12 - 3 = 13$

$9 \neq 13$

Example 3: Simplify then solve.

A) $7x - 3x - 8 = 24$

$4x - 8 = 24$

$+8 \quad +8$

$\frac{4x}{4} = \frac{32}{4}$

$x = 8$

B) $8x - 2(x + 7) = 16$

$8x - 2x - 14 = 16$

$6x - 14 = 16$

$+14 \quad +14$

$\frac{6x}{6} = \frac{30}{6}$

$x = 5$

C) $5x + 3(x + 4) = 28$

$5x + 3x + 12 = 28$

$8x + 12 = 28$

$-12 \quad -12$

$\frac{8x}{8} = \frac{16}{8}$

$x = 2$

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5) $6(x+2) = 15$

$6x + 12 = 15$

$-12 \quad -12$

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

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

6) $8 - 4(x+1) = 8$

$8 - 4x - 4 = 8$

$-4x = 4$

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

$x = -1$

7) $3m + 2(m-5) = 10$

$3m + 2m - 10 = 10$

$5m - 10 = 10$

$+10 \quad +10$

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

$m = 4$

*** You can cancel fractions by multiplying both sides of the equation by the denominator, instead of distributing a fraction. ***

Example 4: Simplify and solve.

A) $(3)4 = (3)\frac{2}{3}(x+3)$

$12 = 2(x+3)$

$12 = 2x + 6$

$-6 \quad -6$

$\frac{6}{2} = \frac{2x}{2}$

$3 = x$

B) $(5)\left(-\frac{2}{5}\right)(x+1) = 6(5)$

$-2(x+1) = 30$

$-2x - 2 = 30$

$+2 \quad +2$

$\frac{-2x}{-2} = \frac{32}{-2}$

$x = -16$

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8) $(4)6 = (4)\frac{3}{4}(x+7)$

$24 = 3(x+7)$

$24 = 3x + 21$

$-21 \quad -21$

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

$1 = x$

9) $(5)\frac{4}{5}(x-2) = 8(5)$

$4(x-2) = 40$

$4x - 8 = 40$

$+8 \quad +8$

$\frac{4x}{4} = \frac{48}{4}$

$x = 12$