

Multi-Step Equations Day 2

① $4(2r-8) = \frac{1}{7}(49r+70)$

$4(2r)+4(-8) = \frac{1}{7}(49r)+\frac{1}{7}(70)$ $\frac{1}{7} \rightarrow \frac{49}{7} = 7$
 $7 \rightarrow 1$

$8r - 32 = 7r + 10$

$8r - 32 - 7r = 7r + 10 - 7r$ $\frac{1}{7} \rightarrow \frac{70}{7} = 10$
 $7 \rightarrow 1$

$r - 32 = 10$

$r - 32 + 32 = 10 + 32$

$r = 42$

② $\frac{1}{3}(18+12q) = 6(2q-7)$

$\frac{1}{3}(18)+\frac{1}{3}(12q) = 6(2q)+6(-7)$ $\frac{1}{3} \rightarrow \frac{18}{3} = 6$
 $3 \rightarrow 1$

$6 + 4q = 12q - 42$ $\frac{1}{3} \rightarrow \frac{12}{3} = 4$
 $3 \rightarrow 1$

$6 + 4q - 12q = 12q - 42 - 12q$

$6 - 8q = -42$

$6 - 8q - 6 = -42 - 6$

$-8q = -48$

$\frac{-8q}{-8} = \frac{-48}{-8}$

$q = 6$

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- ③ A student concluded that $8x - 12 = 4\left(\frac{1}{2}x - 6\right)$ has infinitely many solutions. Which statement best describes the student's conclusion?

$$8x - 12 = 4\left(\frac{1}{2}x - 6\right)$$

$$8x - 12 = 4\left(\frac{1}{2}x\right) + 4(-6)$$

$$8x - 12 = 2x - 24$$

$$8x - 12 - 2x = 2x - 24 - 2x$$

$$6x - 12 = -24$$

$$6x - 12 + 12 = -24 + 12$$

$$6x = -12$$

$$\frac{6x}{6} = \frac{-12}{6}$$

$$x = -2$$

$$x = -2$$

The conclusion is incorrect because there is exactly one solution to the equation.

$$\textcircled{4} \quad \frac{1}{4}x - 13 = \frac{1}{4}(x + 13)$$

$$\frac{1}{4}x - 13 = \frac{1}{4}(x) + \frac{1}{4}(13)$$

$$\frac{1}{4}x - 13 = \frac{1}{4}x + \frac{13}{4}$$

$$4\left(\frac{1}{4}x - 13\right) = \left(\frac{1}{4}x + \frac{13}{4}\right)4$$

$$4\left(\frac{1}{4}x\right) + 4(-13) = 4\left(\frac{1}{4}x\right) + 4\left(\frac{13}{4}\right)$$

$$1x - 52 = 1x + 13$$

$$1x - 52 - 1x = 1x + 13 - 1x$$

$$-52 \neq 13$$

The equation has no solution.

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$$\textcircled{5} \quad 10w + 19 + 3w = 6(9 + w) - 14$$

$$10w + 19 + 3w = 6(9) + 6(w) - 14$$

$$10w + 19 + 3w = 54 + 6w - 14 \quad * \text{Combine like terms}$$

$$13w + 19 = 6w + 40$$

$$13w + 19 - 6w = 6w + 40 - 6w$$

$$7w + 19 = 40$$

$$7w + 19 - 19 = 40 - 19$$

$$7w = 21$$

$$\frac{7w}{7} = \frac{21}{7}$$

$$w = 3$$

$$\boxed{w = 3}$$

$$\textcircled{6} \quad 6 - 2(4 - x) + 3x = 5x - 2$$

$$6 - 2(4) - 2(-x) + 3x = 5x - 2$$

$$6 - 8 + 2x + 3x = 5x - 2$$

$$-2 + 5x = 5x - 2$$

$$-2 + 5x - 5x = 5x - 2 - 5x$$

$$-2 = -2 \checkmark$$

Infinitely Many
Solutions

Any real number value of x satisfies the equation.