Solving Two-Step Equations

Additional Examples — Lesson 2-2

* Add or subtract first

1 EXAMPLE Solve $13 = \frac{y}{3} + 5$.

$13 - 5 = \frac{y}{3} + 5 - 5$ Subtract 5 from each side.

$8 = \frac{y}{3}$ Simplify.

$3 \cdot 8 = 3 \cdot \frac{y}{3}$ Multiply each side by 3.

$24 = y$ Simplify.

Check: $13 = \frac{y}{3} + 5$

$13 \stackrel{?}{=} \frac{24}{3} + 5$ Substitute 24 for y.

$13 \stackrel{?}{=} 8 + 5$

$13 = 13$ ✔

2 EXAMPLE You order iris bulbs from a catalog. Iris bulbs cost \$.90 each. The shipping charge is \$2.50. If you have \$18.50 to spend, how many iris bulbs can you order?

Relate: cost per Iris × number of Iris bulbs + shipping = amount to spend

Define: Let b = the number of bulbs you can order.

Write: $0.90 \cdot b + 2.50 = 18.50$

$0.90b + 2.50 = 18.50$

$0.90b + 2.50 - 2.50 = 18.50 - 2.50$ Subtract 2.50 from each side.

$0.90b = 16$ Simplify.

$\frac{0.90b}{0.90} = \frac{16}{0.90}$ Divide each side by 0.90.

$b = 17.\overline{7}$ Simplify.

You can order 17 bulbs.

Check: Is the solution reasonable? You can only order whole iris bulbs. Since 18 bulbs would cost $18 \cdot 0.90 = 16.20$ plus \$2.50 for shipping, which is more than \$18.50, you can only order 17 bulbs.

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Additional Examples — Lesson 2-2

Add or subtract first.

3 EXAMPLE Solve $21 = -p + 8$.

$21 - 8 = -p + 8 - 8$ Subtract 8 from each side.

$13 = -p$ Simplify.

$-1(13) = -1(-p)$ Use the Multiplication Property of Equality. Multiply each side by -1.

$-13 = p$ Simplify.

Check: $21 = -p + 8$

$21 \stackrel{?}{=} -(-13) + 8$ Substitute -13 for p.

$21 = 21$ ✔

4 EXAMPLE Solve $8 = -\frac{c}{24} + 4$. Justify each step.

$8 - 4 = -\frac{c}{24} + 4 - 4$ Subtraction Property of Equality

$4 = -\frac{c}{24}$ Simplify.

$(-24)(4) = (-24)\left(-\frac{c}{24}\right)$ Multiplication Property of Equality

$-96 = c$ Simplify.

5 EXAMPLE Solve $3 - 5z = 18$. Justify each step.

$3 - 5z - 3 = 18 - 3$ Subtraction Property of Equality

$-5z = 15$ Simplify.

$\frac{-5z}{-5} = \frac{15}{-5}$ Division Property of Equality

$z = -3$ Simplify.