

1.2 Solving Multi-Step Equations

Review: PEMDAS

- P - Parantheses () (25 ÷ 5) × 3
- E - Exponents 3²
- M - Multiplication ×, ·, * , x()
- D - Division ÷, /, ÷, /
- A - Addition +
- S - Subtraction -

Left to right
left to right

When solving two-step equations, you must follow most of PEMDAS but in reverse:

SADMEP

- ① undo + /
- ② undo × ÷

Solve the equation and check your solution:

A) $2x - 5 = 5 + 15$
 subtraction
 multiplication
 $+15 = +15$

$\frac{2x}{2} = \frac{20}{2} = x = 10$
 $2(10) - 15 = 5$

C) $5n + 2 = 3$
 $-2 = -2$
 $5n = 1$
 $\frac{5n}{5} = \frac{1}{5}$
 $n = \frac{1}{5}$
 $5(\frac{1}{5}) + 2 = 3$
 $1 + 2 = 3$

$5(\frac{1}{5}) + 2 = 3$

E) $\frac{h}{8} - \frac{1}{2} = \frac{7}{2}$
 $+\frac{1}{2} = +\frac{1}{2}$

$\frac{h}{8} = -\frac{6}{2}$

$h = -\frac{6}{2} \times \frac{8}{1} = -24$

$h = -24$

$-\frac{24}{8} - \frac{1}{2} = -\frac{7}{2}$

$-\frac{6}{2} + -\frac{1}{2}$

$-\frac{7}{2}$

B) $-2y + 4 = 8$

~~$-2y + 4 = 8$~~
 $-2y + 4 = 8$
 $-4 = -4$

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

$y = -2$
 $2(-2) + 4 = 8$
 $4 + 4 = 8$
 8

D) $\frac{c}{5} - 9 = -2$
 $-\frac{c}{5} = 7$
 $c = 35$

$\frac{35}{5} - 9$

$7 - 9$

-2

F) $\frac{2}{5} + 4a = -\frac{6}{5}$
 $-\frac{2}{5} = -\frac{2}{5}$

$4a = -\frac{8}{5}$
 $a = -\frac{2}{5}$

$a = -\frac{2}{5}$

$-\frac{2}{5} \times \frac{1}{4} = -\frac{2}{20} = -\frac{1}{10}$
 $\frac{2}{5} + \frac{4}{1} \cdot \frac{-2}{5} = -\frac{2}{5} + \frac{4}{1} \cdot \frac{-2}{5} = -\frac{2}{5} - \frac{8}{5} = -\frac{10}{5} = -2$

- G) At the mall, Bobby bought a pair of pants for \$16 and 3 t-shirts (they all cost the same). All together he spent \$28 for the clothes. Find the cost of each shirt.

$c = \text{cost of shirt}$

$$16 + 3c = 28$$

$$28 - 16 = 12$$

$$\frac{3c}{3} = \frac{12}{3}$$

$$\boxed{c = 4}$$

\$4 dollars per shirt

$$\begin{aligned} 4 + 16 \cdot 3 &= \\ 3(4) + 16 &= 28 \end{aligned}$$

- H) Diane sold 9 decorated flowers that each cost the same amount plus a dozen roses for \$28. All together she sold \$73 in flowers. Find the cost of each decorated flower.

$x = \text{cost of a flower}$

$$9x + 28 = 73$$

$$\frac{9x}{9} = \frac{45}{9}$$

$$\boxed{x = 5}$$

$$9(5) + 28 = 73$$

$$\begin{array}{r} 613 \\ \times 78 \\ \hline -28 \\ \hline 45 \end{array}$$

\$5 is the price of the decorated flowers

Combining Like Terms to Solve an Equation:

I. $3y - 8y = 25$

$$\begin{array}{r} -5y = 25 \\ \hline -5 \quad -5 \end{array}$$

$$\boxed{y = -5}$$

J. $7x - 10x = -27$

$$\begin{array}{r} -3x = -27 \\ \hline -3 \quad -3 \end{array}$$

$$\boxed{x = 9}$$

Using the Distributive Property:

I. $5(x - 4) = 15$

$$\begin{array}{r} 5x - 20 = 15 \\ +20 \quad +20 \end{array}$$

$$\begin{array}{r} 5x = 35 \\ \hline 5 \quad 5 \end{array}$$

$$\boxed{x = 7}$$

J. $-4(m + 3) = 24$

$$\begin{array}{r} -4m + -12 = 24 \\ +12 \quad +12 \end{array}$$

$$\begin{array}{r} -4m = 36 \\ \hline -4 \quad -4 \end{array}$$

$$\boxed{m = -9}$$

$$y \overline{)36}$$

$$-4m - 12 = 24$$

K. $-4(3g - 5) + 10g = 19$

$$-12g + 20 + 10g = 19$$

$$-2g + 20 = 19$$

$$2g = -1$$

$$g = -\frac{1}{2}$$

$$\boxed{g = -\frac{1}{2}}$$

L. $2(1 - 5m) + 4 = 26$

$$2 - 10m + 4 = 26$$

$$\begin{array}{r} 2 - 10m = 22 \\ -2 \quad -2 \end{array}$$

$$\begin{array}{r} -10m = 20 \\ \hline -10 \quad -10 \\ m = -2 \end{array}$$