② $\frac{4}{5}x - 1 = 7$

$\overset{\downarrow}{\text{coefficient}}$ $\overset{\downarrow}{\text{constant}}$

$$\frac{4}{5}x - 1 = 7$$
$$\underline{+1 \quad +1}$$
$$\frac{4}{5}x = 8$$

$\frac{4}{5}x = 8$

$4x = 40$
$\frac{4x}{4} = \frac{40}{4}$
$x = 10$

$\dfrac{\frac{4}{5}x}{\frac{4}{5}} = \dfrac{8}{\frac{4}{5}}$

$x = \dfrac{8}{1} \cdot \dfrac{5}{4}$

$x = 10$

(#4) $4 - \frac{1}{3}x = 8$
$$\underline{-4 \qquad -4}$$
$$\frac{-1}{3}x = 4$$

$\frac{-1}{3}x = 4$

$\dfrac{-x}{-1} = \dfrac{12}{-1}$

$x = -12$

$\dfrac{\frac{-1}{3}x}{\frac{-1}{3}} = \dfrac{4}{\frac{-1}{3}}$

$x = 4 \cdot \dfrac{-3}{1}$

$x = -12$

MULTI-VARIABLE EQUATIONS

SOLVE EACH OF THE EQUATIONS BELOW FOR x:

$2x - 5 = 13$	$ax - b = c$

$2x - 5 = 13$

$$\underline{+5 \quad +5}$$

$$\frac{2x}{2} = \frac{18}{2}$$

$$\boxed{x = 9}$$

$ax - b = c$

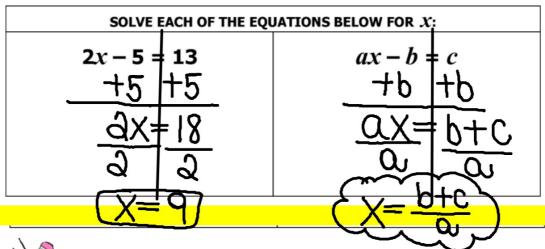$$\underline{+b \quad +b}$$

$$\frac{ax}{a} = \frac{b+c}{a}$$

$$x = \frac{b+c}{a}$$

QUICK-WRITE: What are some similarities and differences between the two equations?

The right equation has no numbers. In both equations, we are solving for x. Multi-variable equations have mostly variable answers.
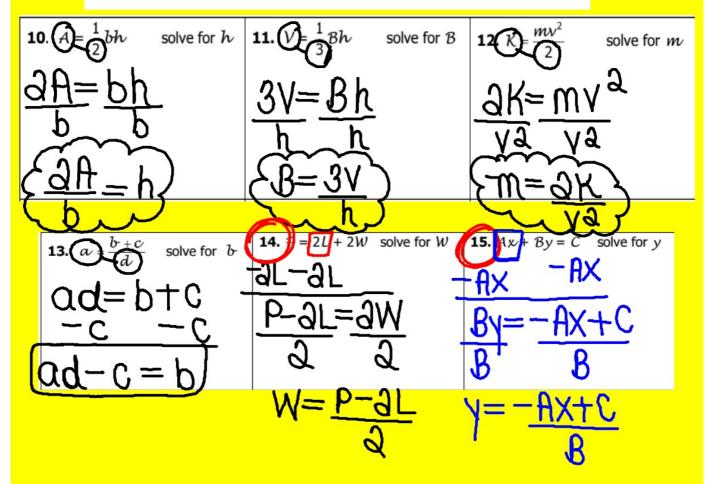
Solve each equation for the specified variable.

$$+, -, \cdot, \div$$

One-Step Problems

1. $A = lw$ solve for w

$$\frac{A}{L} = \frac{lw}{L}$$

$$\boxed{w = A/L}$$

2. $A = bh$ solve for h

$$\frac{A}{b} = \frac{bh}{b}$$

$$\boxed{h = A/b}$$

3. $d = rt$ solve for t

$$\frac{d}{r} = \frac{rt}{r}$$

$$\boxed{t = d/r}$$

4. $I = prt$ solve for t

$$\frac{I}{pr} = \frac{prt}{pr}$$

$$\boxed{t = I/pr}$$

5. $V = lwh$ solve for h

$$\frac{V}{lw} = \frac{lwh}{lw}$$

$$\boxed{V/lw = h}$$

6. $C = 2\pi r$ solve for r

$$\frac{C}{2\pi} = \frac{2\pi r}{2\pi}$$

$$\boxed{r = C/2\pi}$$

7. $m = c - s$ solve for c

$$+s \quad +s$$

$$\boxed{m + s = c}$$

8. $A = \pi r^2$ solve for π

$$\frac{A}{r^2} = \frac{\pi r^2}{r^2}$$

$$\boxed{\pi = A/r^2}$$

9. $D = \frac{m}{v}$ solve for m

$$\boxed{DV = m}$$

Multi-Step Problems

Hints to help:
- Think backwards PEMDAS
- Remove fractions by multiplying by the reciprocal.
- Last step is USUALLY to divide by whatever is next to your variable.

10. $A = \frac{1}{2}bh$ solve for h

$$\frac{2A}{b} = \frac{bh}{b}$$

$$\frac{2A}{b} = h$$

11. $V = \frac{1}{3}Bh$ solve for B

$$\frac{3V}{h} = \frac{Bh}{h}$$

$$B = \frac{3V}{h}$$

12. $K = \frac{mv^2}{2}$ solve for m

$$\frac{2K}{v^2} = \frac{mv^2}{v^2}$$

$$m = \frac{2K}{v^2}$$

13. $a = \frac{b+c}{d}$ solve for b

$$ad = b + c$$
$$\quad -c \qquad -c$$
$$\boxed{ad - c = b}$$

14. $P = 2L + 2W$ solve for W

$$\frac{-2L \quad -2L}{}$$
$$\frac{P - 2L}{2} = \frac{2W}{2}$$

$$W = \frac{P - 2L}{2}$$

15. $Ax + By = C$ solve for y

$$\frac{-Ax \qquad -Ax}{}$$
$$\frac{By}{B} = \frac{-Ax + C}{B}$$

$$y = \frac{-Ax + C}{B}$$

Challenge!

19. Solve $C = \dfrac{5}{9}(F - 32)$ for F

$$\frac{9C}{5} = \frac{5(F-32)}{5}$$

$$\frac{9}{5}C = F - 32$$

$$+32 \qquad\qquad +32$$

$$\frac{9}{5}C + 32 = F$$

20. Solve $A = \dfrac{1}{2}h(b_1 + b_2)$ for b_1

$$\frac{2A}{h} = \frac{h(b_1 + b_2)}{h}$$

$$\frac{2A}{h} = b_1 + b_2$$

$$-b_2 \qquad\qquad -b_2$$

$$\frac{2A}{h} - b_2 = b_1$$