Simplify each expression using the correct order of operations:

1.) $\dfrac{50 + (3 \cdot 10^2)}{2}$

$\dfrac{50 + (3 \cdot 100)}{2} \quad = 175$

$\dfrac{50 + 300}{2} = \dfrac{350}{2}$

2.) $\dfrac{18 + 7^2 - 7}{9 - 20 \div 4 + 16}$

$\dfrac{18 + 49 - 7}{9 - 5 + 16} = \dfrac{67 - 7}{4 + 16}$

$\dfrac{60}{20} = 3$

3.) Solve: $10m - 3(2m-9) = 9(m-1)+1$

$10m - 6m + 27 = 9m - 9 + 1$

$\quad 4m + 27 = 9m - 8$

$-4m \qquad\quad -4m$

$\qquad 27 = 5m - 8$

$\; +8 \qquad\qquad +8$
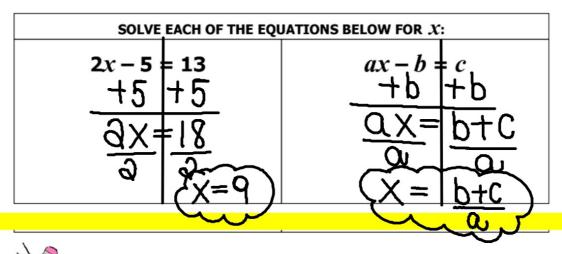
$\dfrac{35}{5} = \dfrac{5m}{5}$

$m = 7$

4.) It costs Raquel \$5 in tolls to drive to work and back each day, plus she uses 3 gallons of gas. It costs her a total of \$15.50 to drive to work and back each day. How much per gallon is Raquel paying for her gas? How do you know?

$3x + 5 = 15.50$

$\quad -5 \quad -5$

$\dfrac{3x}{3} = \dfrac{10.50}{3}$

$x = 3.50$

$x = $ cost per gallon

Simplify:

$3x(2y + 5) - 2y(3x - 5) - 5(3x + 2).$

The final result contains how many terms?

A) three   *B) only two   C) just one   D) none

$6xy + 15x - 6xy + 10y - 15x - 10$

$3x \cdot 2y = 6xy$

$10y - 10$

$3x + 2y$ ~~(crossed out)~~

$\dfrac{3}{2} \cdot \dfrac{8}{1} = \dfrac{24}{2}$
$= 12$

Solve: $\dfrac{3}{2}(8x + 10) - \dfrac{3}{5}(10x - 5) = 0$

A) $-\dfrac{11}{10}$ B) $-\dfrac{9}{2}$ *C) -3 D) -9

$12x + 15 - 6x + 3 = 0$

$6x + 18 = 0$

$\quad\quad -18 \quad -18$

$\dfrac{6x}{6} = \dfrac{-18}{6}$

$x = -3$

MULTI-VARIABLE EQUATIONS

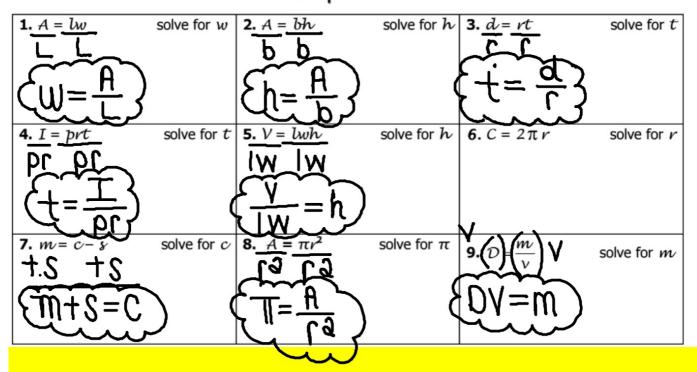| SOLVE EACH OF THE EQUATIONS BELOW FOR x:	
$2x - 5 = 13$ $$\frac{+5 \quad | \quad +5}{\cancel{2}x = 18}$$ $$\frac{}{\cancel{2} \quad | \quad 2}$$ $x = 9$	$ax - b = c$ $$\frac{+b \quad | \quad +b}{ax = b+c}$$ $$\frac{}{a \quad | \quad a}$$ $x = \frac{b+c}{a}$

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

Both equations are solved using addition and division. The left equation has numbers while the right has letters.

Solve each equation for the specified variable.

One-Step Problems

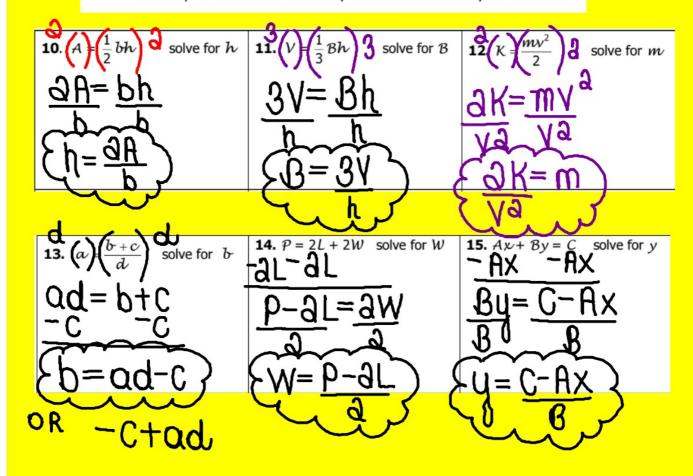|		
1. $A = lw$ solve for w $\dfrac{A}{L} = \dfrac{lw}{L}$ $W = \dfrac{A}{L}$	**2.** $A = bh$ solve for h $\dfrac{A}{b} = \dfrac{bh}{b}$ $h = \dfrac{A}{b}$	**3.** $d = rt$ solve for t $\dfrac{d}{r} = \dfrac{rt}{r}$ $t = \dfrac{d}{r}$
4. $I = prt$ solve for t $\dfrac{I}{pr} = \dfrac{prt}{pr}$ $t = \dfrac{I}{pr}$	**5.** $V = lwh$ solve for h $\dfrac{V}{lw} = \dfrac{lwh}{lw}$ $\dfrac{V}{lw} = h$	**6.** $C = 2\pi r$ solve for r
7. $m = c - s$ solve for c $m + s = c - s + s$ $m + s = c$	**8.** $A = \pi r^2$ solve for π $\dfrac{A}{r^2} = \dfrac{\pi r^2}{r^2}$ $\pi = \dfrac{A}{r^2}$	**9.** $D = \left(\dfrac{m}{v}\right) v$ solve for m $DV = m$

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. $\left(A = \left(\frac{1}{2} bh\right)\right)$ solve for h

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

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

11. $\left(V = \left(\frac{1}{3} Bh\right)\right)$ solve for B

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

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

12. $\left(K = \left(\frac{mv^2}{2}\right)\right)$ solve for m

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

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

13. $(a)\left(\frac{b+c}{d}\right)$ solve for b

$$\begin{array}{rl} ad = & b+c \\ -c & -c \end{array}$$

$$b = ad - c$$

OR $\quad -c + ad$

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

$$\begin{array}{rl} -2L & -2L \\ \hline P - 2L = & 2W \\ 2 & 2 \end{array}$$

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

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

$$\begin{array}{rl} -Ax & -Ax \\ \hline By = & C - Ax \\ B & B \end{array}$$

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

Challenge!

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

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