

Manipulating Eqns (M.E.)

M.E. is an extension of solving. The difference between "solving" and "M.E." is the outcome.

Remember that outcomes for solving are solution(s), no soln, and all solns. The outcome for m.e. is another equation.

$$\begin{array}{r} \text{ex) } \underline{\text{solve}}: 7 = 2x + 3 \\ \underline{-3} \quad \underline{-3} \\ 4 = 2x \\ \underline{\quad} \quad \underline{\quad} \\ \frac{4}{2} = \frac{2x}{2} \\ \boxed{x=2} \end{array}$$

$$\begin{array}{r} \underline{\text{manipulate}} \\ \text{solve } y = 2x + 3 \text{ for "x"} \\ \underline{\quad} \quad \underline{-3} \\ y - 3 = 2x \\ \underline{\quad} \quad \underline{\quad} \\ \frac{y-3}{2} = \frac{2x}{2} \\ \boxed{x = \frac{y-3}{2}} \end{array}$$

* When M.E., often multiple variables are involved. Remember, different variables are not "like terms." Hence, they cannot be combined.

* When M.E., use the same steps/strategies for solving, being mindful of rules surrounding variables.

ex1 solve for "c"

$$3(a+b) = 4(d-c)$$

$$3a + 3b = 4d - 4c$$

$$\underline{-4d} \quad \underline{-4c}$$

simplify

isolate "c"

$$\frac{3a + 3b - 4d}{-4} = \frac{-4c}{-4}$$

isolate "c"

$$c = \frac{3a + 3b - 4d}{-4}$$

solution

ex2 solve for "d"

$$\frac{5b}{11d} = \frac{-2c}{3}$$

$$(3)(5b) = (-2c)(11d)$$

cross multiply

$$\frac{15b}{-22c} = \frac{-22cd}{-22c}$$

simplify

isolate "d"

$$d = \frac{15b}{-22c}$$

solution

ex 3 | $S = 2(\pi r^2) + 2\pi r \cdot l$

surface area of a cylinder

Solve for "l"

$S = 2(\pi r^2) + 2\pi r \cdot l$

$S = 2\pi r^2 + 2\pi r \cdot l$
 $\underline{-2\pi r^2} \quad \underline{-2\pi r^2}$

PEMDAS in reverse to isolate variable

$\frac{S - 2\pi r^2}{2\pi r} = \frac{2\pi r \cdot l}{2\pi r}$

$l = \frac{S - 2\pi r^2}{2\pi r}$

ex 4 | $y = mx + p$ linear eqn

Solve for "x"

$y = mx + p$
 $\underline{-p} \quad \underline{-p}$

PEMDAS in reverse to isolate variable

$\frac{y - p}{m} = \frac{mx}{m}$

$x = \frac{y - p}{m}$

