

# Steps to solve word problems.

1. Write down known quantities.
2. Write down the quantity that you are solving for.
3. Write down an equation that includes the quantity solving for.
4. Check the equation to make sure you have only one unknown value (if you have more than one unknown - find another equation!).
5. Manipulate the equation so that the unknown variable is by itself on the left side of the equation.
6. Plug in known quantities (watch units!).
7. Clearly identify answer.

## Example

A soccer ball is rolling down a field. At  $t=0$ , the ball has an initial velocity of  $4 \text{ m/s}$ . If the acceleration of the ball is constant at  $-0.3 \text{ m/s}^2$ , how long will it take the ball to come to a complete stop?

$$v_i = 4 \text{ m/s}$$

$$v_f = 0 \text{ m/s}$$

$$a = -0.3 \text{ m/s}^2$$

$$t_i = 0 \text{ s}$$

$$[t_f = ?]$$

$$\Delta s = s_f - s_i$$

$$v = \frac{s_f - s_i}{t_f - t_i} \quad \times$$

$$a = \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{t_f - t_i}$$

$$(t_f - t_i) a = \frac{(v_f - v_i)}{(t_f - t_i)} (t_f - t_i) \quad \text{Victory!}$$

$$\begin{aligned} 2 (4 \times 2) &= (8 \times 1) 2 \\ &= (8) = (8) 2 \\ 16 &= 16 \end{aligned}$$

$$\frac{1}{a} a(t_f - t_i) = (v_f - v_i) \frac{1}{a}$$

$$t_f - t_i = \frac{(v_f - v_i)}{a} + t_i$$

$$t_f = \frac{(v_f - v_i)}{a} + t_i$$

$$t_f = \frac{0 \text{ m/s} - 4 \text{ m/s}}{-0.3 \text{ m/s}^2} = \frac{-4 \text{ m/s}}{-0.3 \text{ m/s}^2} = \boxed{13.3 \text{ s}}$$