The Ever Popular Word Problem!!

Strategy:

1. Read the problem.
2. Draw a picture if it helps.
3. Make a good “Let Statement”.
4. Translate the problem into Math.
5. Solve for the unknown or solve the system of equations.

Example:

Cade traveled 48 miles at a certain speed. If he had gone 4 mph faster, the trip would have taken 1 hr less. Find Cade’s average speed.

Solution:

$$D=r∙t$$

Let r = Cade’s average speed.

Let t = the times it took

1. $48=r∙t$
2. $48=\left(r+4\right)∙(t-1)$

$So solving for t:\frac{48}{r}=t$

$$48=\left(r+4\right)∙\left(\frac{48}{r}-1\right)\rightarrow 48=48-r+4∙\frac{48}{r}-4\rightarrow 0=-r+4∙\frac{48}{r}-4$$

Multiply both sides by $r:$

$$0=-r^{2}-4r+4∙48=-\left(r^{2}+4r-192\right)=-\left(r+16\right)\left(r-12\right)=0$$

So

$r=-16 \left(he drove backwards\right), 12 mph$

Ex: A Flying Nun flies 5 mph faster than your mom can fly her model air plane. If the flying nun goes 200 mi in 3 hrs less time than it takes your mom to fly her model plane 280 mi, find the speed of each. Click [here](http://www.youtube.com/watch?v=SnhgpVb-u5s) for a link to a video of The Flying Nun.

Solution:

Let x = Your mom’s plane’s speed.

Let y = Flying- nun’s speed = $x+5$

Let t = time it takes for your mom to fly plane 280 mi.

1. $200=\left(x+5\right)∙(t-3)$
2. $280=xt$

$So solving for t:\frac{280}{x}=t$

$$200=\left(x+5\right)∙\left(t-3\right)=200=\left(x+5\right)∙\left(\frac{280}{x}-3\right)\rightarrow $$

$$200=280-3x+5\frac{280}{x}-15\rightarrow 0=-3x+\frac{1400}{x}+65$$

Multiply both sides by x:

$$0=-3x^{2}+65x+1400=-\left(3x^{2}-65x-1400\right)=-\left(3x+40\right)\left(x-35\right)$$

$$x=35,-\frac{40}{3}$$

Since your mom’s plane wont fly backward, it must cruise at 35mph (it’s a miracle she has not crashed and burned), so the nun flies at 40 mph.

$$D=r∙t$$

In this section we will also practice solving equations for a variable that seems hard to solve for.

Ex: Solve

Solution:









Ex: Solve the following:

1. $F=\frac{Gm\_{1}m\_{2}}{r^{2}}$, for $r$
2. $c=\sqrt{gH}$, for $H$
3. $V=3.5\sqrt{h}$, for $h$
4. $a^{2}+b^{2}=c^{2}$, for $b$
5. $A=A\_{o}\left(1-r\right)^{2}$, for $r$
6. $A=πr^{2}+πrs$, for $r$
7. $W=\sqrt{\frac{1}{LC}}$, for $L$