Word Problem

Rate of Speed / Travel

Ashley and Devon are meeting in Orlando for the weekend. Ashley travels 320 miles in the same time that Devon travels 270 miles. If Ashley's rate of travel is 10 mph more than Devon's, and they travel the same length of time, at what speed is Ashley traveling?

Step1: Set it up
Determine what type of problem it is and what formula applies.

$$d = rt$$

← It's a distance/rate/time problem.

$$t_{Ashley} = t_{Devon}$$

← Ashley and Devon's times are the same.

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

← We need the formula to be in terms of <u>time</u>. Thus, both sides of d=rt have been divided

<u>Ashley's time</u>

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

$$t = \frac{320}{X+10}$$

We do know that Ashley's rate of travel is 10 mph more than Devon's, hence, "x +

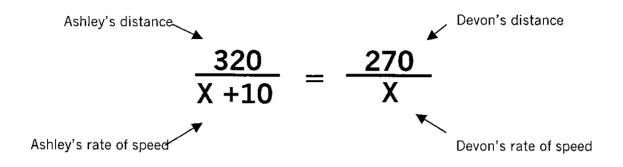<u>Devon's time</u>

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

$$t = \frac{270}{}$$

We don't know anything about Devon's rate of travel, so we will call it "x".

$$\frac{320}{X+10} = \frac{270}{}$$

← Since Ashley and Devon's times are the same, we will set them equal to each other, and then solve for "x". Ashley's rate will be whatever "x" is, plus 10.

Step 2: Solve the

Ashley's distance

Devon's distance

$$\frac{320}{X+10} = \frac{270}{X}$$

Ashley's rate of speed

Devon's rate of speed

$$\frac{320}{X+10} \times \frac{270}{X}$$ Cross-multiply

$$320\,(x) \ = \ 270\,(x + 10)$$ Distribut

$$320x \ = \ 270x + 2700$$ Get the "x's" together by

$$\begin{array}{rcl} 320x & = & 270x + 2700 \\ -270x & & 270x \\ \hline 50x & = & 2700 \end{array}$$ Divide both sides by 50 to isolate "x".

$$\frac{50x}{50} \ = \ \frac{2700}{50}$$

$$X \ = \ 54$$ ⟵ Devon's speed

$$X + 10 \ = \ \boxed{64\ \text{mph}}$$ ⟵ Ashley's speed (54) + 10