Average Speed Challenge Problems

3.3.20

Today's Objectives:

○ Learn the steps of a challenge problem

○ Avoid the "average of speeds" trap

○ Solve multiple stage problems

<u>Steps for solving these problems:</u>

Stay Organized!

1) Make a data table of the known information

2) Always get the problem into total distance/total time

3) If it's a comparison question, save one number for a comparison at the end
    Ex: Does he get a speeding ticket?
    (compare his speed to the speed limit)

$$\boxed{\bar{V} = d/t}$$

1) You drive at 40 mph for 20 miles, then another 70 mph for 50 miles.
What was your average speed for the whole trip?

1	2	Total
$V_1 = 40$	$V_2 = 70$	$V_T = ?$
$d_1 = 20$	$d_2 = 50$	$d_T = 70$ miles
$t_1 = ?$	$t_2 = ?$	$t_T = ?$ 1.214 hrs

$$40 = \frac{20}{t_1} \quad \Big| \quad 70 = \frac{50}{t_2}$$

ADD

$$t_1 = 0.5 \, hrs \quad \Big| \quad t_2 = 0.714 \, hrs$$

$$\bar{V} = \frac{d}{t} = \frac{70 \, miles}{1.214 \, hrs} = \boxed{57.66 \, mph}$$

9.9.19

Today's Objectives:

- Solve harder challenge problems
- Avoid "the trap"
- Take real world data

To make the soccer team, players need to run 2 miles with an overall average speed of 9 miles/hour. These are Julie's run times. Does she make the team?

- First mile at 10 mph
- Second mile at 8 mph

TRAP! 👀

$$\frac{10+8}{2} = 9\,mph$$

1

$d_1 = 1$

$V_1 = 10$

$10 = \dfrac{1}{t_1}$

$t_1 = 0.1\,hrs$

2

$d_2 = 1$

$V_2 = 8$

$8 = \dfrac{1}{t_2}$

$t_2 = 0.125\,hrs$

ADD

T

$d_T = 2\,miles$

$T_T = 0.225\,hrs$

No!

$$\frac{2\,miles}{0.225\,hrs} = 8.89\,mph$$