

MAT 104 Quiz 3

Monday, September 13, 2004

1. Strong Bad leaves Utica at a rate of 60 miles per hour towards Syracuse which is 50 miles away. 15 minutes later, Strong Sad leaves Utica towards Syracuse. Strong Sad wants to arrive in Syracuse at the same time as Strong Bad.

- (a) How long does it take for Strong Bad to drive to Syracuse?

This is a uniform motion problem, so we will probably need to utilize the formula

$$D = rt$$

where $D = 50$ miles, the distance to Syracuse, and $r = 60$ miles per hour. So substituting these values in, we get

$$50 \text{ miles} = 60 \frac{\text{miles}}{\text{hour}} \times t.$$

Solving for t , we get

$$t = \frac{50}{60} \text{ hours},$$

or by converting to minutes,

$$t = 50 \text{ minutes}.$$

- (b) How much time does Strong Sad have to drive to Syracuse?

Strong Sad leaves 15 minutes after Strong Bad does, so he has

$$50 - 15 = 35 \text{ minutes}$$

to get to Syracuse if he wants to arrive at the same time as Strong Bad.

- (c) How fast does Strong Sad have to drive in order to arrive in Syracuse at the same time as Strong Bad?

Strong Sad has 35 minutes to go 50 miles. So by substituting into $D = rt$, we get

$$50 \text{ miles} = r \times 35 \text{ minutes},$$

or

$$r = \frac{50}{35} \frac{\text{miles}}{\text{minute}}.$$

If you are not satisfied with having your answer in these awkward units, we can convert to miles per hour by multiplying by 60, and so

$$r = \frac{50}{35} 60 = \frac{600}{7} = 85\frac{5}{7} \text{ miles per hour}$$

2. You ride your bike to Clinton which is 10 miles away at a rate of 5 miles per hour. If you want to average 10 miles per hour for a round trip, how fast would you have to ride on your way back?

Did you get it? It will take you 2 hours to get to Clinton riding 5 miles per hour. To average 10 miles per hour for a 20 mile round trip, you will need to do it in 2 hours. When you get to Clinton, you will have no time left! So it is impossible to average 10 miles per hour for the round trip. Good work if you got this one! And if you did not, do not worry about it. Albert Einstein was once fooled by this clever little problem as well.