

Okay, let's move away from "Divisibility and Remainders" on the GMAT, at least temporarily, and let's focus our attention on another topic. If you have read some of my previous posts, I guess you know that I like to solve questions "logically." I like to avoid making equations. Instead, I try to make myself "figure it out."

A few days back, I came across a Time-Speed-Distance problem which was a perfect example of how you could "figure stuff out" without dealing with any equations. Actually, you can do that with a majority of GMAT questions (and save yourself loads of time!) but what was special about this question was that a couple of instructors of one of our competitor (I am not at liberty to disclose exactly who this competitor is!) had told their students that it is not possible to solve it logically. That got me thinking that perhaps, logical thinking is not as widely utilized as we at Veritas would like to believe. (I think our love for logical thinking is also apparent in the way we teach Sentence Correction!) Anyway, I thought of sharing the question and its logical solution with you! Here goes...

Now, before you look at the solution, try and solve it on your own. Do not use a pen/pencil/marker/any other writing instrument and don't try to make equations in your head. Just try and reason out the solution! It will be a great intellectual exercise and if you are able to get the answer by using your mind alone, let me know for a virtual pat on the back!

Two friends, Tanaya and Stephen were standing together. Tanaya begins to walk in a straight line away from Stephen at a constant rate of 3 miles per hour. One hour later, Stephen begins to run in a straight line in the exact opposite direction at a constant rate of 9 miles per hour. If both Tanaya and Stephen continue to travel, what is the positive difference between the amount of time it takes Stephen to cover the exact distance that Tanaya has covered and the amount of time it takes Stephen to cover twice the distance that Tanaya has covered?

- (A) 60 mins
- (B) 72 mins
- (C) 90 mins
- (D) 100 mins
- (E) 120 mins

Solution:

Following is what goes on in my mind when I read the question. I will quote sentences from the question to explain you the thought process.

"Two friends, Tanaya and Stephen were standing together."

When I read the above, I think, "Ok, so two people, Tanaya and Stephen, are standing at the same point at a particular time, say 12 noon."

"Tanaya begins to walk in a straight line away from Stephen at a constant rate of 3 miles/hour."

Now I think, "Stephen is still standing where they were standing together but Tanaya starts walking away from Stephen at a speed of 3 miles/hour. Women!"

"One hour later, Stephen begins to run in a straight line in the exact opposite direction at a constant rate of 9 miles per hour."

Stephen was shell shocked! After a whole hour (i.e. at 1:00 pm), when Tanaya was actually 3 miles away from him, he regains control of his legs and starts running in the opposite direction at 9 miles/hr, three times the speed at which Tanaya was walking away (vengeance!).

"What is the positive difference between the amount of time it takes Stephen to cover the exact distance that Tanaya has

covered and ...”

So, I need to find the time it takes Stephen to cover the exact distance that Tanaya has covered. To cover the same distance as Tanaya, Stephen needs to cover the distance that Tanaya is covering now plus he has to cover the extra 3 miles that Tanaya has already covered. The thing going for him is that he is running much faster than Tanaya. Out of his speed of 9 miles/hr, 3 miles/hr get used to cover what Tanaya is covering right now (since Tanaya's speed is 3 miles/hr). So he uses the extra 6 miles/hr to cover the 3 miles that Tanaya has already covered! That means it will take him half an hour ($3 \text{ miles} / 6 \text{ miles/hr}$) to cover the extra distance. In half an hour, i.e. at 1:30 pm, Stephen would have covered the same distance as Tanaya. At 1:30, Tanaya must be 4.5 miles ($= 3 \text{ miles/hr} \times 1.5 \text{ hrs}$) away from the starting point and Stephen would also be 4.5 miles away from the starting point (since he has covered the same distance as Tanaya).

“...and the amount of time it takes Stephen to cover twice the distance that Tanaya has covered?”

I also need to find the time it takes Stephen to cover twice the distance that Tanaya has covered. So, out of his speed of 9 miles/hr, 6 miles/hr will be used to cover twice of what Tanaya will now cover at a speed of 3 miles/hr. The leftover 3 miles/hr ($= 9 \text{ miles/hr} - 6 \text{ miles/hr}$) of his speed will be used to cover an extra 4.5 miles. If you are wondering why he has to cover an extra 4.5 mile, recall that at 1:30 pm, both of them are at a distance of 4.5 miles from the starting point. Stephen should have been at a distance of 9 miles from the starting point if he wants to cover double the distance that Tanaya covers from the starting point.

Hence, now he needs to cover an extra 4.5 miles. At a speed of 3 miles/hr (which we obtained above using $9 \text{ miles/hr} - 6 \text{ miles/hr}$), it will take him 1.5 hrs to cover the extra 4.5 miles ($= 4.5 \text{ miles} / 3 \text{ miles per hour}$). Therefore, at 3:00 pm he would have covered twice the distance that Tanaya would have covered since 12 noon.

The time difference between 1:30 pm and 3:00 pm is 1.5 hrs (90 mins). This is the required time difference.

Answer (C)

How long do you think it takes to think all this?