IIT Madras

ONLINE DEGREE

Mathematics for Data Science 1
Week-02 Tutorial-09

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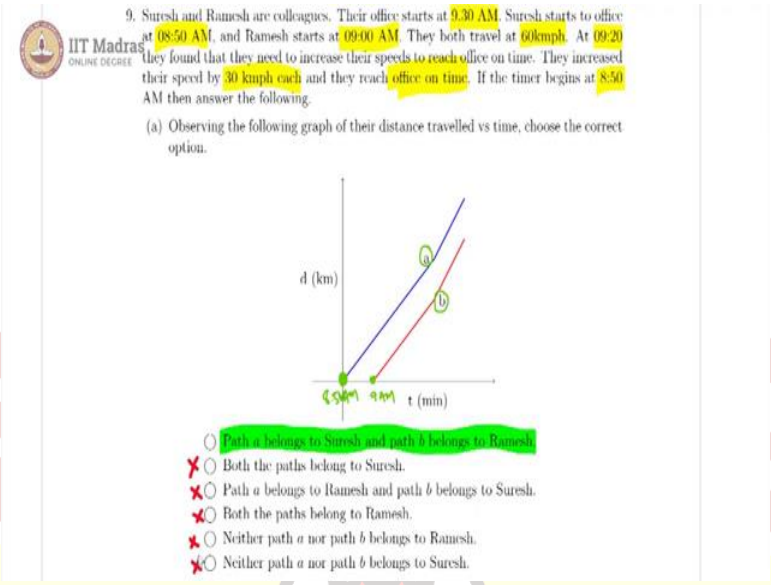

For our 9 th problem, we have 2 colleagues Ramesh and Suresh, and their office starts at 9:30 AM, Suresh starts at 8:50, Ramesh starts at 9, and they both go at equal speed. At 9:20 they decide to increase their speeds in order to reach their office on time, which is at 9:30 and this increase in speed was 30 kilometer per hour each, and they manage to reach the office on time. So, the timer begins at 8:50 AM, which means our origin is corresponding to 8:50 AM.

And since we know that Suresh started at 8:50 path A must belong to Suresh and Ramesh started a little late, so this here should be 9 AM. So, B, the path B corresponds to Ramesh's journey, which gives us option A is correct. Of course, this is wrong because both paths do not belong to Suresh. This is also wrong because path A does not belong to Ramesh, both paths do not belong to Ramesh and Ramesh has a path Suresh has a path so all of these options are wrong, only option A is right.

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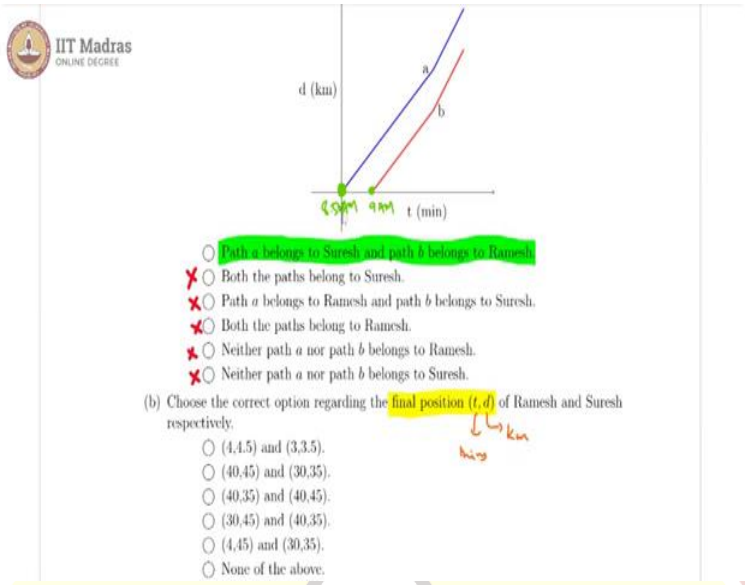

Now, in the second part, we are being asked the final position t, d, where t must be in minutes and d must be in kilometers. So, what, so this is not actually the position, is a coordinate in this particular graph regarding the final position of Ramesh and Suresh respectively.

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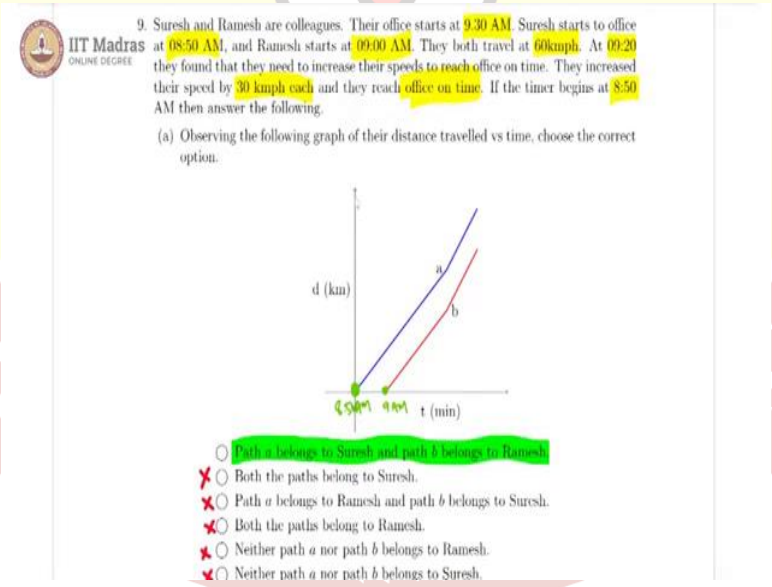

So, we know that, Suresh started at 8:50 and he traveled till 9:30. That means, Suresh traveled for 40 minutes, whereas, Ramesh started at 9 AM and reached office at 9:30 AM. So, Ramesh started for 30 minutes.

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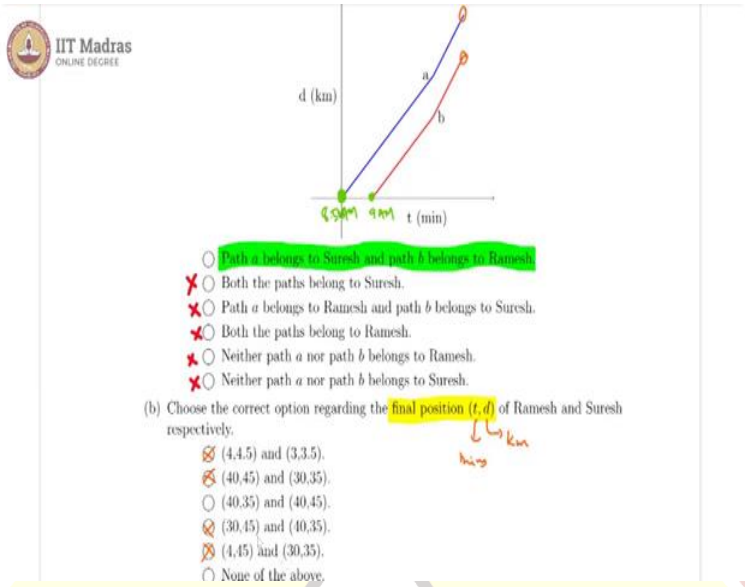

However, both of them reached at the same time, which means, this point and this point in the graph, both of them have the same x coordinate. Now, that clearly rules out this, this, this and this, because none of these have the same x coordinate.

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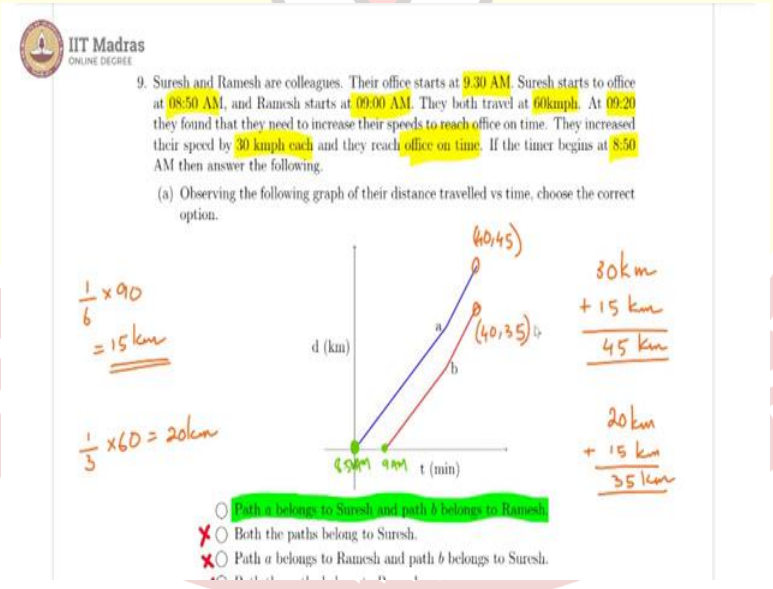

In terms of the number of kilometers traveled, Suresh goes at 60 kmph for $\frac{1}{2}$ an hour till 9:20. So, in $\frac{1}{2}$ an hour he must have covered 30 kilometers and then for 10 minutes, he goes at a speed of an additional 30 kmph, so, 90 kilometer per hour for 10 minutes. So, 10 minutes is $\frac{1}{6}$ an hour, $\frac{1}{6} \times 90$ gives us 15 km. So, overall Suresh covered 45 km, so this point it must be 40, 45.

Whereas, Ramesh also covered the same 15 km in those 10 minutes but in the initial time of established it is only 20 minutes, he did not cover 30, he instead covered 20 minutes is $\frac{1}{3}$ of an hour $\frac{1}{3} \times 60$ gives us 20 km. So, Ramesh covered 20 km + 15 km s giving us 35 kilometer overall. So, this point here it is 40, 35.

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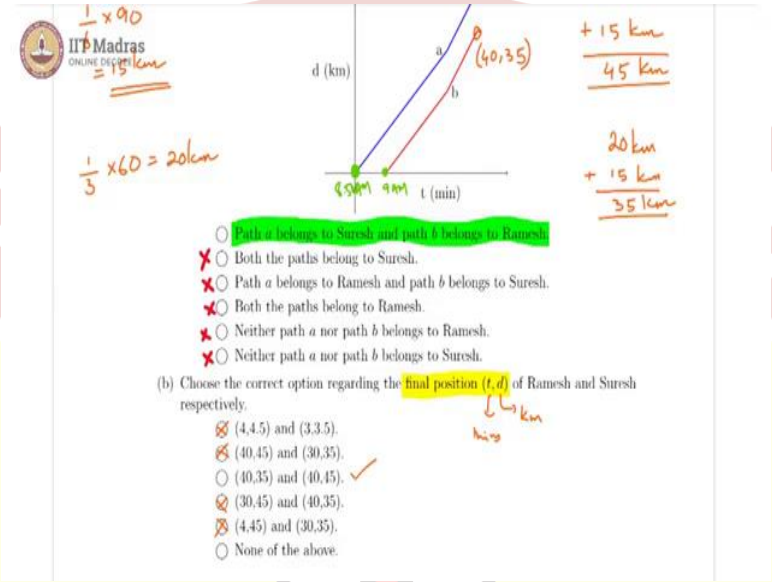

So, our correct option is this one.