The Fastest First Science lesson 2

Learning aim: To calculate, evaluate and present conclusions from distance time graphs.

Problem solving step 5 – I explore problems by thinking about the pros and cons of possible solutions.

Speaking step 5 – I speak effectively by using appropriate language.

Aliyah is a planning officer with the Department for Transport working on routes between Creweston station and 3 destinations for the HS2 (high speed train) government project. They need to start building the fastest route first due to budgeting limitations.

The 3 destinations are:
1) Birmingbeef
2) Ladychester
3) Liverpond

She has distance-time graphs which simulate the 3 routes and must work out which will be the quickest. (They are all 60 miles away). Some routes involve more stop signals, some go through rock so the train must slow down etc., and this can affect journey time.

Aliyah has lost the information that tells her which distance time graph is which destination. She has also made some calculations but did them in a rush.
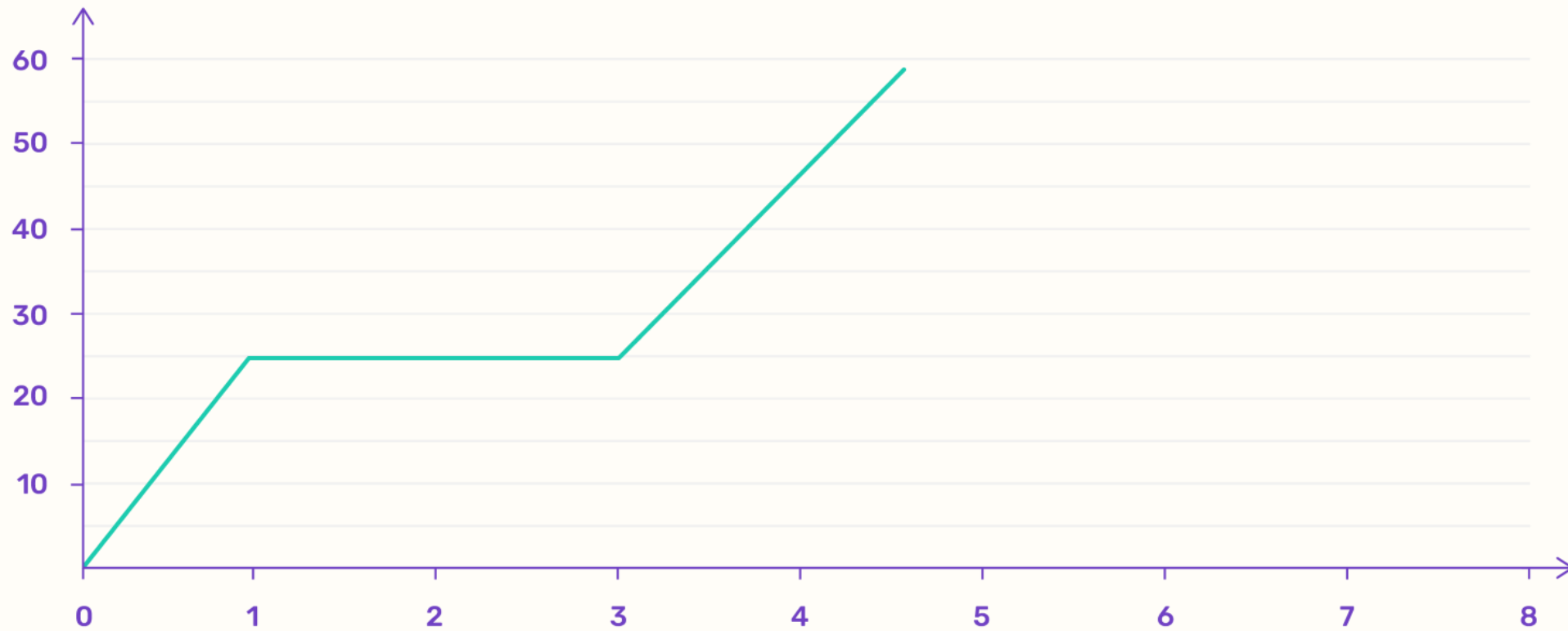
$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

Distance

Speed x Time
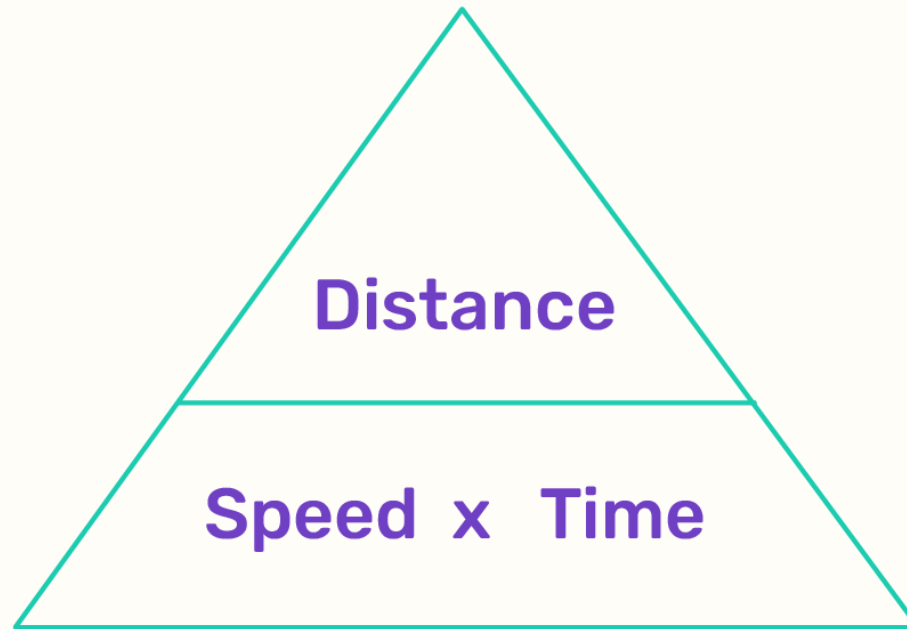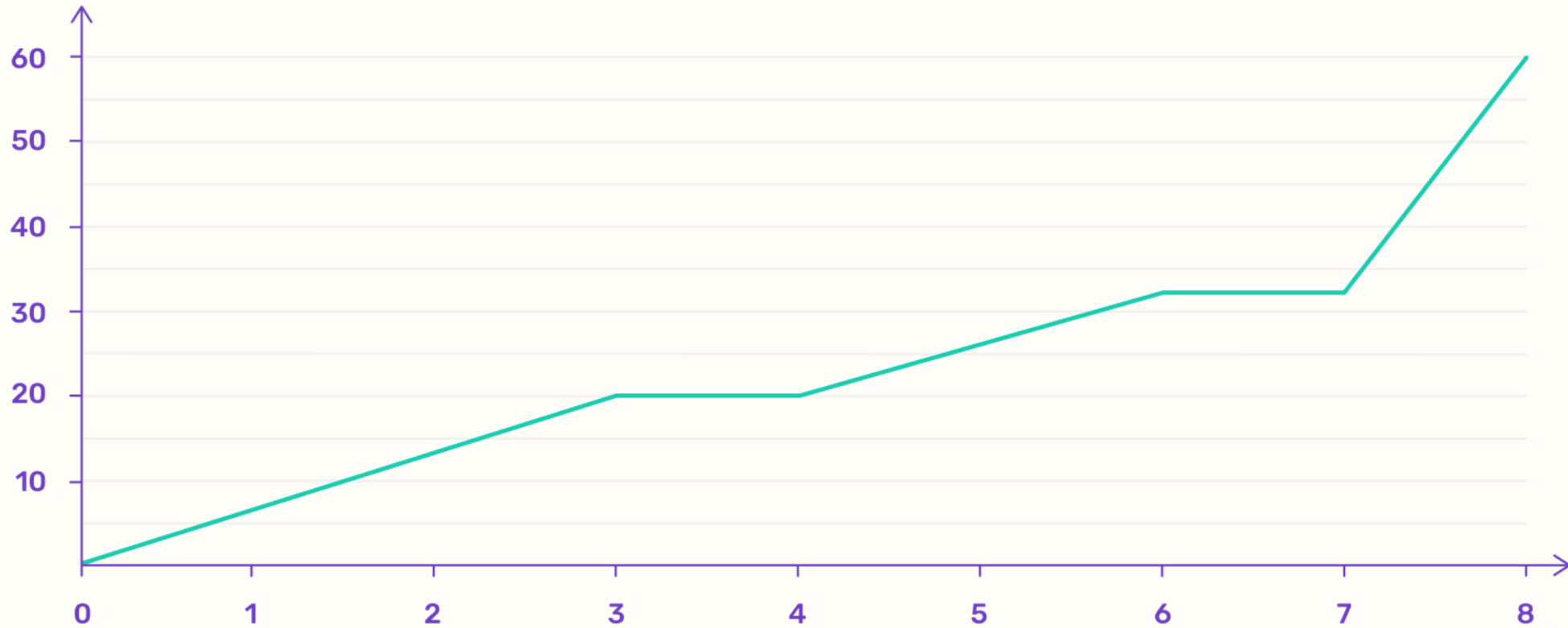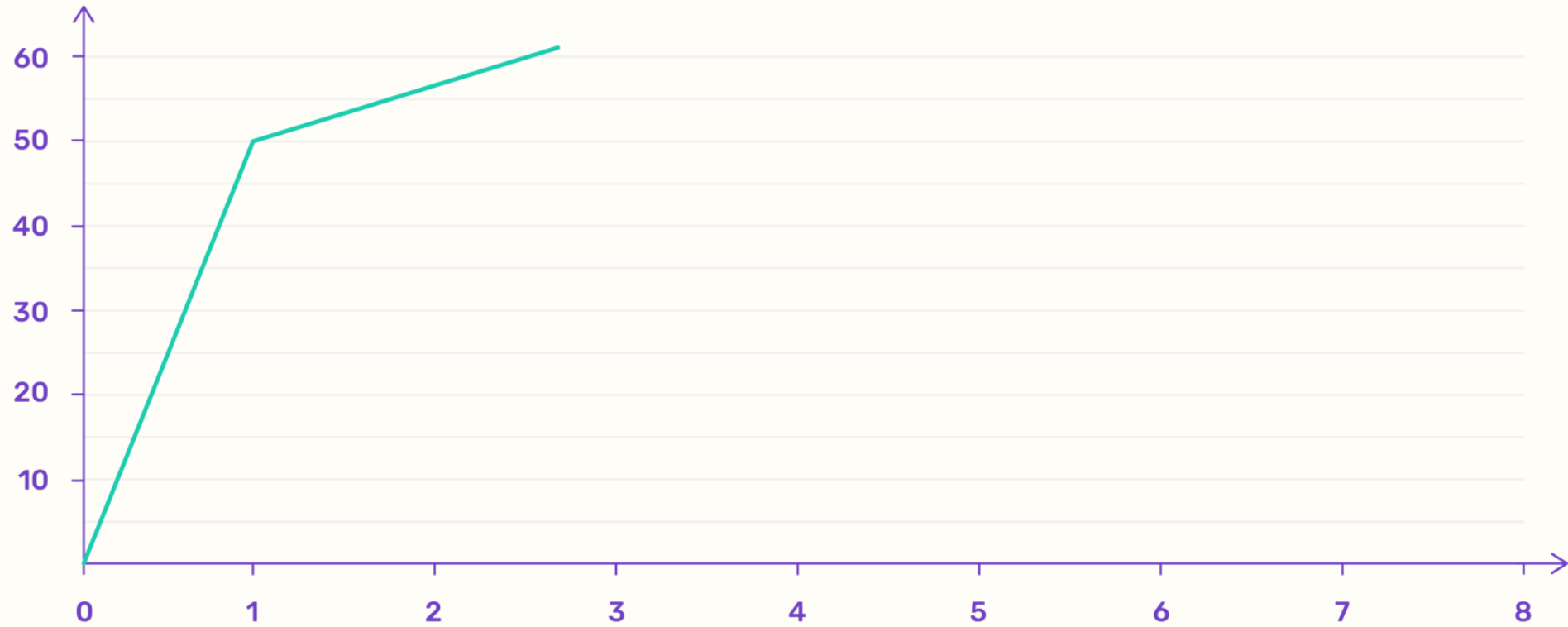
Graph 1

Graph 2

Graph 3

Distance (miles)

Time (hours)

Task

You are in a group of 3 troubleshooters who work for the Department for Transport. Aliyah has asked for your help. You need to present your findings to each other and Aliyah.

In your group, you must:

1) Work out which distance time graph is which from information given on the student task sheet and add labels to the graphs to help you explain your decision.

2) Check Aliyah's calculations and make any corrections.

For each of her calculations:
- Check if her calculations are correct or not AND be able to explain the calculation.
- Show the correct answer – with the working out, if you think she has made a mistake.
- Tell her which is the quickest route.

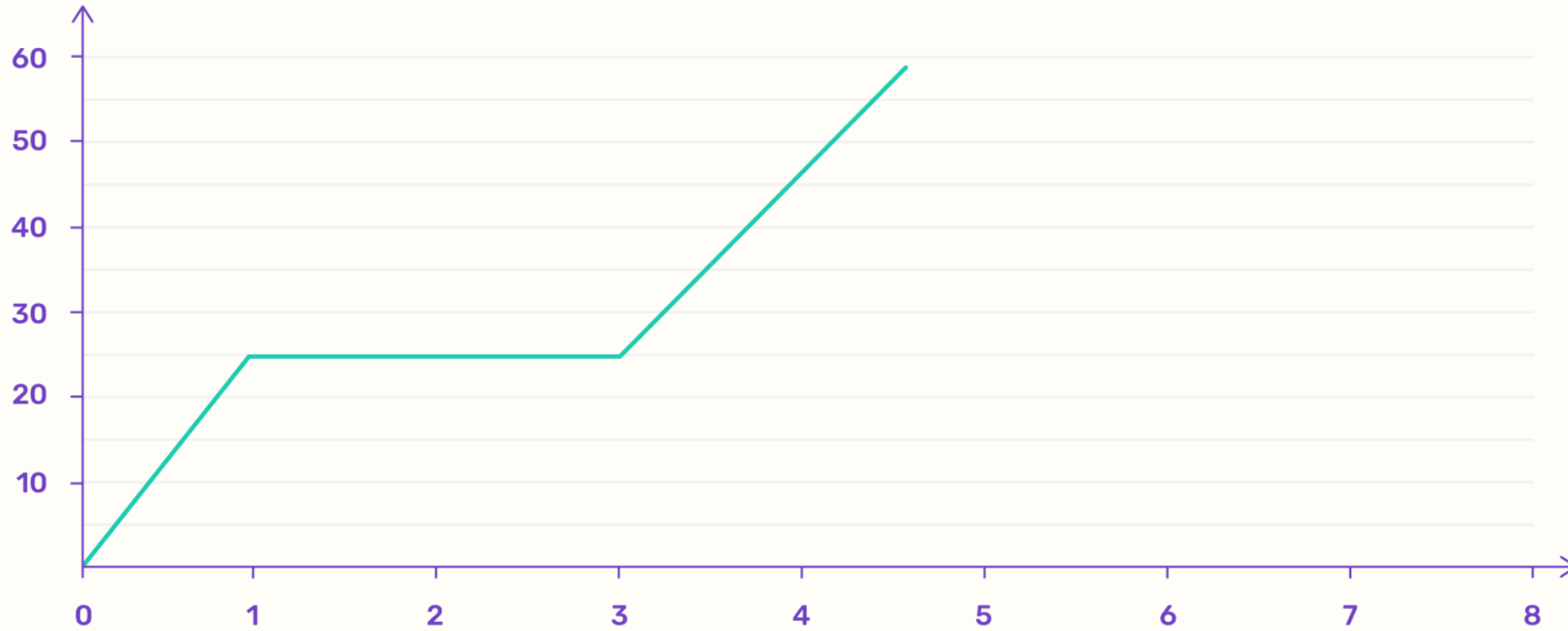$$Speed = \frac{Distance}{Time}$$

Distance

Speed x Time
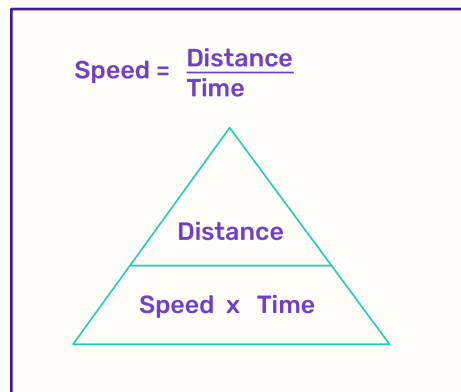
You will present your conclusions in 10 minutes and explain which route Aliyah should recommend building first. (Remember, they will need to build the fastest route first.)

➢ The youngest in your group will check graph 1
➢ The oldest - graph 2
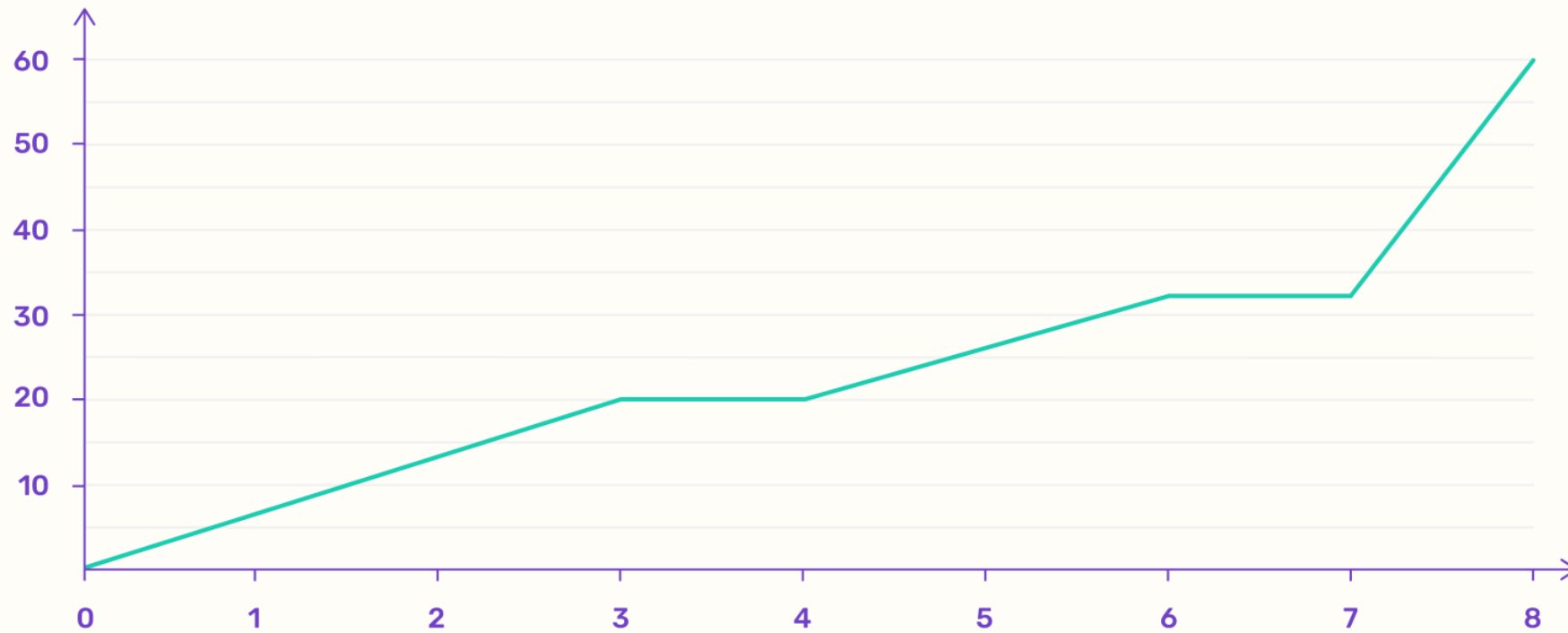➢ The third person in your group - graph 3

Graph 1 answer

Graph 2 answer

Graph 3 answer

Extension

A HS2 train travels from Creweston to a town near Liverpond called Toy Town. The train leaves at 09:15 and stops at Ladychester along the way. The distance-time graph below shows the train's journey.
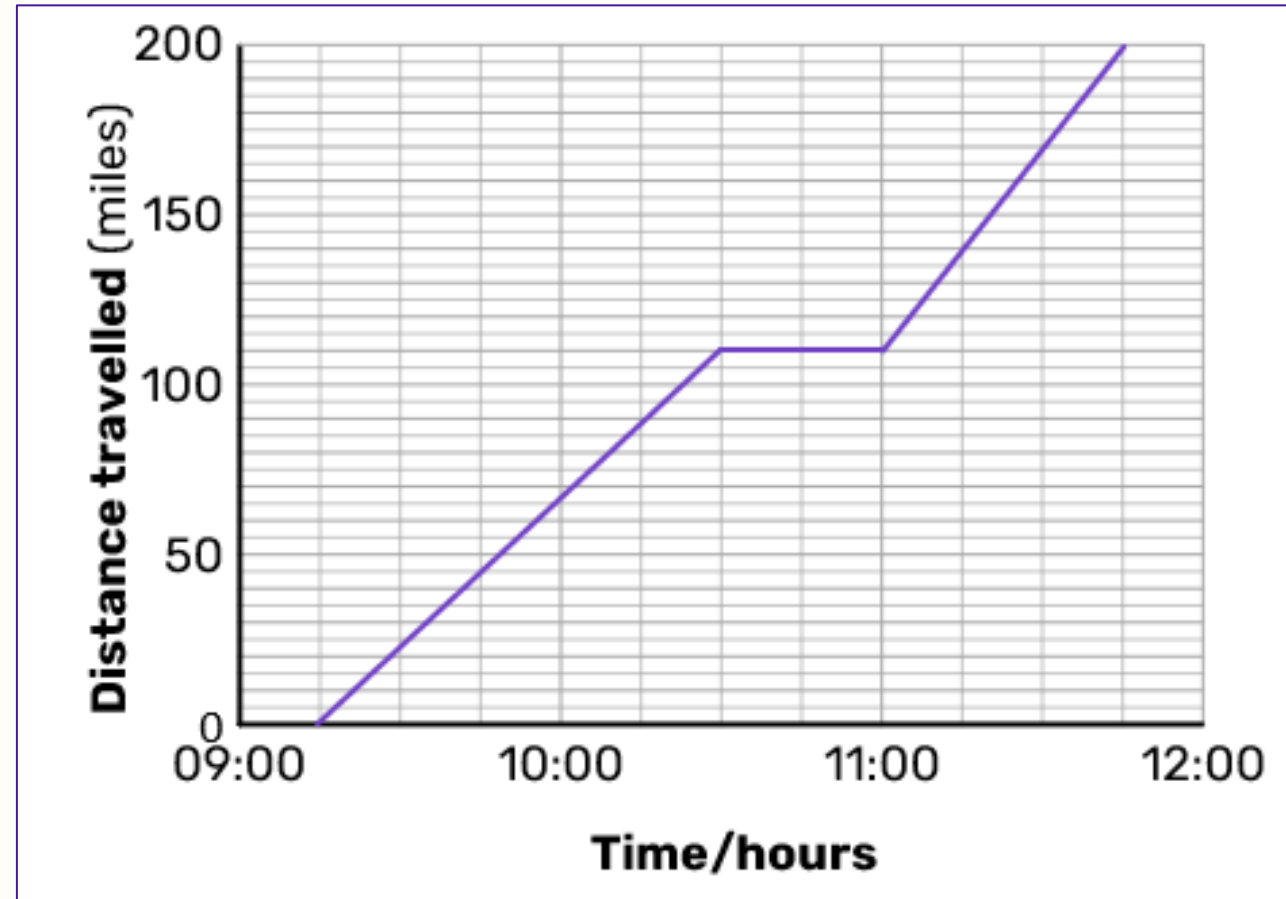
Q1.
[A] What is the distance between Creweston and Ladychester?

[B] How long did the train stay at Ladychester?

[C] What speed did the train travel at between Ladychester and Toy Town?

[D] How far did the train travel in total?

[E] What was the train's average speed for the entire journey?

Extension

A HS2 train travels from Creweston to a town near Liverpond called Toy Town. The train leaves at 09:15 and stops at Ladychester along the way. The distance-time graph below shows the train's journey.

Answers

Q1.
[A] What is the distance between Creweston and Ladychester?

110 miles

[B] How long did the train stay at Ladychester?

30 minutes

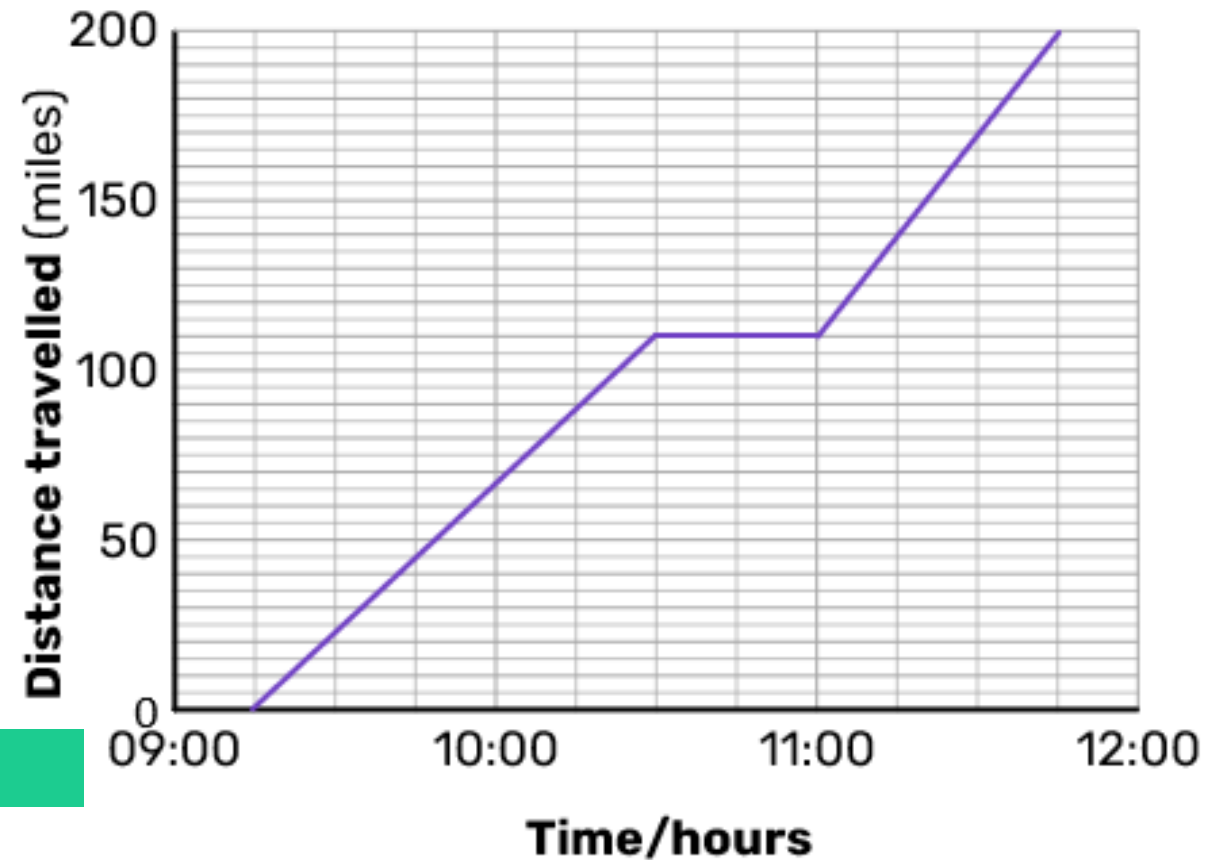[C] What speed did the train travel at between Ladychester and Toy Town?

120 mph
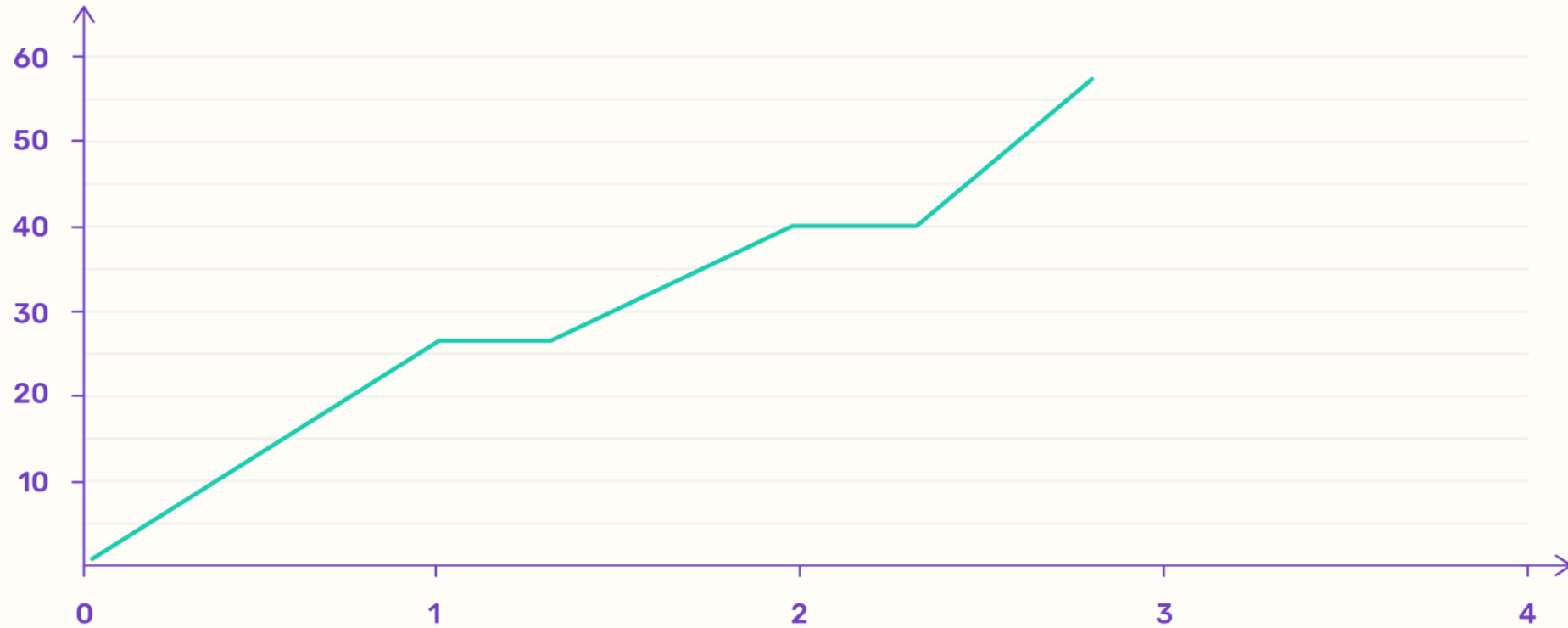
[D] How far did the train travel in total?

200 miles

[E] What was the train's average speed for the entire journey?

80 mph

Extension activity graph answer

1 – What did you do well in today's session?
2 – How well did you speak in your team today?
Rate yourself 1-5.
1 (I didn't speak at all in my team) - 5 (I spoke in my team, using appropriate language and examples to illustrate my points)
3 – What could you do to improve your speaking skills in future?