Textbook

4 Forces and motion

4.1 Speed

1   150 km / 2 hours = 75 km/h
2   200 m / 40 s = 5 m/s
3   Nikita
4a True – Car 1 = 100 km / 2 hours = 50 km/h. Car 2 = 100 km / 3 hours = 33.3 km/h.
 b True – Girl = 10 m / 4 s = 2.5 m/s. Boy = 10 m / 3 s = 3.3 m/s.
 c False – Motorbike = 50 km / 0.5 h = 100 km/h. Car = 100 km / 0.45 h = 133.3 km/h.

5   The two speeds are measured in different units so it is not possible to tell which speed is faster by the number. The speeds need to be changed into the same units to know which one is fastest.

4.3 Distance-time graphs

1   Section E – it is the steepest which she has moved a greater distance in a shorter time, and so is moving faster than anywhere else on the graph.
2a Amira
 b David – there is a section of his graph where the distance does not change.
 c David
 d Amira
 e Average speed = total distance / total time = 4500 m / 15 minutes = 4500 m / 900 s = 5 m/s
3   C = 1400 m / 13 mins = 1400 m / 780 s = 1.8 m/s
    E = 2100 m / 10 mins = 2100 m / 600 s = 3.5 m/s

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4 Forces and motion

4.1 Speed

1a F – to calculate speed you need to know distance and time

b T

c F – speed is not measured in newtons per second.

d F – a steady speed is a speed that is constant.

2a average speed

b The average speed is the total distance travelled divided by the total time, the speed may have varied during this time.

3a 101 seconds

b average speed = 800 m/101 s = 7.92 m/s

c average speed = 400 m/44 s = 9.09 m/s

d 88 seconds

4.3 Distance-time graphs

1a 20 m/4 s = 5 m/s, 18 m/6 s = 3 m/s, 16 m/8 s = 2 m/s

b graph A shows the fastest speed – the line is steepest meaning the same distance is travelled in less time.

2a 600 m

b 180 s

c average speed = 600 m/180 s = 3.33 m/s