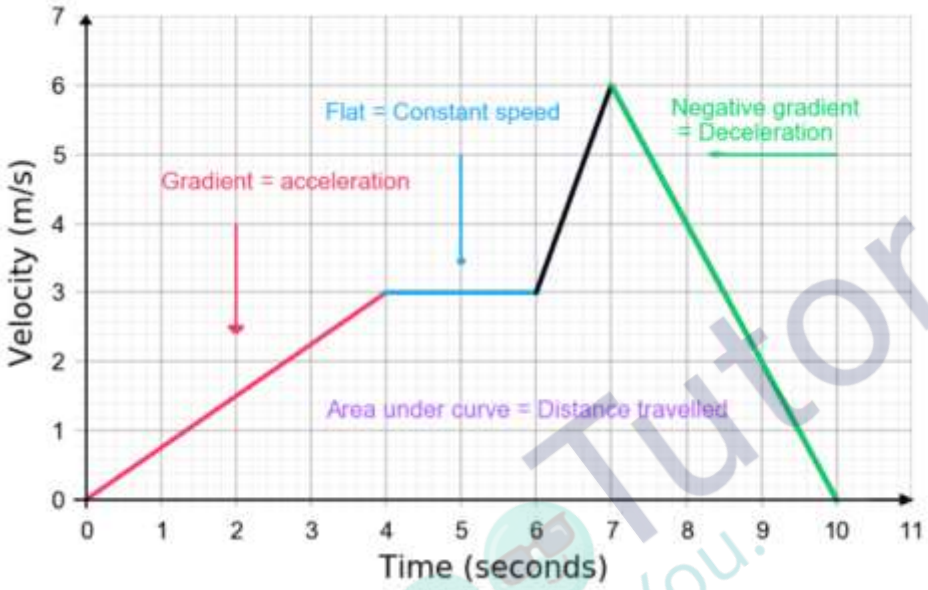
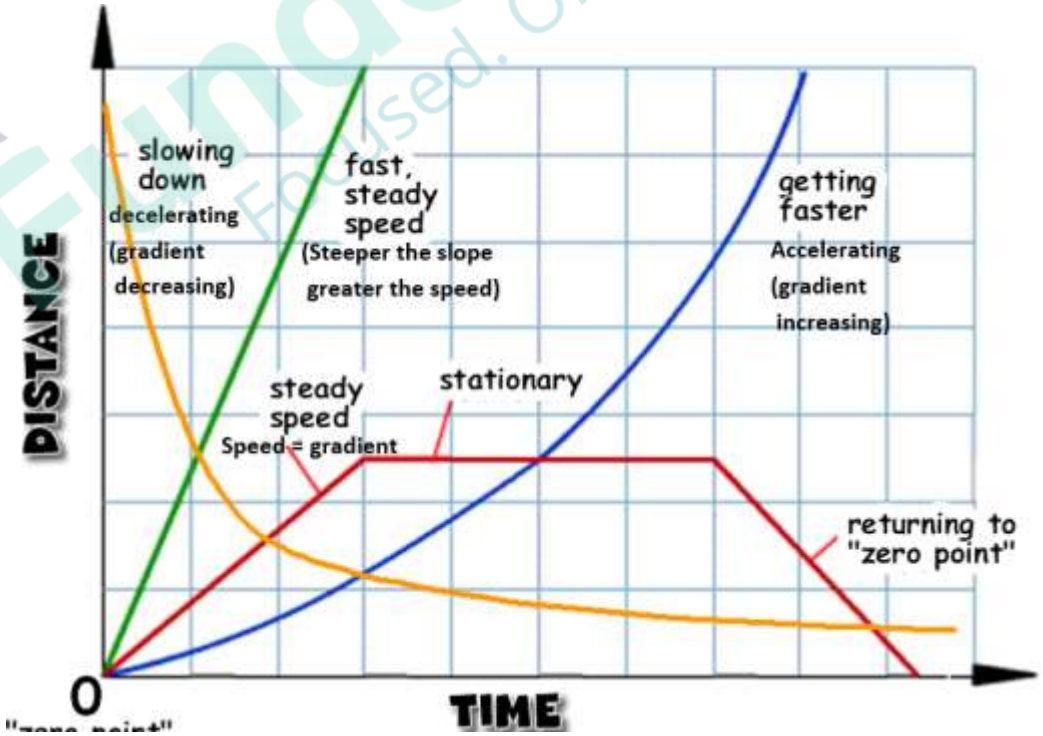
Past Papers Worksheet P2 and P4 Travel Graphs IGCSE Mathematics 0580

Speed Time Graph



Distance Time Graph

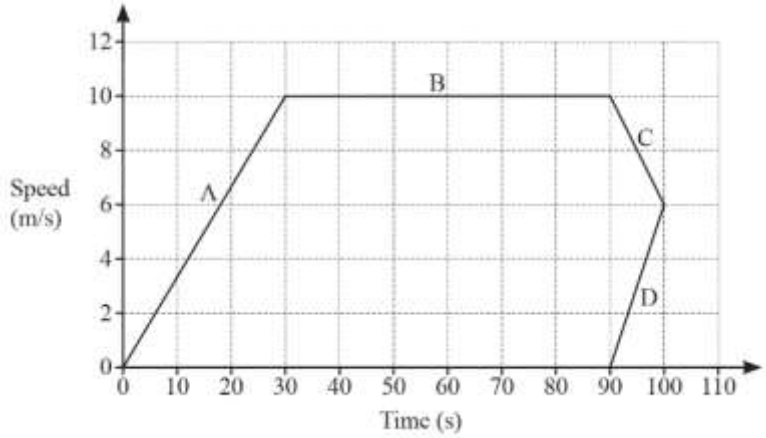


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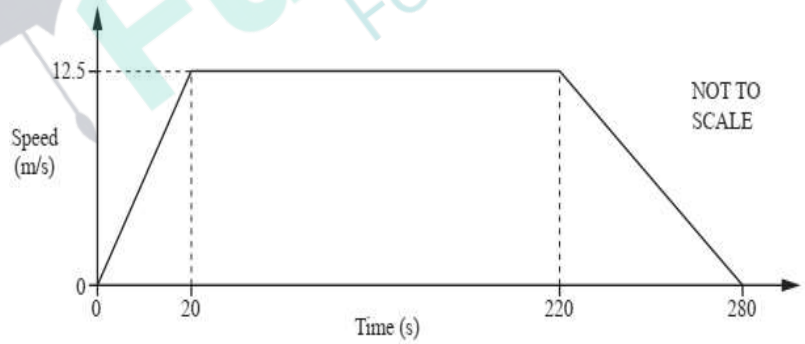
[Q1 to Q34]

1. Abdul draws this speed–time graph for a journey.



The graph has four sections A, B, C and D.
Complete these statements about the speed–time graph.
Section ..... cannot be correct.
Section ..... shows constant speed.
Section ..... shows deceleration.
Section A shows acceleration of .....m/s^2
The distance travelled in the first 30 seconds of the journey is ..... m. [4]
0580/23/M/J/22 Q16)

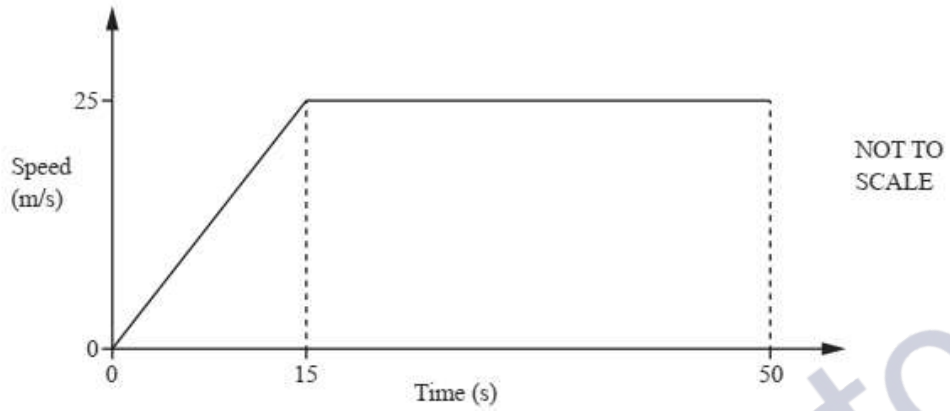
2. The diagram shows a speed-time graph for the journey of a car.



Calculate the total distance travelled. [3]
0580/23/M/J/17 Q18)

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3. The speed–time graph shows the first 50 seconds of a journey.
Calculate

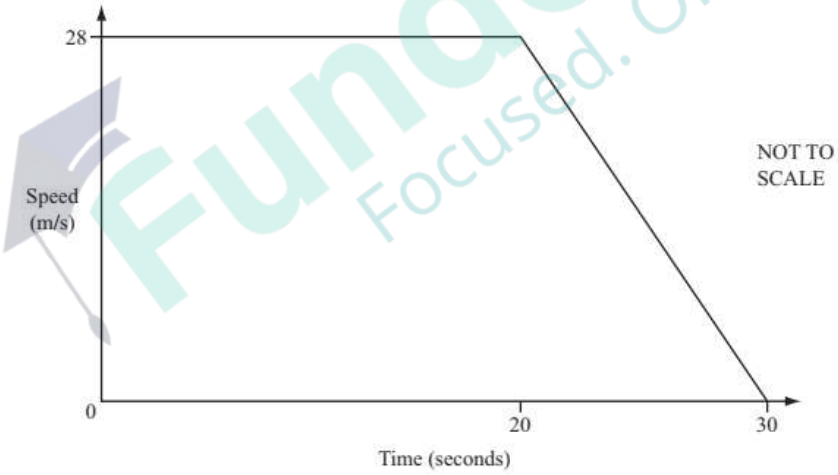


(a) the acceleration during the first 15 seconds, [1]

(b) the distance travelled in the 50 seconds. [3]

0580/22/F/M/19 Q22)

4. The diagram shows the speed-time graph of a car.



It travels at 28m/s for 20 seconds and then decelerates until it stops after a further 10 seconds.

(a) Calculate the deceleration of the car. [1]

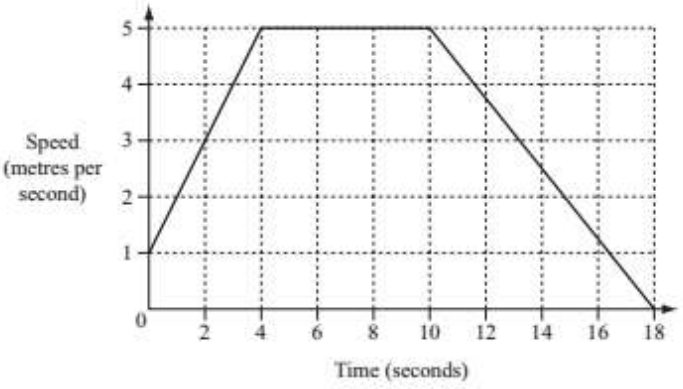
(b) Calculate the distance travelled during the 30 seconds. [3]

0580/21/M/J/13 Q25)

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5. The diagram shows the speed-time graph for the last 18



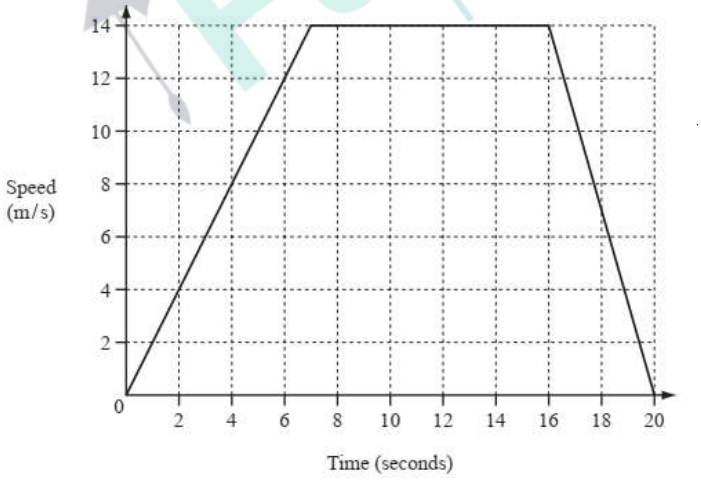
seconds of Roman's cycle journey.

(a) Calculate the deceleration. [1]

(b) Calculate the total distance Roman travels during the 18 seconds. [3]

0580/23/O/N/12 Q19)

6. An animal starts from rest and accelerates to its top speed in 7 seconds. It continues at this speed for 9 seconds and then slows to a stop in a further 4 seconds.
The graph shows this information.



(a) Calculate its acceleration during the first seven seconds. [1]

(b) Write down its speed 18 seconds after the start. [1]

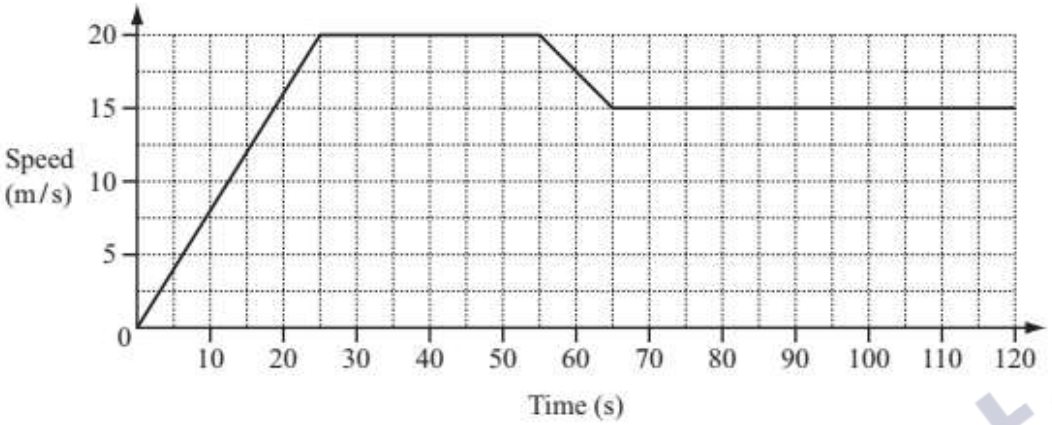
(c) Calculate the total distance that the animal travelled. [3]

0580/22/O/N/10 Q21)

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7. The diagram shows the speed-time graph for the



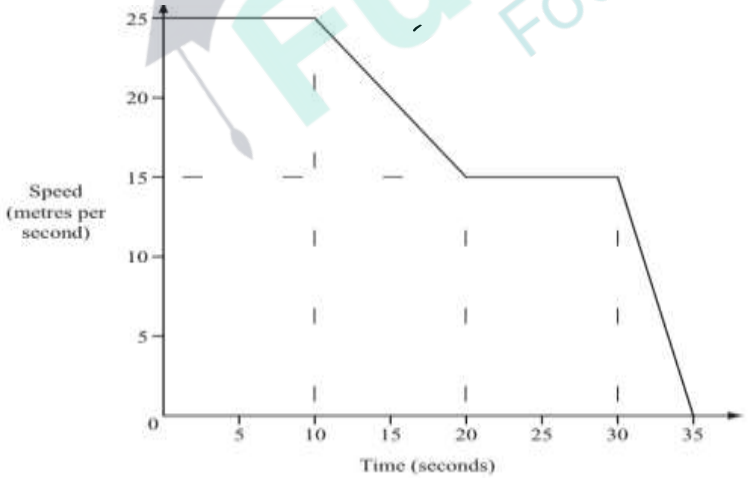
first 120 seconds of a car journey.

(a) Calculate the acceleration of the car during the first 25 seconds. [1]

(b) Calculate the distance travelled by the car in the first 120 seconds. [4]

0580/21/M/J/12 Q18)

8. The diagram shows the speed-time graph for the last 35 seconds of a car journey. The diagram shows the speed-time graph for the last 35 seconds of a car journey.



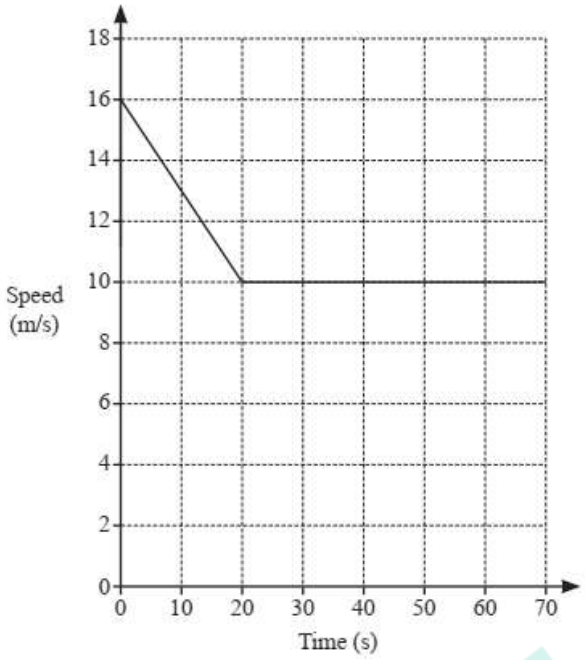
(a) Find the deceleration of the car as it came to a stop. [1]

(b) Calculate the total distance travelled by the car in the first 30 seconds. [3]

0580/22/O/N/12 Q15)

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9. The diagram shows the speed–time graph for 70 seconds of a car journey

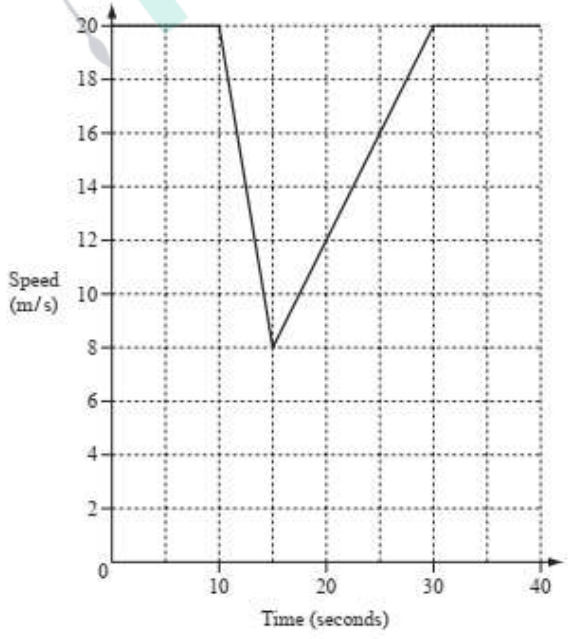


(a) Calculate the deceleration of the car during the first 20 seconds. [1]

(b) Calculate the total distance travelled by the car during the 70 seconds. [3]

0580/23/O/N/19 Q19)

10. The graph shows 40 seconds of a car journey.



The car travelled at a constant speed of 20 m/s, decelerated to 8 m/s then accelerated back to 20 m/s. Calculate

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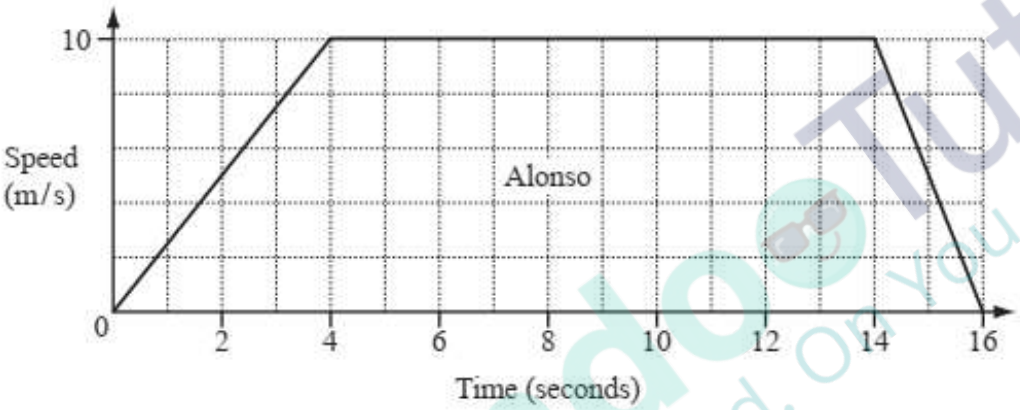


(a) the deceleration of the car, [1]

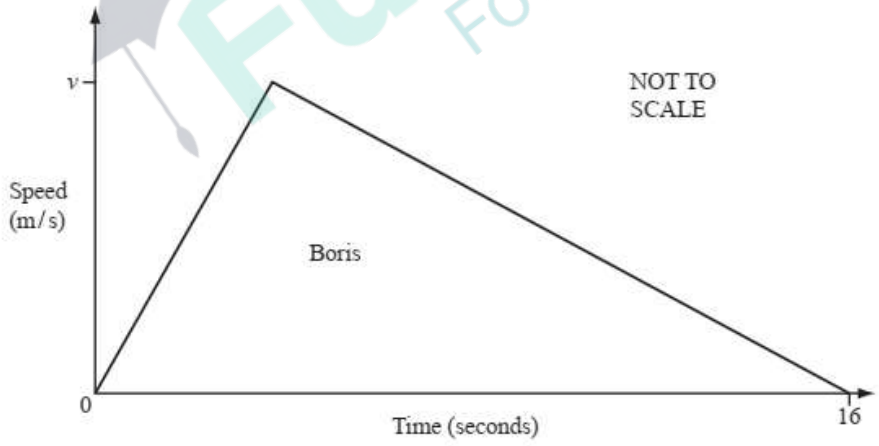
(b) the total distance travelled by the car during the 40 seconds. [3]

0580/23/O/N/10 Q21)

11. The graphs show the speeds of two cyclists, Alonso and Boris. Alonso accelerated to 10 m/s, travelled at a steady speed and then slowed to a stop.



Boris accelerated to his maximum speed, v m/s, and then slowed to a stop.

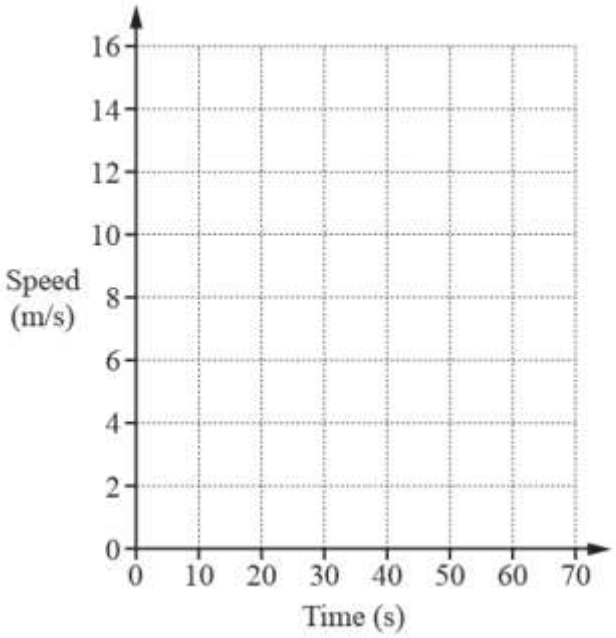


Both cyclists travelled the same distance in the 16 seconds. Calculate the maximum speed for Boris. Show all your working. [5]

0580/22/M/J/10 Q16)

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12. Petra begins a journey in her car.

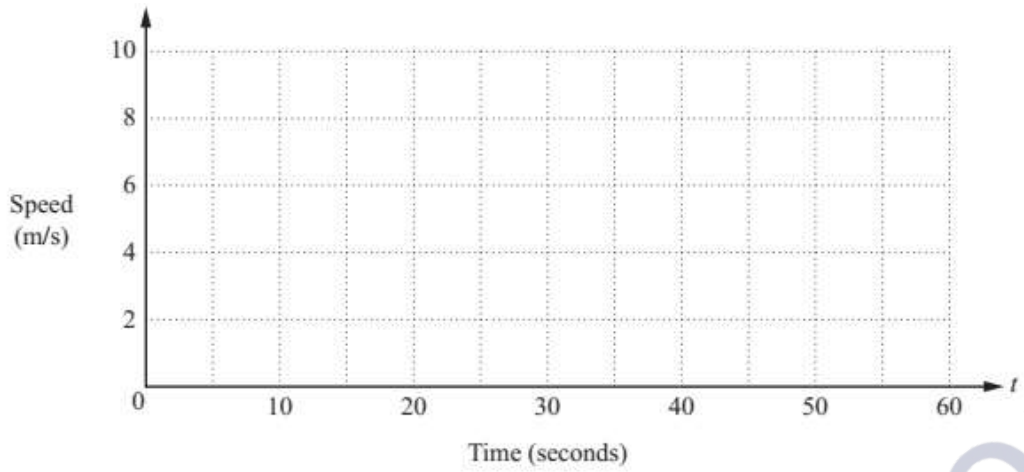


She accelerates from rest at a constant rate of 0.4 m/s^2 for 30 seconds. She then travels at a constant speed for 40 seconds. On the grid, draw the speed-time graph for the first 70 seconds of Petra's journey. [2]

0580/21/O/N/17 Q7)

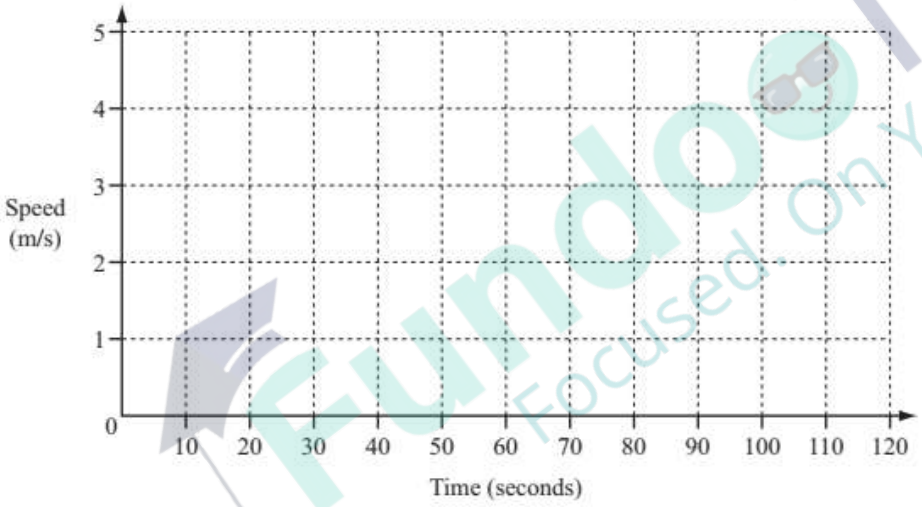
13. A car passes through a checkpoint at time t= 0 seconds, travelling at 8m/s.
It travels at this speed for 10 seconds.
The car then decelerates at a constant rate until it stops when t = 55 seconds.
(a) On the grid, draw the speed-time graph. [2]
(b) Calculate the total distance travelled by the car after passing through the checkpoint. [3]

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0580/22/O/N/15 Q20)

14. Emily cycles along a path for 2 minutes.



She starts from rest and accelerates at a constant rate until she reaches a speed of 5m/s after 40 seconds. She continues cycling at 5m/s for 60 seconds. She then decelerates at a constant rate until she stops after a further 20 seconds.

(a) On the grid, draw a speed-time graph to show Emily's journey. [2]

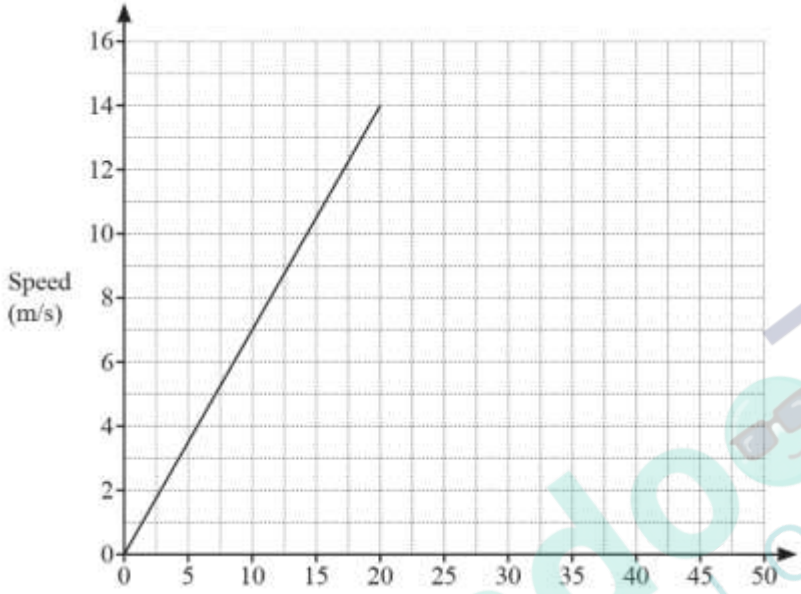
(b) Find Emily's acceleration. [1]

(c) Calculate Emily's average speed for the journey. [4]

0580/41/O/N/13 Q2)

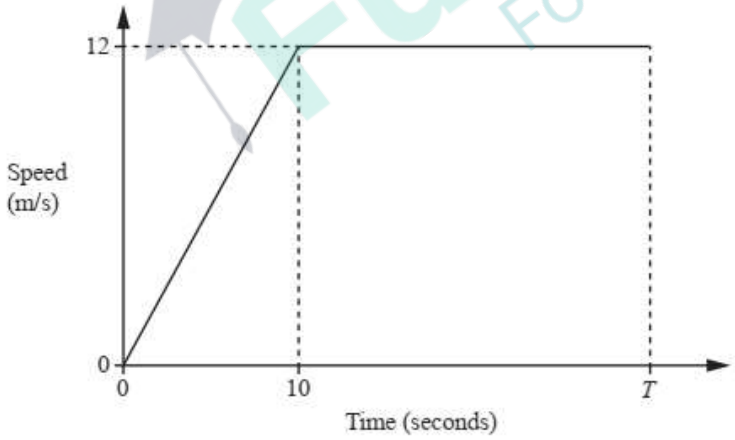
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15. A car starts its journey by accelerating from rest at a constant rate of $0.7\ \text{m/s}^2$ for 20 seconds, before reaching a constant speed of $14\ \text{m/s}$. It then travels at $14\ \text{m/s}$ for a distance of $210\ \text{m}$. The car then decelerates at a constant rate of $1.4\ \text{m/s}^2$, before coming to a stop. On the grid, complete the speed-time graph for the car's journey.



0580/22/O/N/21 Q11)

16. The diagram shows the speed–time graph for the first



T seconds of a car journey.

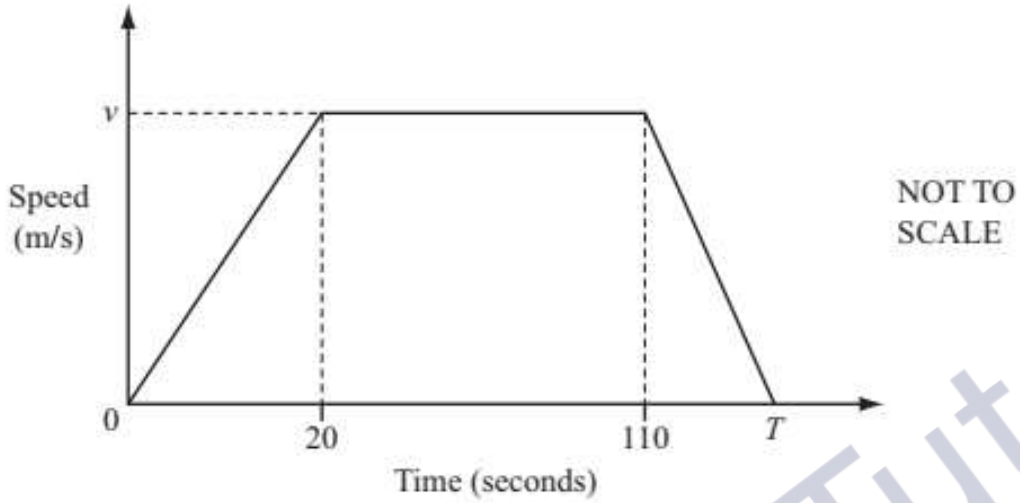
(a) Find the acceleration during the first 10 seconds. [1]

(b) The total distance travelled during the T seconds is 480m. Find the value of T. [3]

0580/23/O/N/18 Q21)

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17. The diagram shows the speed-time graph for a car travelling along a road for T seconds.



To begin with the car accelerated at 0.75m/s^2 for 20 seconds to reach a speed of v m/s.

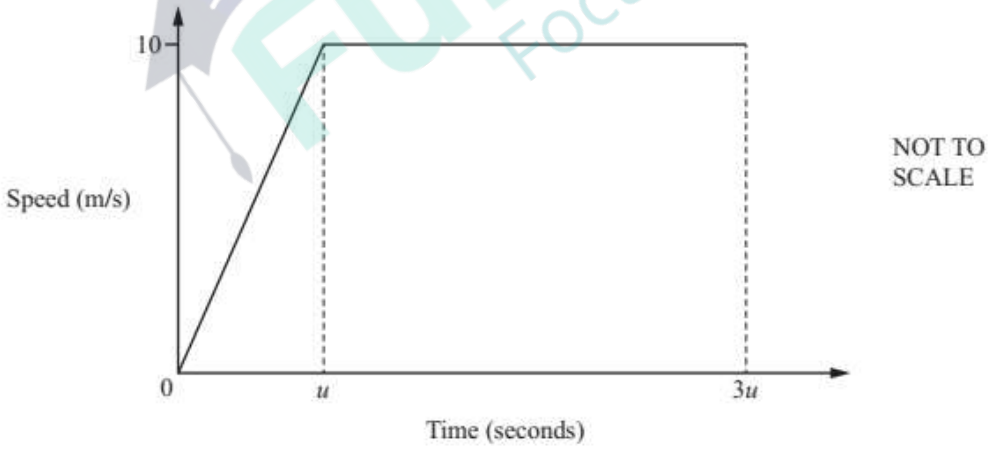
(i) Show that the speed, v, of the car is 15 m/s. [1]

(ii) The total distance travelled is 1.8 **kilometres**.

Calculate the total time, T, of the journey. [4]

0580/41/O/N/14 Q2(c)

18. A car starts from rest and accelerates for u seconds until it reaches a speed of 10m/s. The car then travels at 10m/s for 2u seconds.



The diagram shows the speed-time graph for this journey.

The distance travelled by the car in the first 3u seconds is 125m.

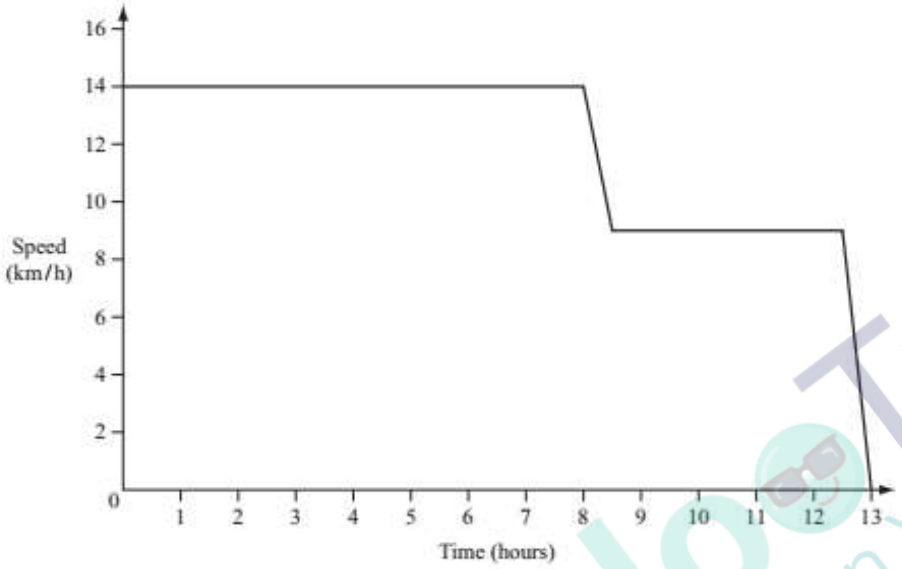
(a) Find the value of u. [3]

(b) Find the acceleration in the first u seconds. [1]

0580/23/M/J/15 Q12)

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19. A container ship travelled at 14 km/h for 8 hours and then slowed down to 9 km/h over a period of 30 minutes. It travelled at this speed for another 4 hours and then slowed to a stop over 30 minutes. The speed-time graph shows this voyage.

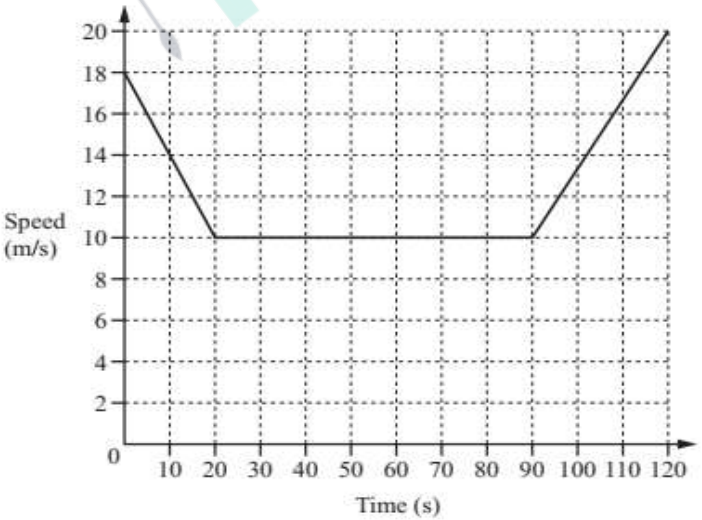


(a) Calculate the total distance travelled by the ship. [4]

(b) Calculate the average speed of the ship for the whole voyage. [1]

0580/21/O/N/11 Q15)

20. The diagram shows the speed-time graph for 120 seconds of a car journey.



(a) Calculate the deceleration of the car during the first 20 seconds. [1]

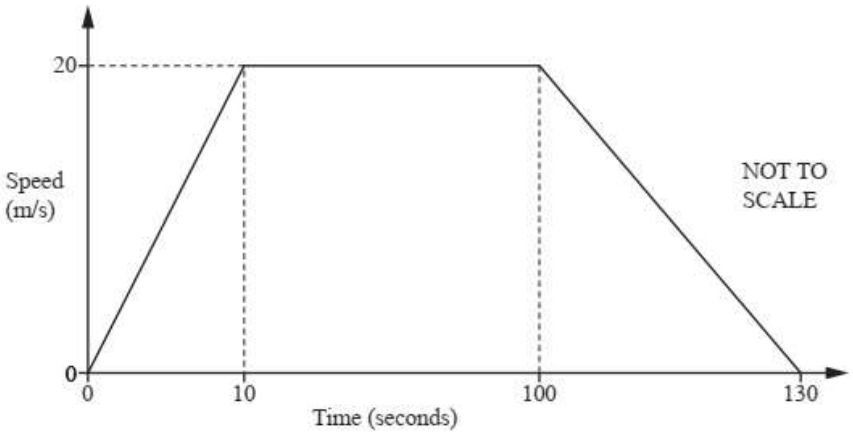
(b) Calculate the total distance travelled by the car during the 120 seconds [3]

(c) Calculate the average speed for this 120 second journey. [1]

0580/22/M/J/15 Q23)

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21. The speed-time graph shows information about the journey of a tram between two stations.

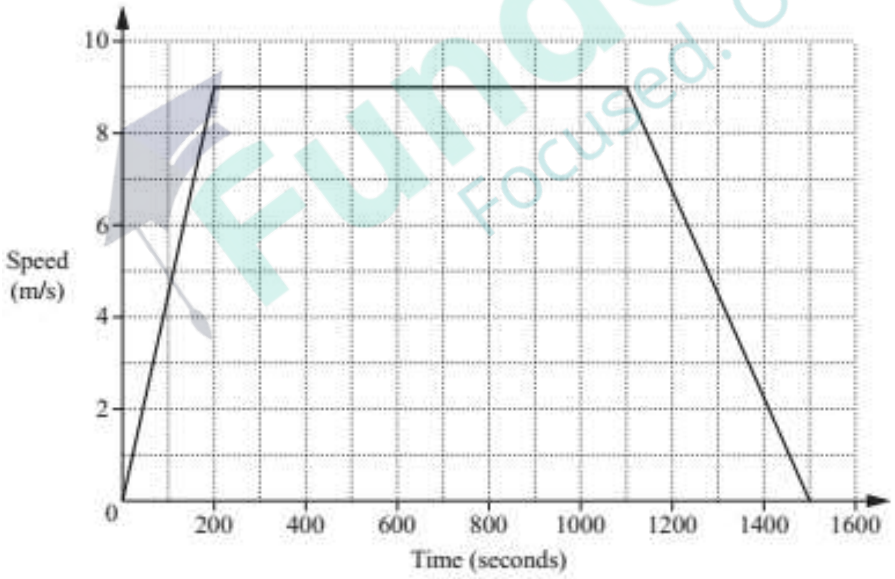


(a) Calculate the distance between the two stations. [3]

(b) Calculate the average speed of the tram for the whole journey. [1]

0580/21/M/J/18 Q17)

22. Davinder draws a speed-time graph for his bus journey to the market



Find

(i) the acceleration of the bus during the first 200 seconds, [1]

(ii) the total distance travelled by the bus, [3]

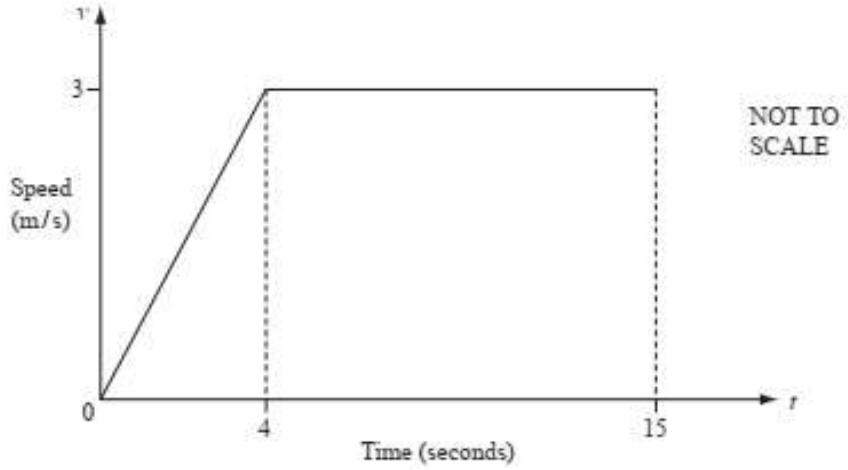
(iii) the average speed of the bus for the whole journey. [1]

0580/42/F/M/16 Q3)(b)

23. The diagram shows the speed-time graph for

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15 seconds of the journey of a cyclist.

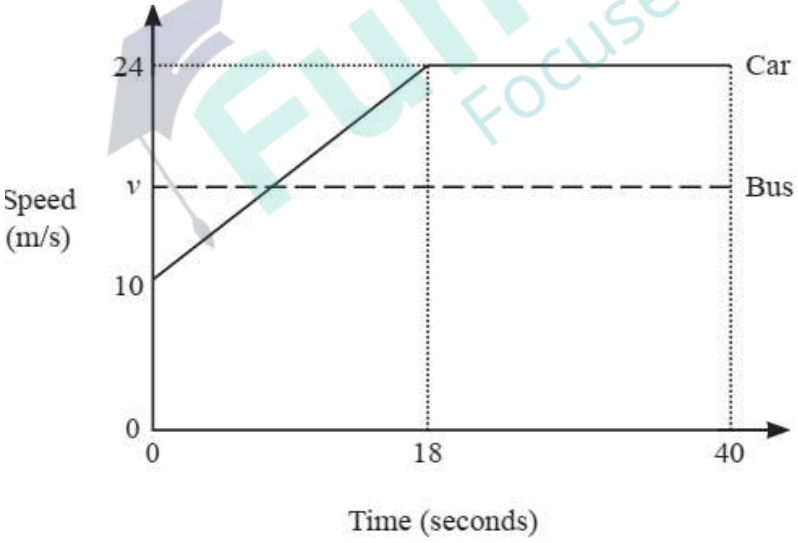


(a) Calculate the acceleration of the cyclist during the first 4 seconds. [1]

(b) Calculate the average speed for the first 15 seconds. [3]

0580/23/M/J/10 Q19)

24. (a) The diagram shows the speed–time graph for part of a journey for two vehicles, a car and a bus.



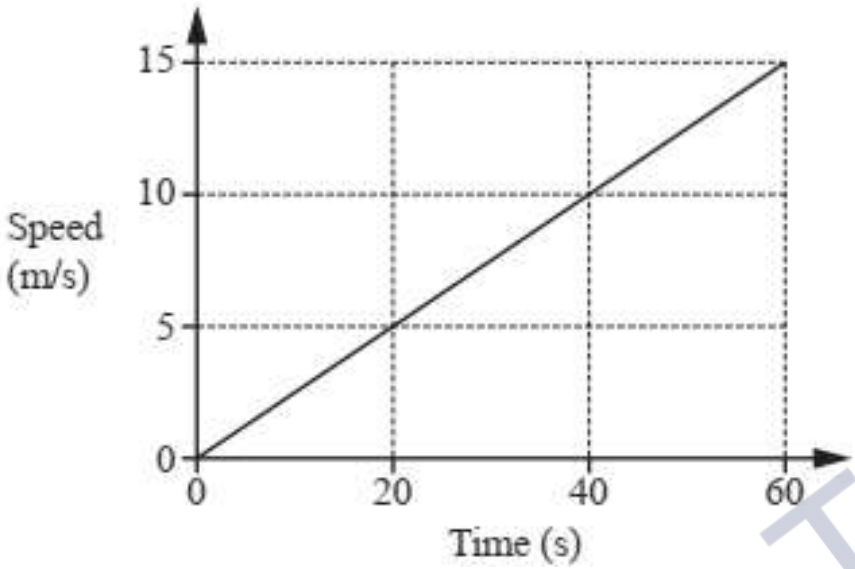
(i) Calculate the acceleration of the car during the first 18 seconds. [1]

(ii) In the first 40 seconds the car travelled 134m more than the bus. Calculate the constant speed, v, of the bus [4]

0580/42/O/N/22 Q5(a)

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25. The speed-time graph shows the first 60 seconds of a train journey.



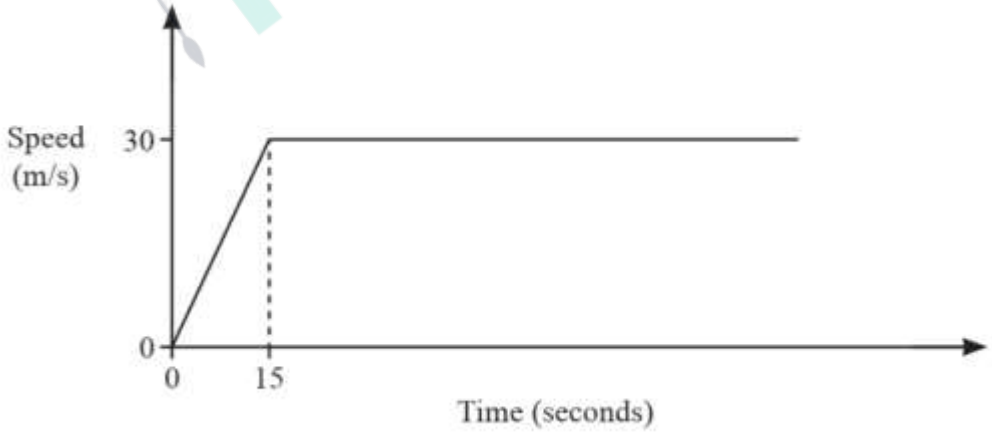
(a) Find the acceleration of the train [1]

(b) Calculate the distance the train has travelled in this time.
Give your answer in kilometres. [3]

0580/22/F/M/17 Q16)

26. The diagram shows the speed–time graph for part of the journey of a car. The car starts from rest and accelerates at a uniform rate for 15 seconds before reaching a constant speed of 30m/s.

(a) Calculate the acceleration for the first 15 seconds. [1]

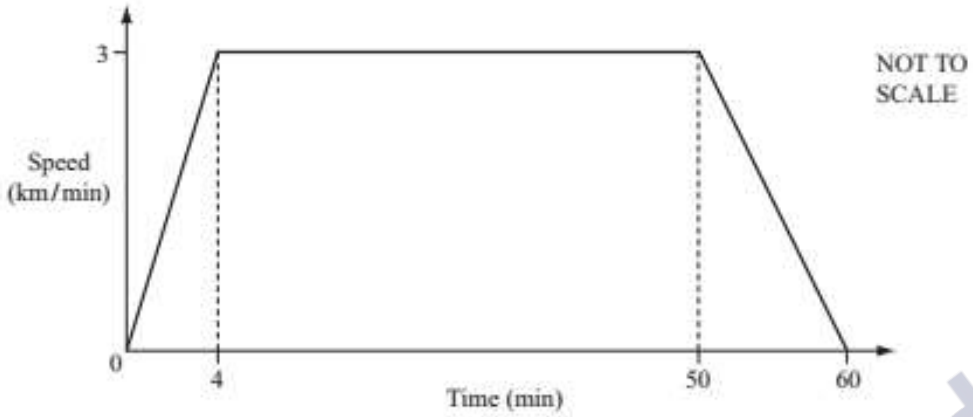


(b) After T **minutes**, the total distance travelled is 45 **kilometres**.
Find the value of T. [4]

0580/23/O/N/22 Q15)

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27. A train journey takes one hour.



The diagram shows the speed-time graph for this journey.

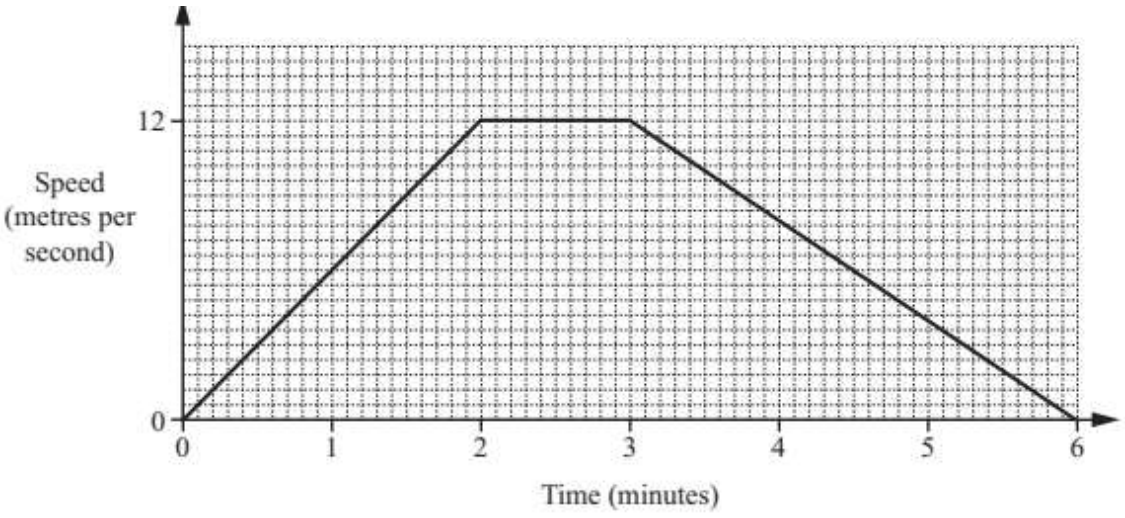
(a) Calculate the total distance of the journey.
Give your answer in kilometres. [3]

(b) (i) Convert 3 kilometres / minute into metres /second. [2]

(ii) Calculate the acceleration of the train during the first 4 minutes. Give your answer in metres / second^2. [2]

0580/23/M/J/11 Q22)

28. A tram leaves a station and accelerates for 2 minutes until it reaches a speed of 12 metres per second. It continues at this speed for 1 **minute**. It then decelerates for 3 minutes until it stops at the next station. The diagram shows the speed-time



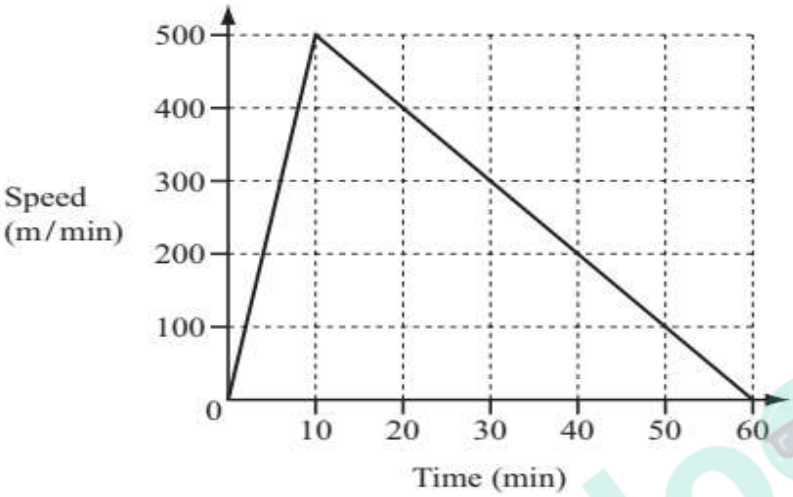
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graph for this journey. Calculate the distance, in metres, between the two stations. [3]

0580/21/M/J/15 Q10)

29. The diagram shows the speed-time graph for a boat journey.

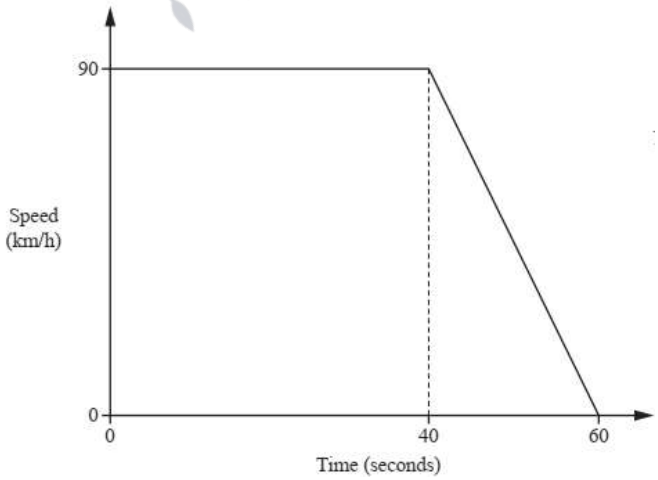


(a) Work out the acceleration of the boat in metres /minute^2. [1]

(b) Calculate the total distance travelled by the boat. Give your answer in **kilometres**. [2]

0580/22/M/J/12 Q10)

30. The diagram shows the speed–time graph for 60 seconds of a car journey.



(a) Change 90 km/h to m/s. [2]

(b) Find the deceleration of the car in m/s^2 [1]

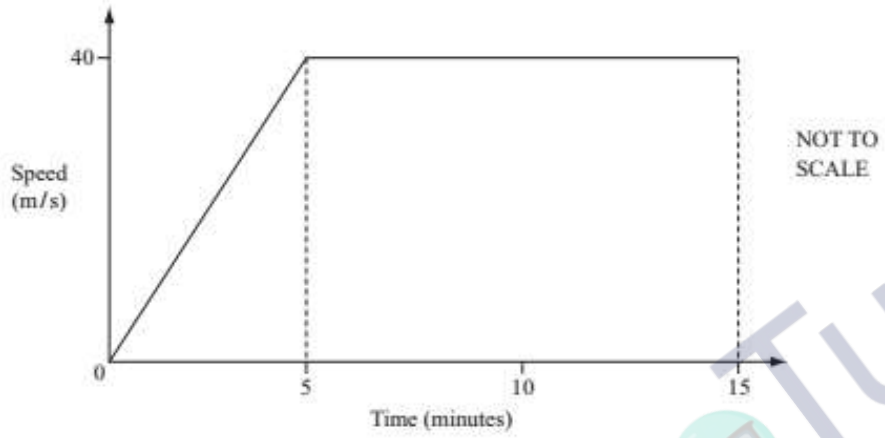
(c) Find the distance travelled, in metres, in the 60 seconds. [2]

0580/23/M/J/18 Q24)

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31. The diagram shows the speed-time graph for the first 15 **minutes** of a train journey. The train accelerates for 5 minutes and then continues at a constant speed of 40 metres/**second**.

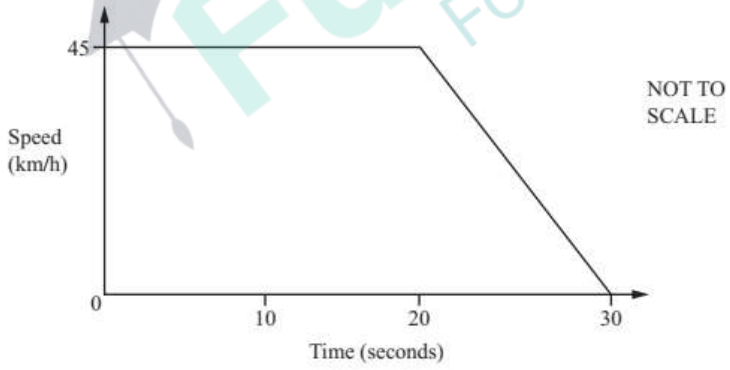


(a) Calculate the acceleration of the train during the first 5 minutes. Give your answer in m/s^2. [2]

(b) Calculate the average speed for the first 15 minutes of the train journey. Give your answer in m/s. [3]

0580/23/O/N/11 Q23)

32. The diagram shows the speed-time graph of a car. The



car travels at 45km/h for 20 seconds. The car then decelerates for 10 seconds until it stops.

(a) Change 45 km/h into m/s. [2]

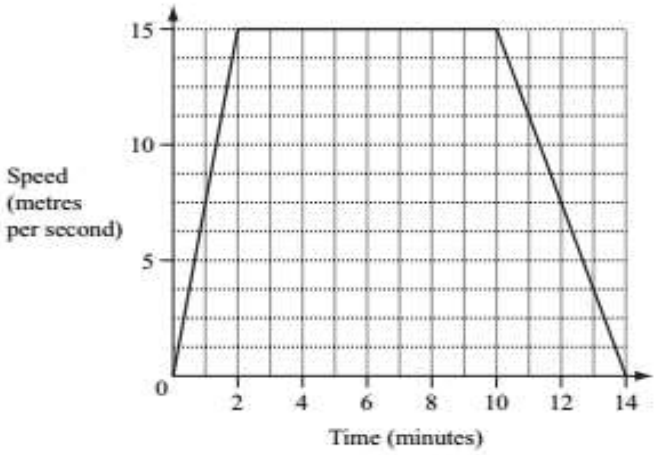
(b) Find the deceleration of the car, giving your answer in m/s^2. [1]

(c) Find the distance travelled by the car during the 30 seconds, giving your answer in metres . [3]

0580/23/O/N/15 Q26)

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33. The diagram shows the speed-time graph of a train journey



between two stations. The train accelerates for two minutes, travels at a constant maximum speed, then slows to a stop.

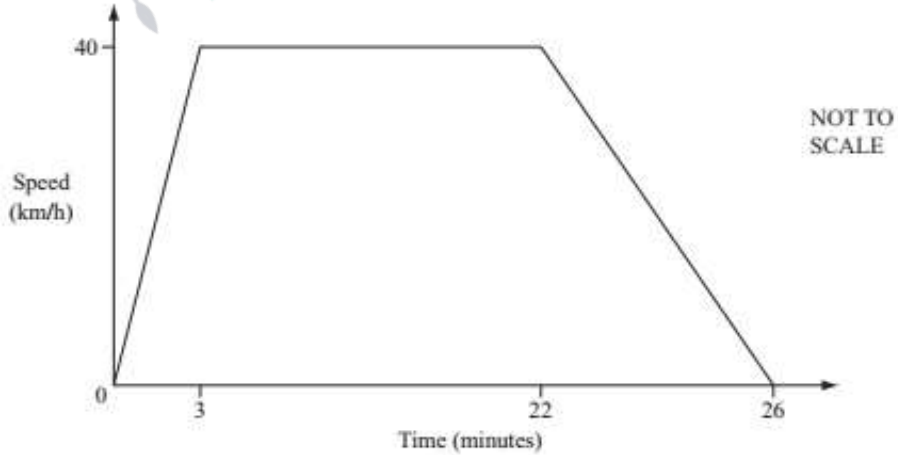
(a) Write down the number of **seconds** that the train travels at its constant maximum speed. [1]

(b) Calculate the distance between the two stations **in metres**. [3]

(c) Find the acceleration of the train in the **first two minutes**. Give your answer in m/s^2. [2]

0580/21/M/J/11 Q19)

34. The diagram shows the speed-time graph of a train journey between two stations.



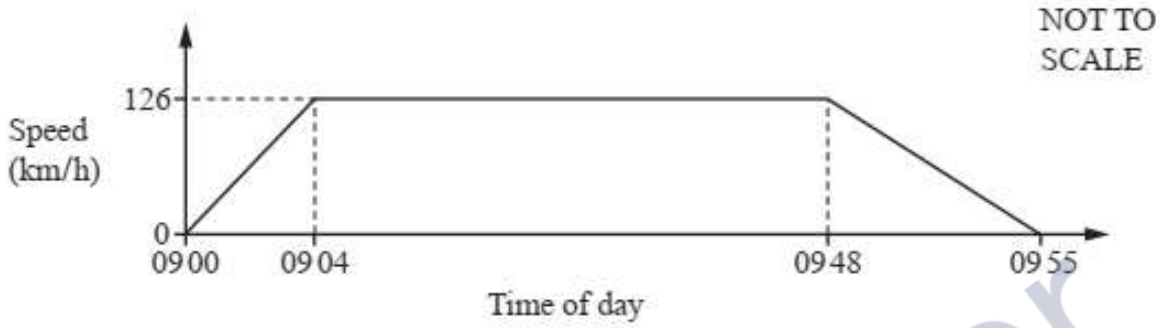
The train accelerates for 3 minutes, travels at a constant maximum speed of 40km/h, then takes 4 minutes to slow to a stop. Calculate the distance in kilometres between the two stations. [4]

0580/22/M/J/13 Q16)

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[Q35 to Q40]

35. The graph shows information about the journey of a train between two stations

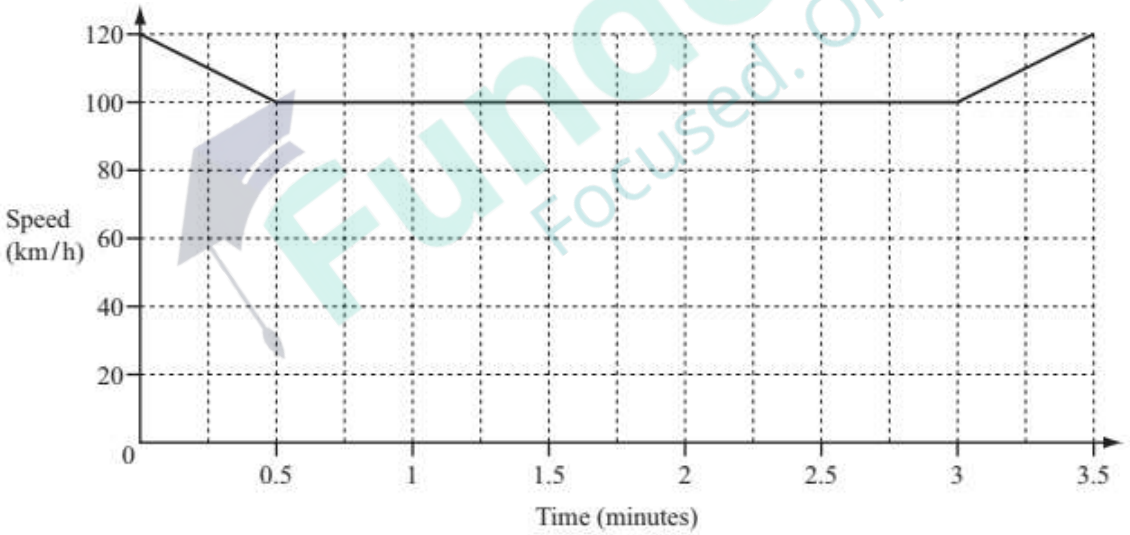


(a) (i) Work out the acceleration of the train during the first 4 minutes of this journey. Give your answer in km/h^2. [2]

(ii) Calculate the distance, in kilometres, between the two stations. [4]

0580/43/O/N/17 Q3

36. The diagram shows the speed-time graph for part of a car journey. The speed of the car is shown in kilometres / **hour**.



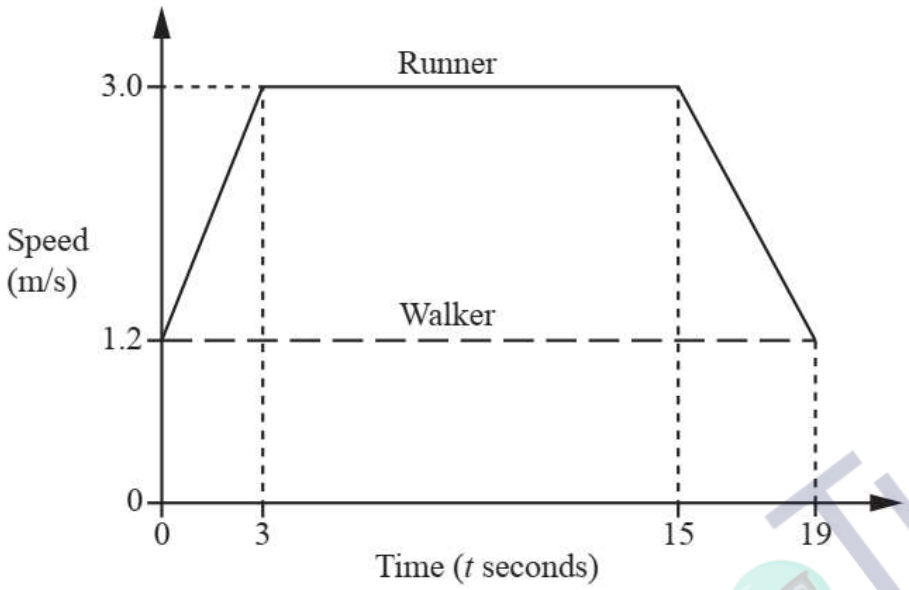
Calculate the distance travelled by the car during the 3.5 **minutes** shown in the diagram.

Give your answer in kilometres. [4]

0580/23/M/J/12 Q19)

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37. The diagram shows the speed–time graph for part of a journey for two people, a runner and a walker.



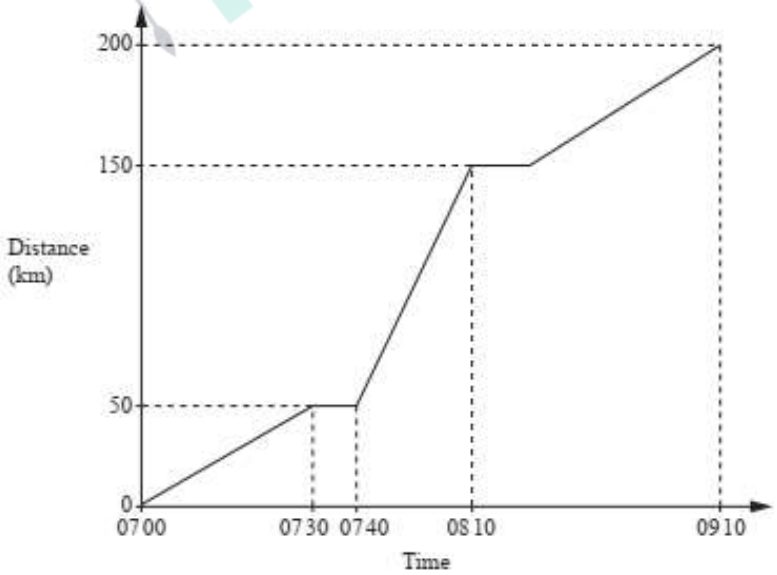
(a) Calculate the acceleration of the runner for the first 3 seconds. [1]

(b) Calculate the total distance travelled by the runner in the 19 seconds. [3]

(c) The runner and the walker are travelling in the same direction along the same path.
When t = 0, the runner is 10 metres behind the walker.
Find how far the runner is ahead of the walker when t = 19 [3]

0580/42/O/N/18 Q6)

38. (a) The distance-time graph shows the journey of a train.



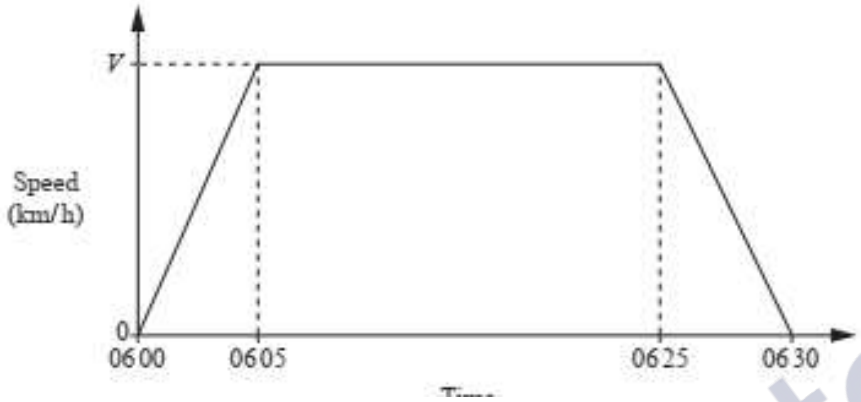
(i) Find the speed of the train between 0700 and 0730 in km/h [1]

(ii) Find the average speed for the whole journey. [3]

(b) The speed-time graph shows the first 30 minutes

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of another train journey. The distance travelled is 100km. The maximum speed of the train is V km/h.

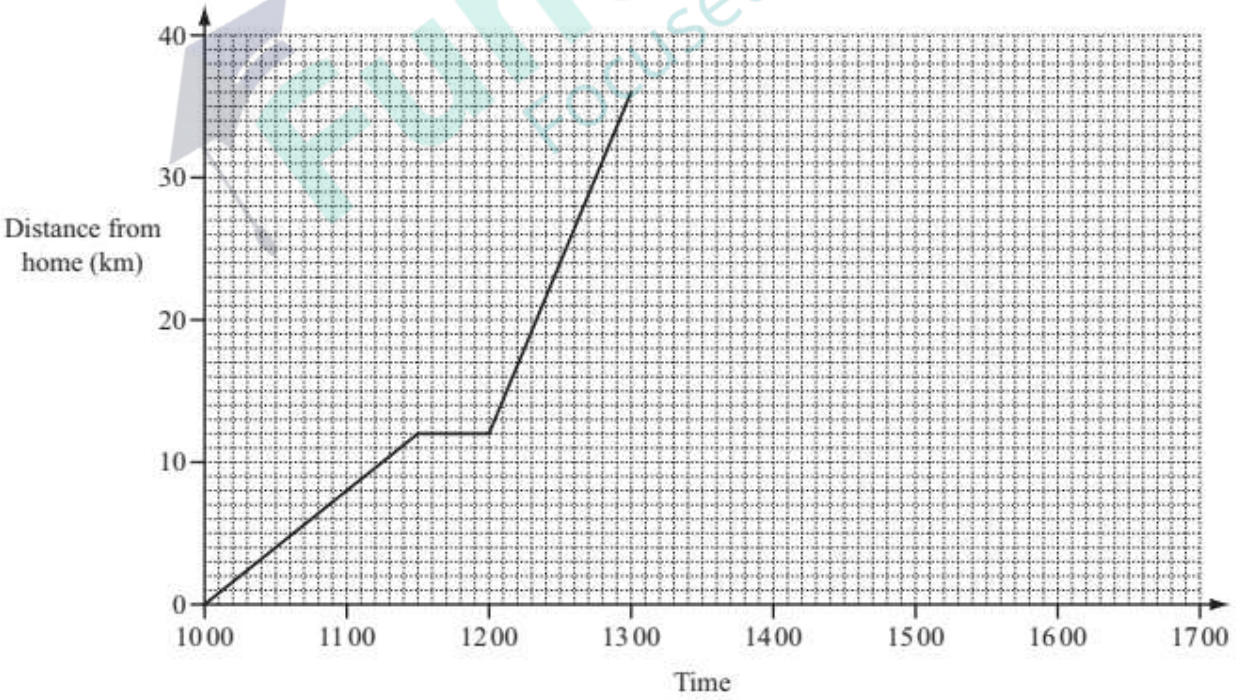


(i) Find the value of V. [3]

(ii) Find the acceleration of the train during the first 5 minutes. Give your answer in m/s^2. [2]

0580/42/M/J/17 Q9)

39. Ali leaves home at 1000 to cycle to his grandmother's house. He arrives at 1300. The distance-time graph represents his



journey.

(a) Calculate Ali's speed between 1000 and 1130. Give your answer in kilometres per hour. [2]

(b) Show that Ali's average speed for

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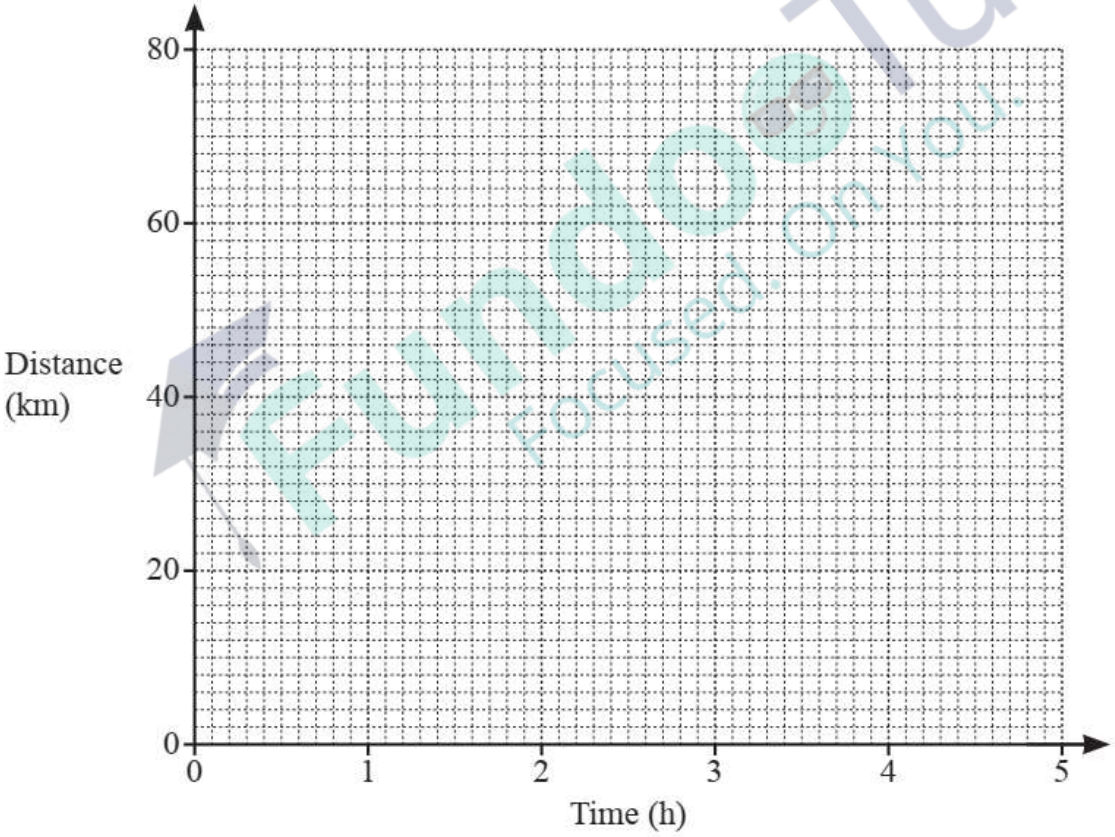
the whole journey to his grandmother's house is 12km/h. [2]

(c) Change 12 kilometres per hour into metres per minute. [2]

(d) Ali stays for 45 minutes at his grandmother's house and then returns home. He arrives home at 1642. Complete the distance-time graph. [2]

0580/41/M/J/14 Q2)

40. Annette cycles a distance of 70km from Midville to Newtown. Leaving Midville, she cycles for 1 hour 30 minutes at a constant speed of 20km/h and then stops for 30 minutes. She then continues the journey to Newtown at a constant speed of 16km/h.



(a) On the grid, draw the distance–time graph for the journey. [3]

(b) Calculate the average speed for the whole journey in km/h. [3]

0580/22/M/J/22 Q12)

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Answers

1) D B C , $\frac{1}{3}$, 150	15) Straight line from (20, 14) to (35, 14) andstraight line from (35, 14) to (45, 0)	29) (a) 50 (b)15
2) 3000	16) (a)1.2 (b)45	30) (a) 25 (b) 1.25 (c) 1250
3) (a) $1\frac{2}{3}$ (b) 1062.5	17) (i) 0.75 × 20 [=15] (ii) 150 s	31) (a) 2/15 (b)$\frac{100}{3}$ or $33\frac{1}{3}$
4) (a) 2.8 (b)700	18) (a)5 (b)2	32) (a) $\frac{25}{2}$ or 12.5 oe (b) $\frac{5}{4}$ or 1.25 oe (c) $\frac{625}{2}$ or 312.5
5) (a) 5/8 (b) 62	19) (a) 156 (b) 12	33) oe (a) 480 (b) 9900 (c) 1/8 oe
6) (a) 2 (b) 6.7 to 7.3 (c) 203	20) (a) 0.4 (b) 1430 (c) $\frac{143}{12}$ *or* $11\frac{11}{12}$	34) 15
7) (a) 4/5 oe (b) 1850	21) (a) 2200 (b) $\frac{220}{13}$ *or* $16\frac{12}{13}$	35) (a) (i) 1890 (ii) 103.95
8) (a) 3 (b) 600	22) (i)9/200 or 0.045 (ii) 10800 (iii) $\frac{36}{5}$ or 7.2 oe	36) 6
9) (a) 0.3 (b)760	23) (a)3/4 or 0.75 (b) 2.6 oe	37) (a)0.6 (b)50.7 (c) 17.9
10) (a) 2.4 (b) 680	24) (i) 14/18 (ii)17.5 oe	38) (a)(i) 100 (ii) 92.3 (b)(i) 240 (b)(ii)2/9
11) $16\frac{1}{4}$ or 16.25	25) (a) 0.25 oe (b)0.45	39) (a) 8 (b) [Distance =] 36 their36 ÷ 3 [= 12] oe (c) 200 (d) Horizontal line at 36 to 13 45 (13 45, 36) joined to (16 42, 0)
12) Diagonal line from (0, 0) to (30, 12) and Horizontal line from (30, 12) to (70, 12)	26) (a)2 (b) $\frac{201}{8}$, $25\frac{1}{8}$oe	40) (a) straight lines (0,0) to (1.5,30) to (2, 30) to (4.5,70) (b)15.6
13) (a) line from (0, 8) to (10, 8) (b) 260	27) (a) 159 (b) (i)50 (ii) 5/24 oe	
14) (a) (0, 0) to (40, 5) , (40, 5) to (100, 5) , (100, 5) to (120, 0) (b)5/40 (c)$3\frac{3}{4}$	28) 2520	

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