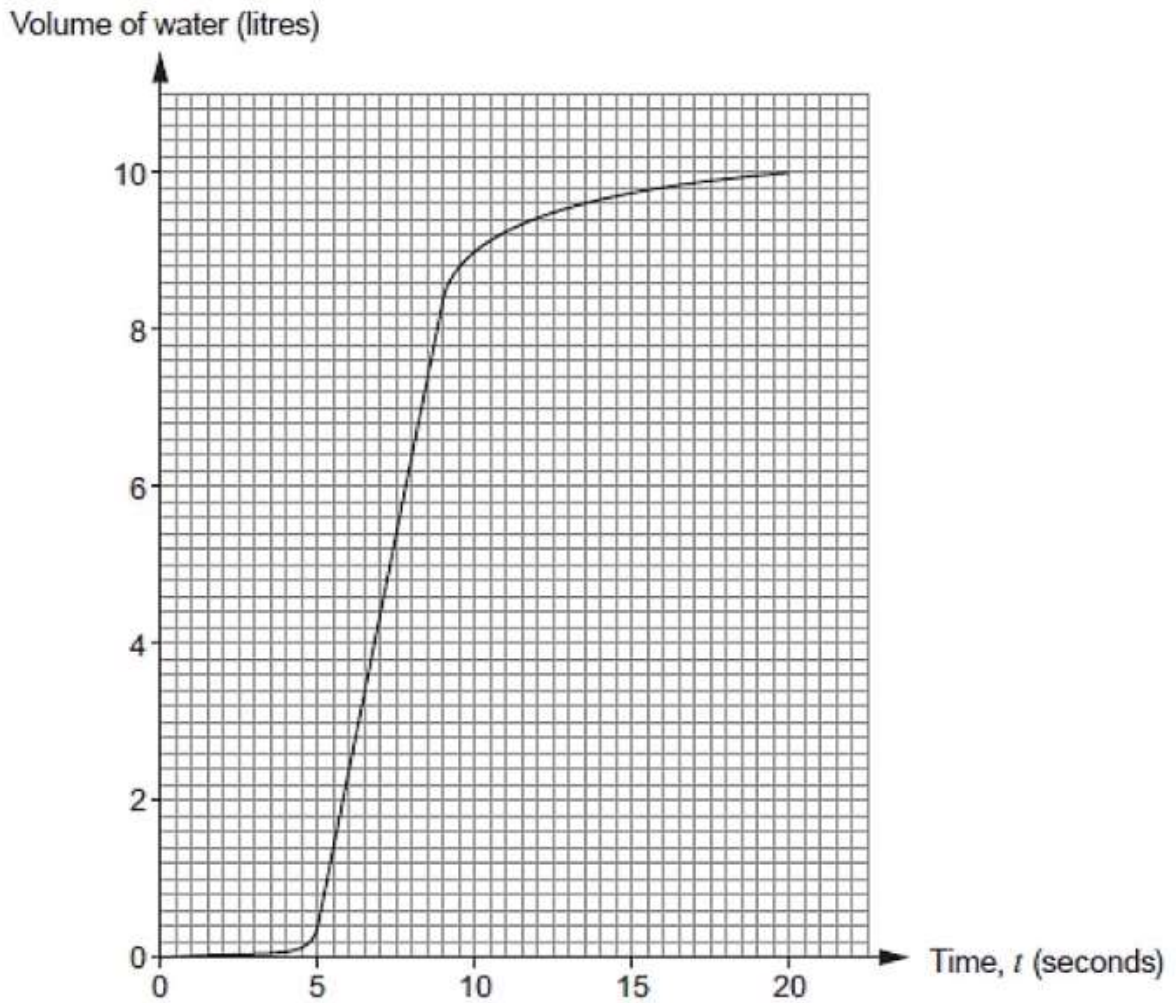


Higher Numeracy Summer 2018 P2 Q7(a)(b)

Gwen fills a 10-litre bucket with water from a tap. She turns the tap until it is fully open. The bucket fills up with water, and when Gwen thinks it is close to being full, she slowly closes the tap. The bucket is full after 20 seconds.

The graph below shows the volume of water in the bucket during the 20 seconds.



(a) After how many seconds did Gwen start to close the tap? [1]

.....

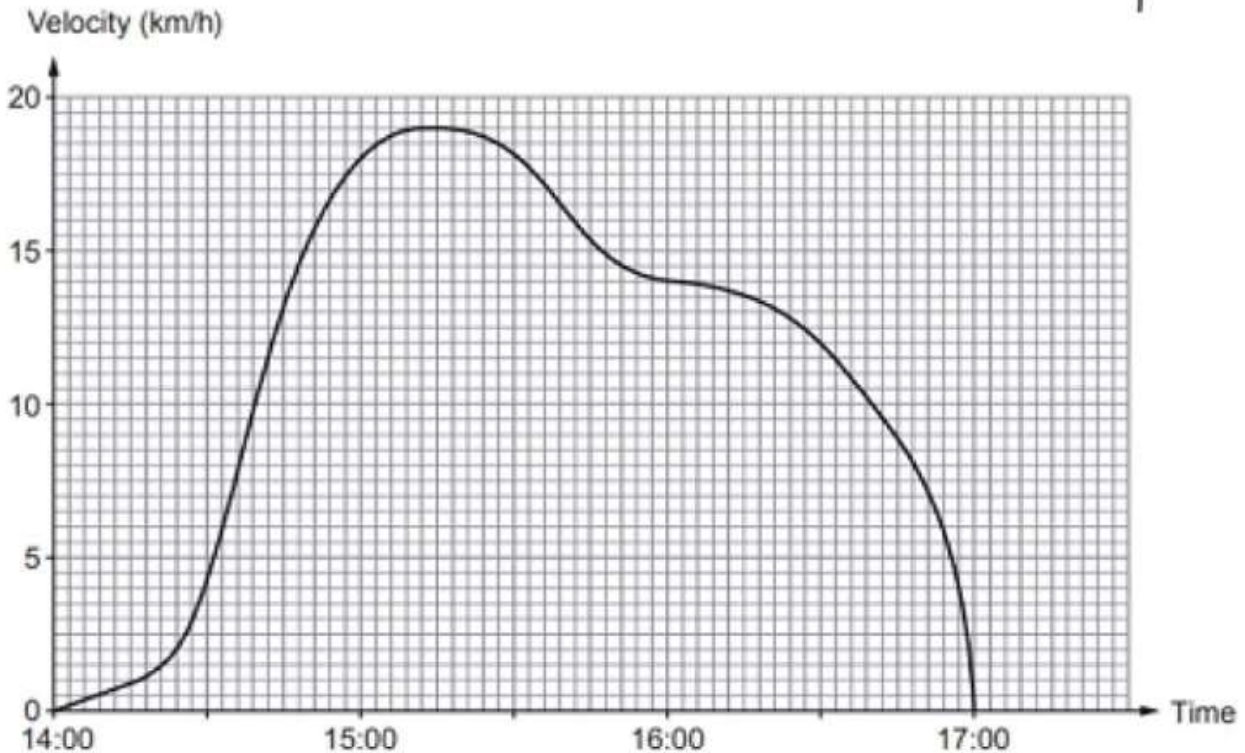
(b) Estimate at what rate water is entering the bucket at time $t = 10$ seconds. Give your answer in litres per second. [3]

Higher Numeracy Nov 2016 P1 Q7

Siân went for a ride on her bike.

She started her ride at 14:00.

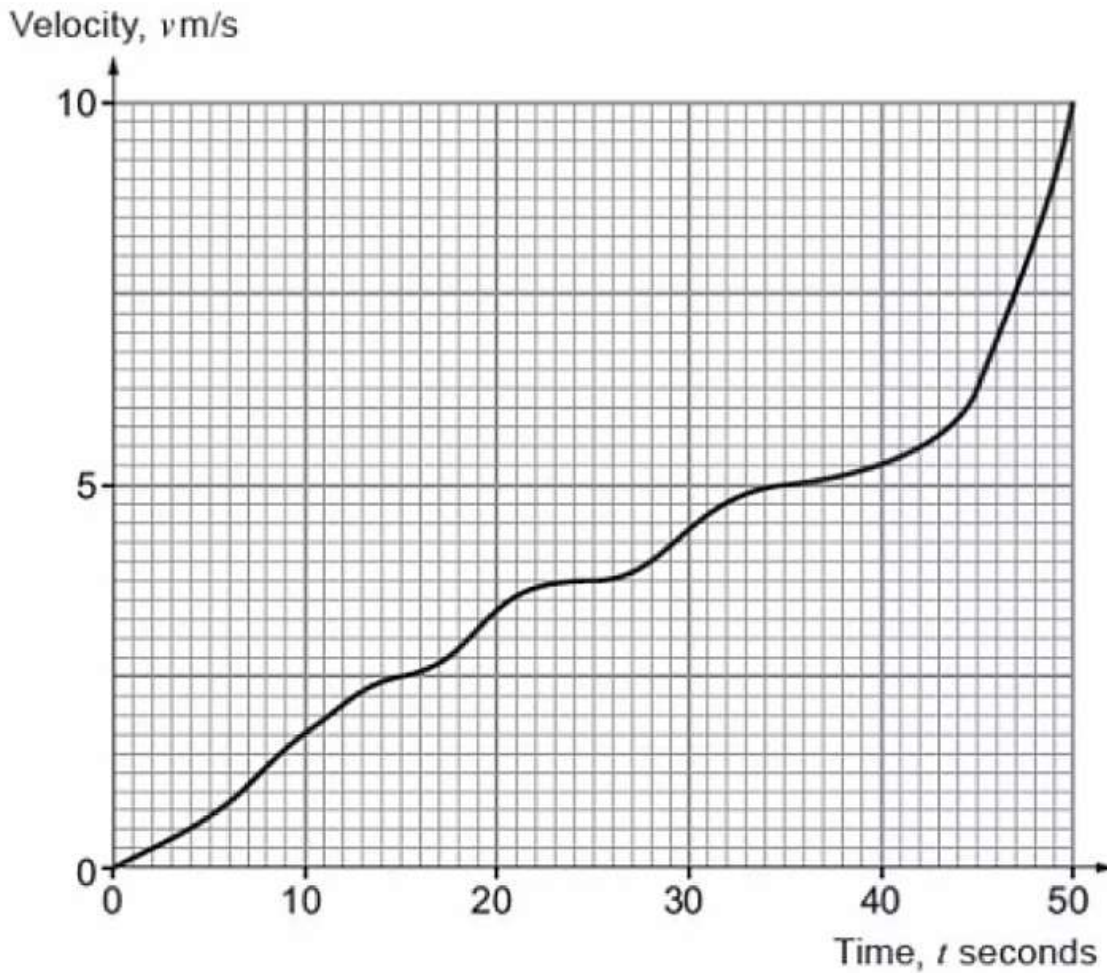
The graph below shows information about her bike ride.



- (a) During which quarter-hour period was Siân's acceleration the greatest? [1]
- (b) At about what time did Siân stop accelerating? [1]
- (c) Siân usually finds cycling at a velocity of 18 km/h very comfortable. Express 18 km/h in metres per second. [2]
- (d) Using her velocities at 14:00, 15:00 and 16:00, calculate an estimate for the total distance Siân travelled **between 14:00 and 16:00**. [3]
- (e) *In this part of the question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*
 Siân estimated the distance she travelled between 16:00 and 17:00 as **5 miles**.
 Is Siân's estimate reasonable?
 You must justify your answer and show your working. [3 + 2 OCW]

Higher Numeracy Sample 1 P1 Q8

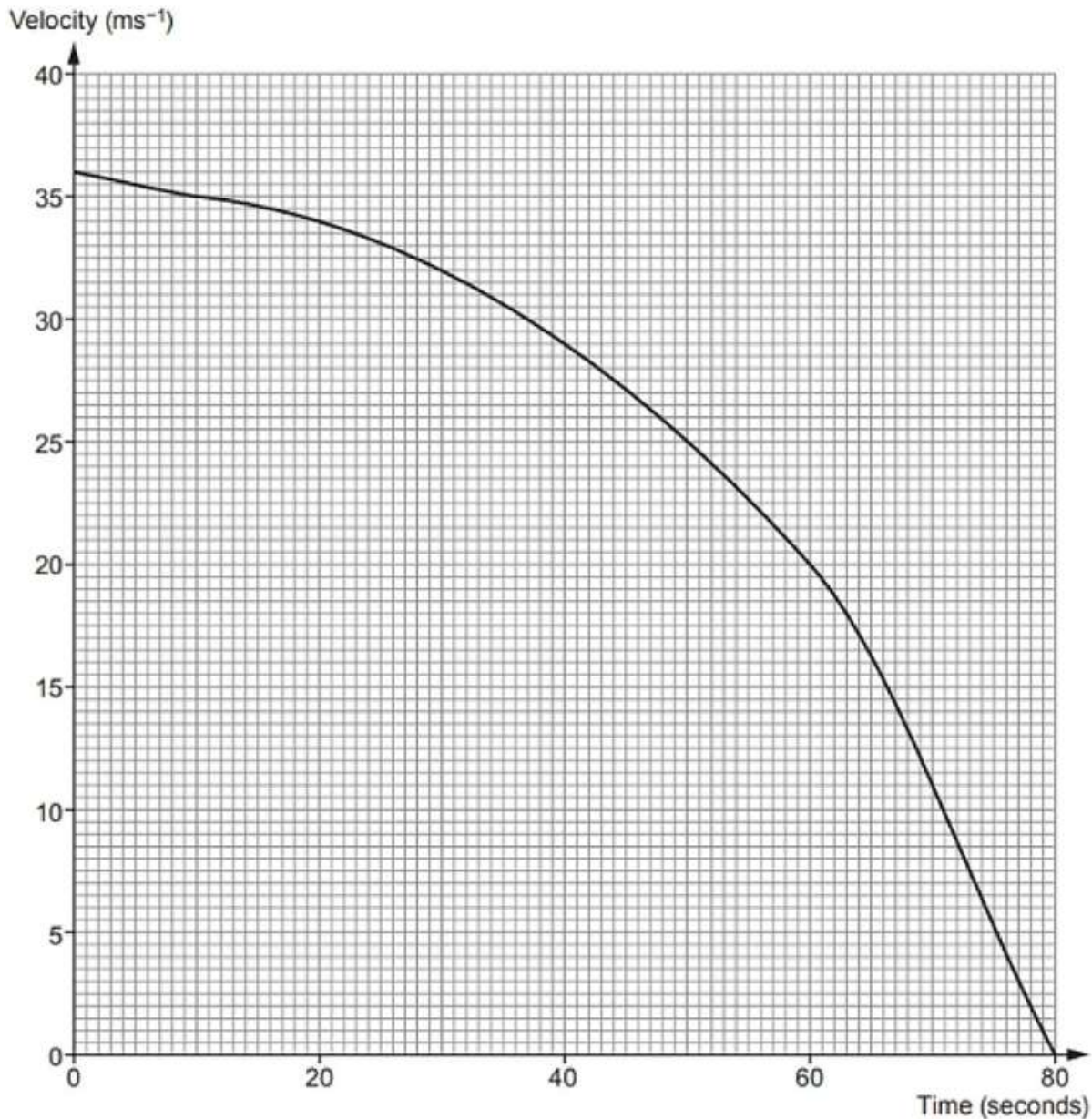
A velocity-time graph, representing a 50-second journey of a bicycle accelerating from 0 m/s, is shown below.



- (a) Calculate an estimate for the acceleration at time $t = 30$ seconds.
You must give the units for your answer. [4]
- (b) Calculate an estimate for the distance travelled by the bicycle in the first 30 seconds. [3]

Higher Numeracy Nov 2018 P2_Q9

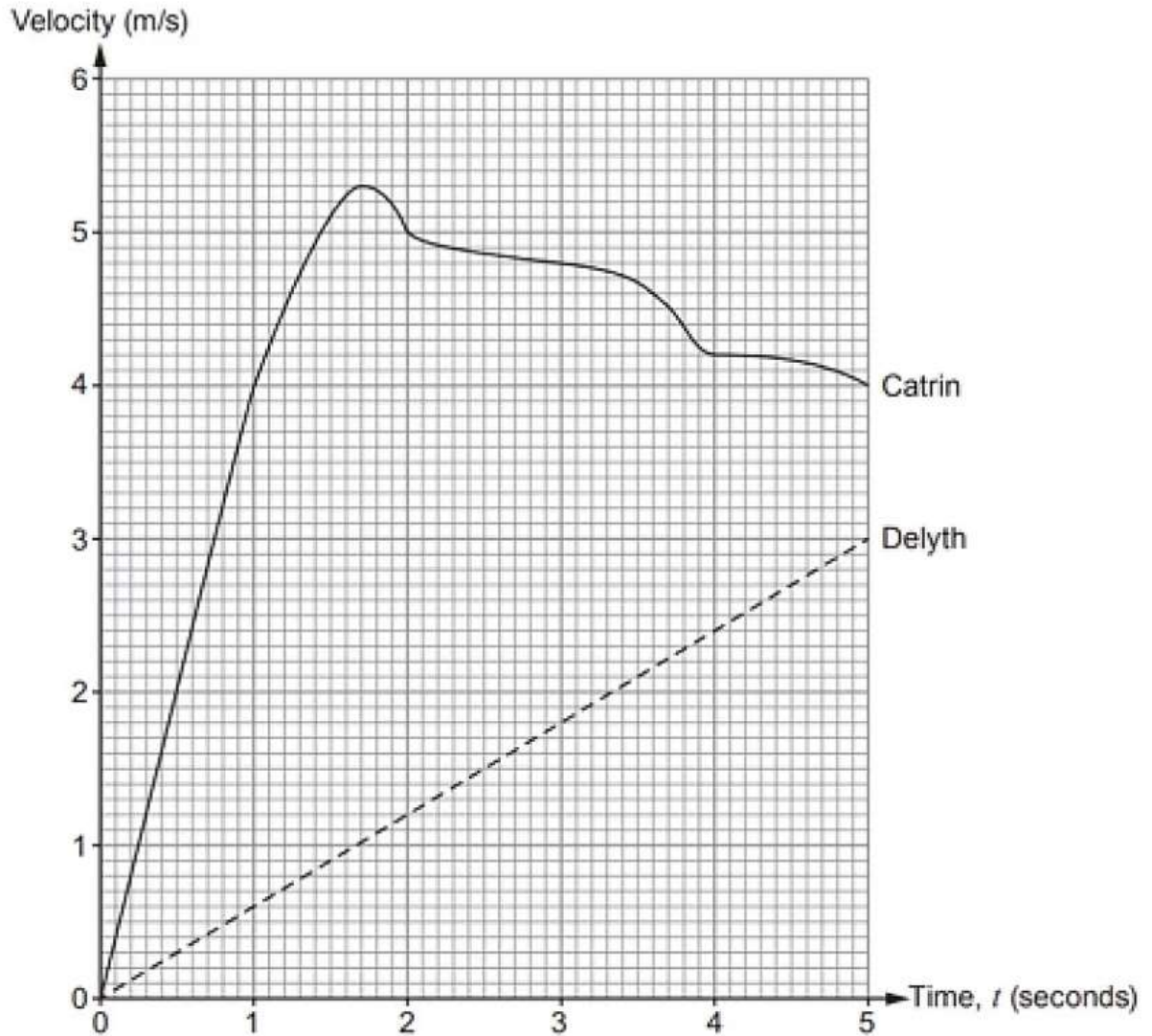
9. A train manufacturer has developed a new braking system.
The velocity-time graph shows the velocity of a train from when the new brakes are applied until it comes to rest.



- (a) Estimate the train's deceleration at time 60 seconds. [3]
- (b) (i) Calculate an estimate of the distance travelled by the train from the instant the brakes are applied until it comes to rest.
You must use exactly 4 strips of equal width. [3]
- (ii) Explain how you could use the graph to gain a more accurate estimate of the distance travelled. [1]

Higher Numeracy Nov 2017 P1__Q9

Two runners, Catrin and Delyth, start a race at the same time.
The velocity-time graph shows their velocities over the first 5 seconds of the race.



- (a) After the start of the race, what was the earliest time that Catrin's acceleration was 0 m/s^2 ? [1]

- (b) Use the trapezium rule to calculate an estimate of the distance Catrin travelled in the first 5 seconds of the race.
Use Catrin's velocities at times $t = 0, t = 1, t = 2, t = 3, t = 4$ and $t = 5$.
You must show all your working. [3]

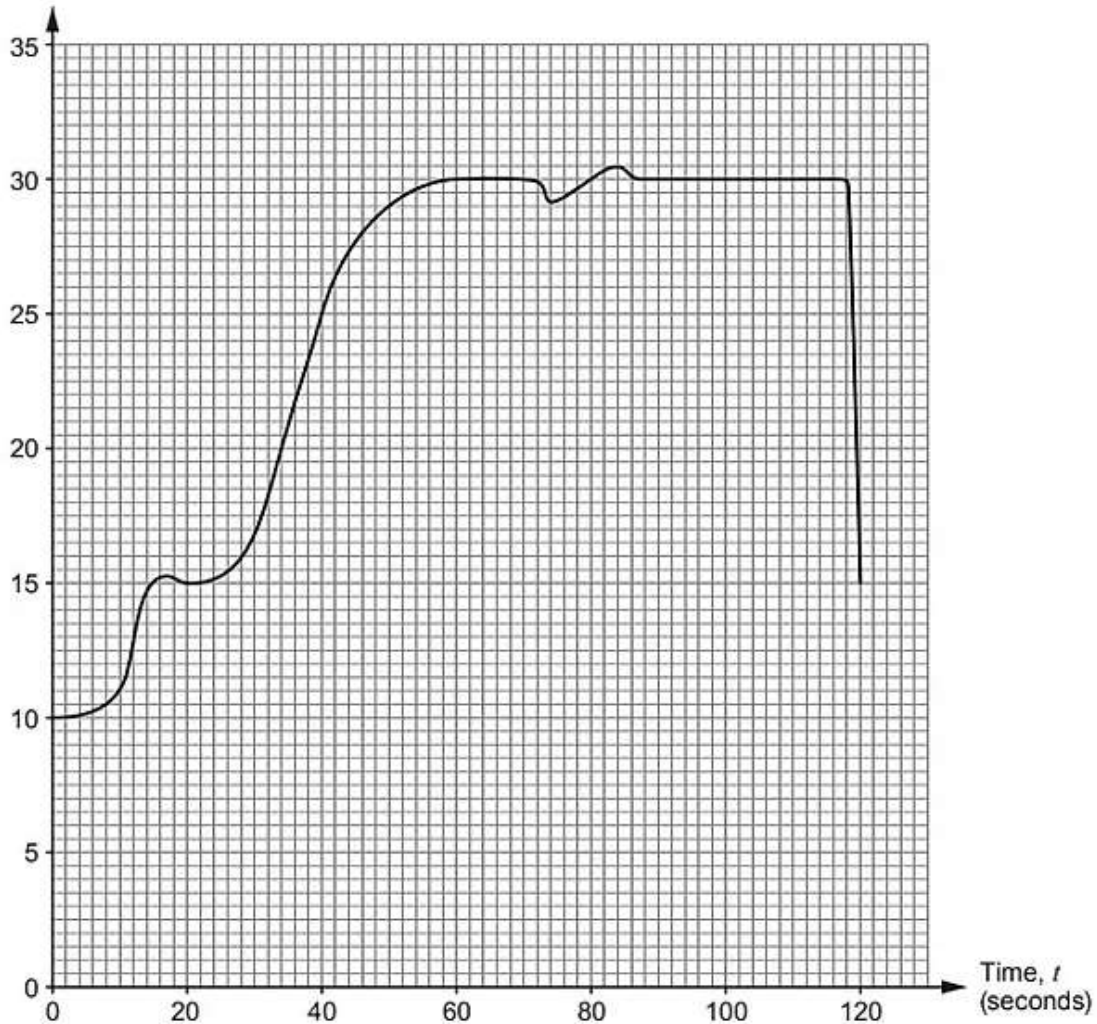
- (c) (i) Calculate an estimate of how far Catrin was ahead of Delyth after 5 seconds. [2]

- (ii) Explain why your answer to (c) (i) is an underestimate. [1]

Higher Numeracy Summer 2017 P1 Q10

10. The graph below shows a 120-second section of Iestyn's car journey to work this morning.

Speed (metres per second)



- (a) (i) At $t = 50$ seconds, estimate the acceleration of Iestyn's car in m/s^2 .
Leave your answer as a fraction. [3]

- (b) (i) Calculate an estimate of the distance travelled by Iestyn's car in the first 80 seconds of his journey.
You must consider the speed of the car when $t = 0, 20, 40, 60$ and 80 seconds. [4]

- (ii) Hence, calculate an estimate of the average speed of Iestyn's car for this entire 120-second section of his car journey.
Give your answer in m/s . [4]

Higher Numeracy Sample 2 P2 Q13a

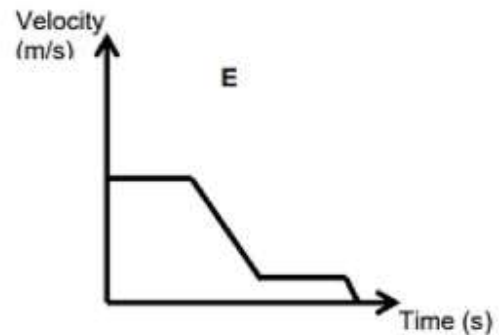
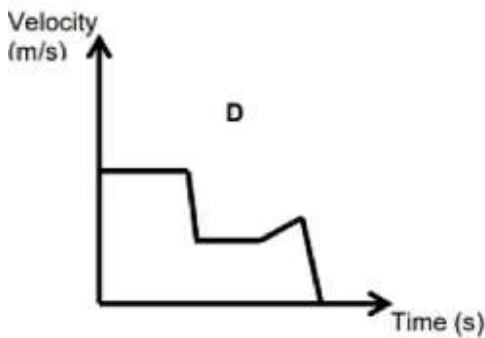
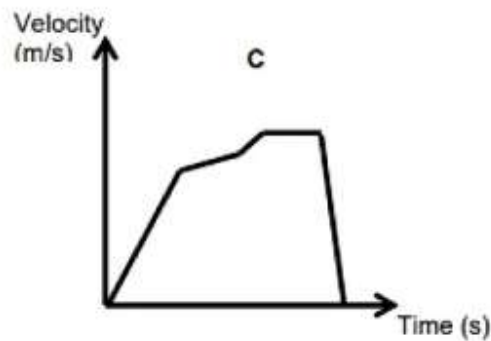
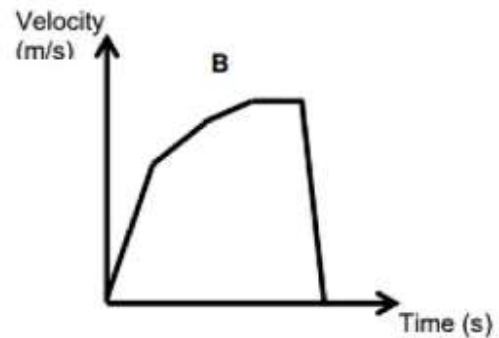
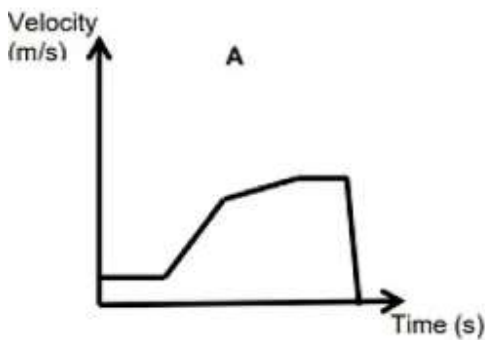
13. Dewi was a cyclist.

He travelled along a straight flat road to the bottom a hill and cycled up the hill. The gradient of the hill was constant at first, then decreased near the top, where Dewi stopped for a rest.

Dewi maintained the same level of effort throughout his journey.

(a) Which of the following **velocity-time** graphs represents Dewi's journey?

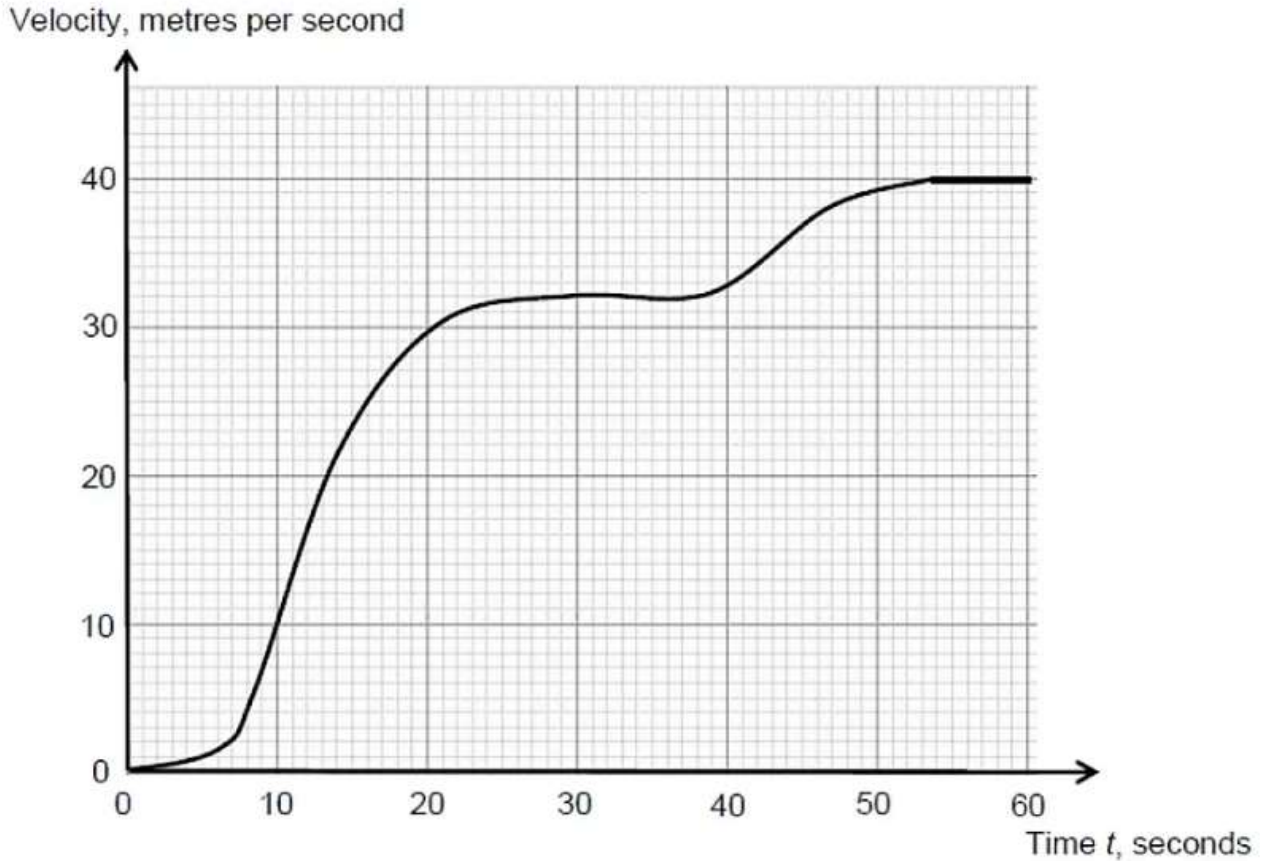
[1]



The graph which represents Dewi's journey is graph

Higher Maths Sample 2 P2 Q12

The velocity-time graph shows the first 60 seconds of a train's journey from a station.



(a) Calculate an estimate of the acceleration of the train when $t = 20$ seconds.
State the units of your answer.

|

(b) Use the trapezium rule with ordinates $t = 0, t = 10, t = 20, t = 30, t = 40, t = 50$ and $t = 60$ calculate an estimate of the distance travelled by the train in the first 60 seconds of its journey.