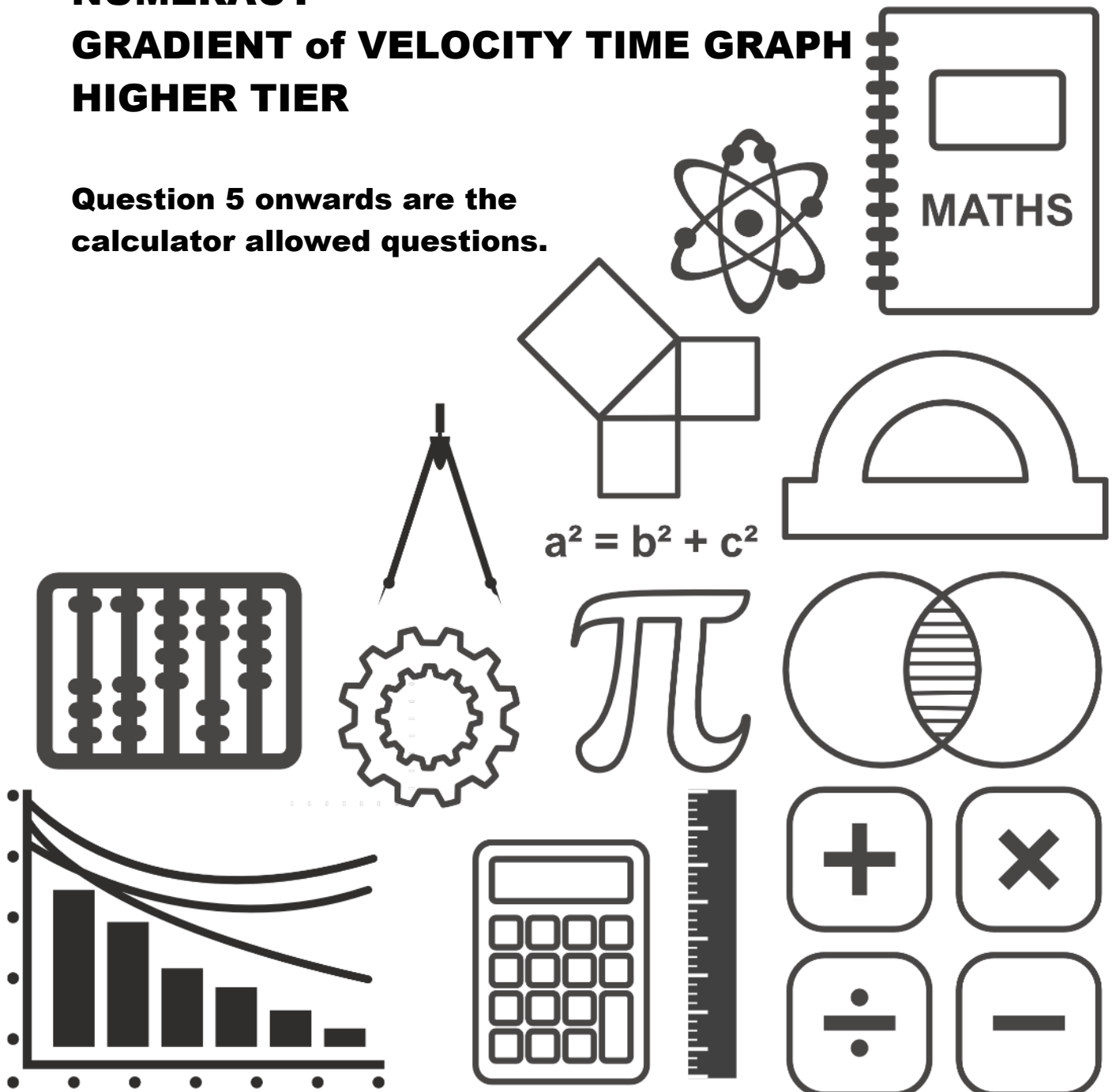


GCSE TOPIC BOOKLET

NUMERACY

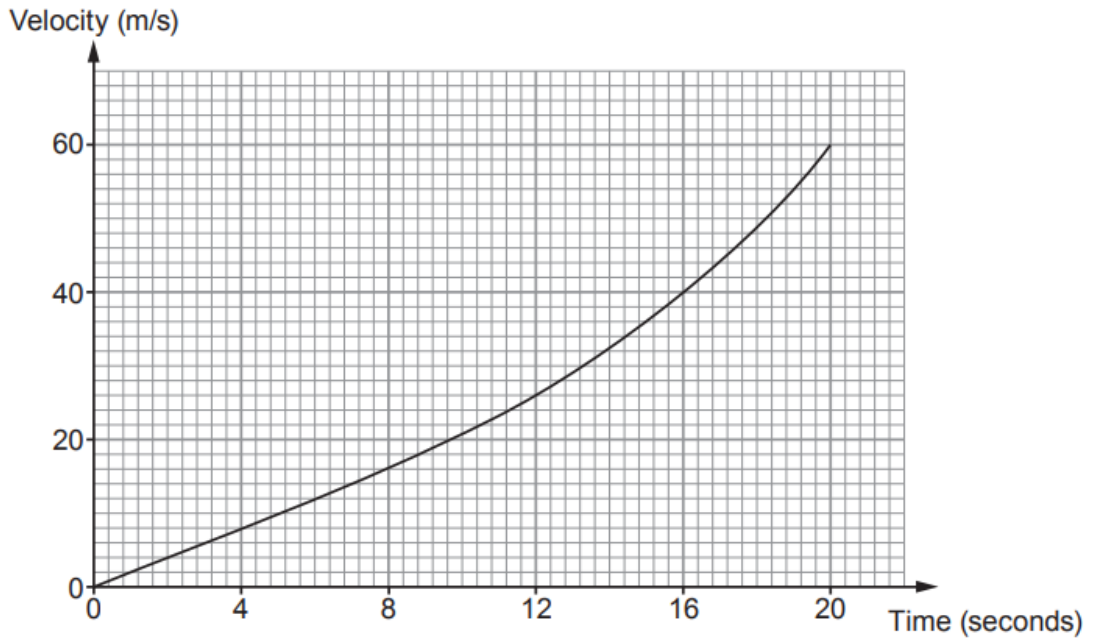
GRADIENT of VELOCITY TIME GRAPH HIGHER TIER

Question 5 onwards are the
calculator allowed questions.



$$a^2 = b^2 + c^2$$

1. The velocity-time graph below shows the velocity of an aircraft for the first 20 seconds of take-off.



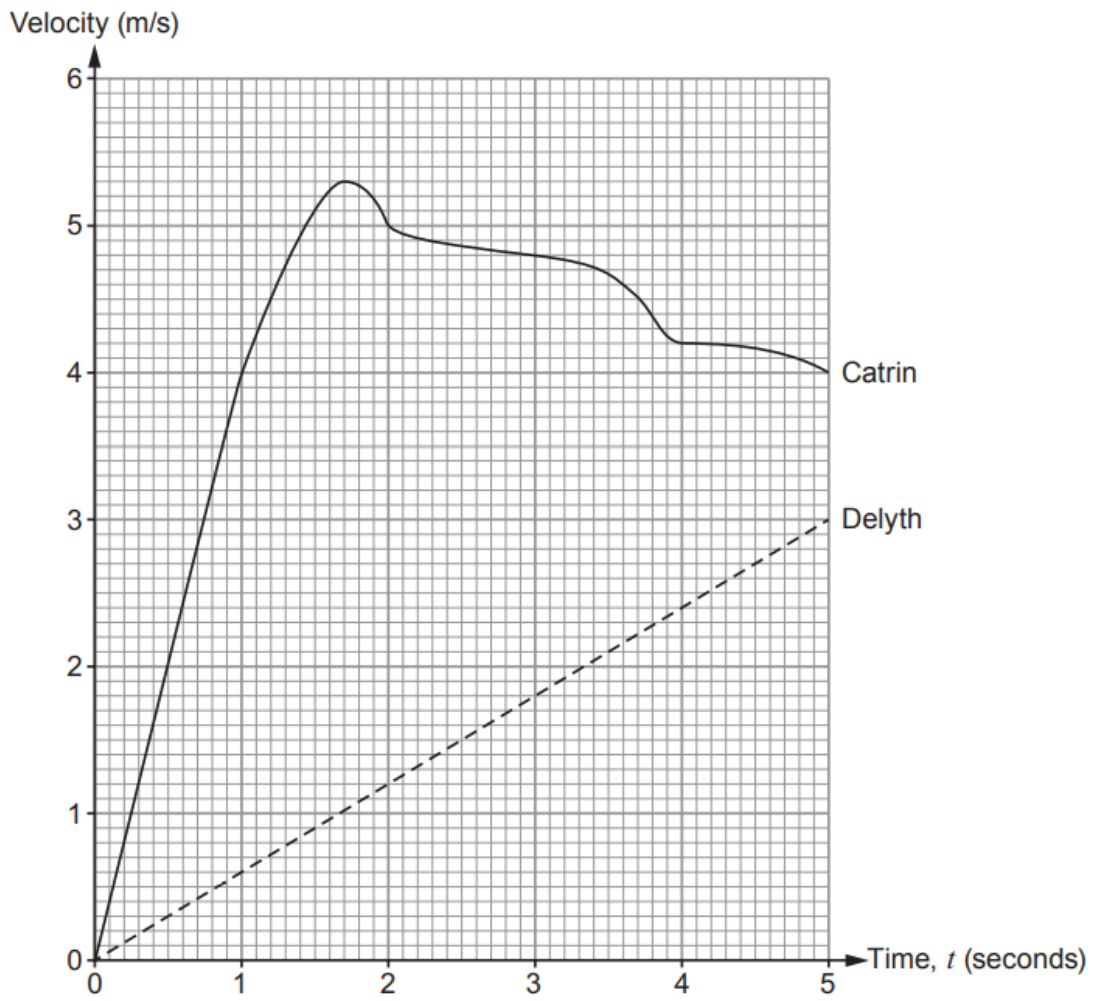
(a) Calculate an estimate of the acceleration of the aircraft at time 16 seconds. [3]

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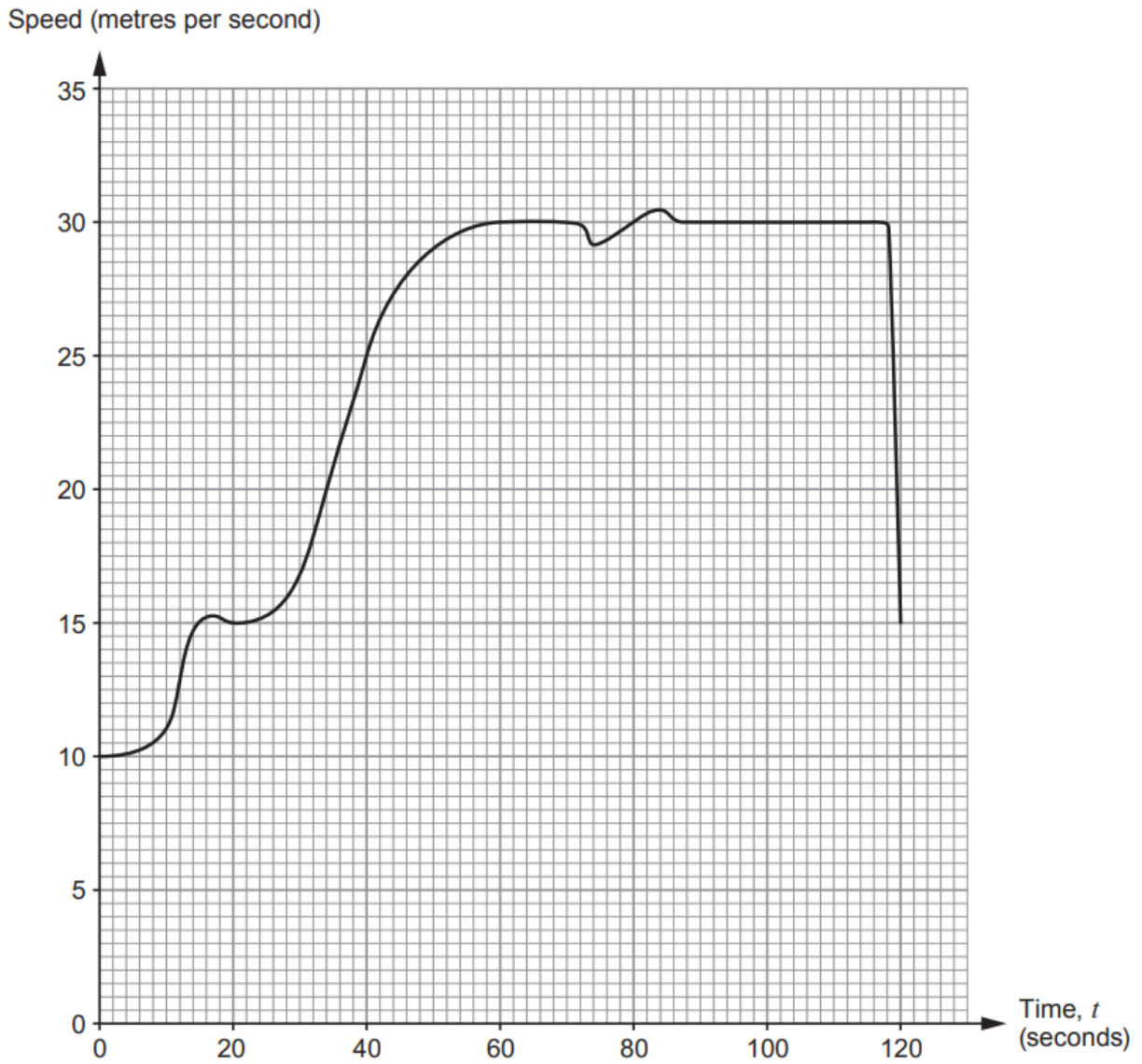
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2. Two runners, Catrin and Delyth, start a race at the same time. The velocity-time graph shows their velocities over the first 5 seconds of the race.



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

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



At $t = 50$ seconds, estimate the acceleration of Iestyn's car in m/s^2 .
 Leave your answer as a fraction.

[3]

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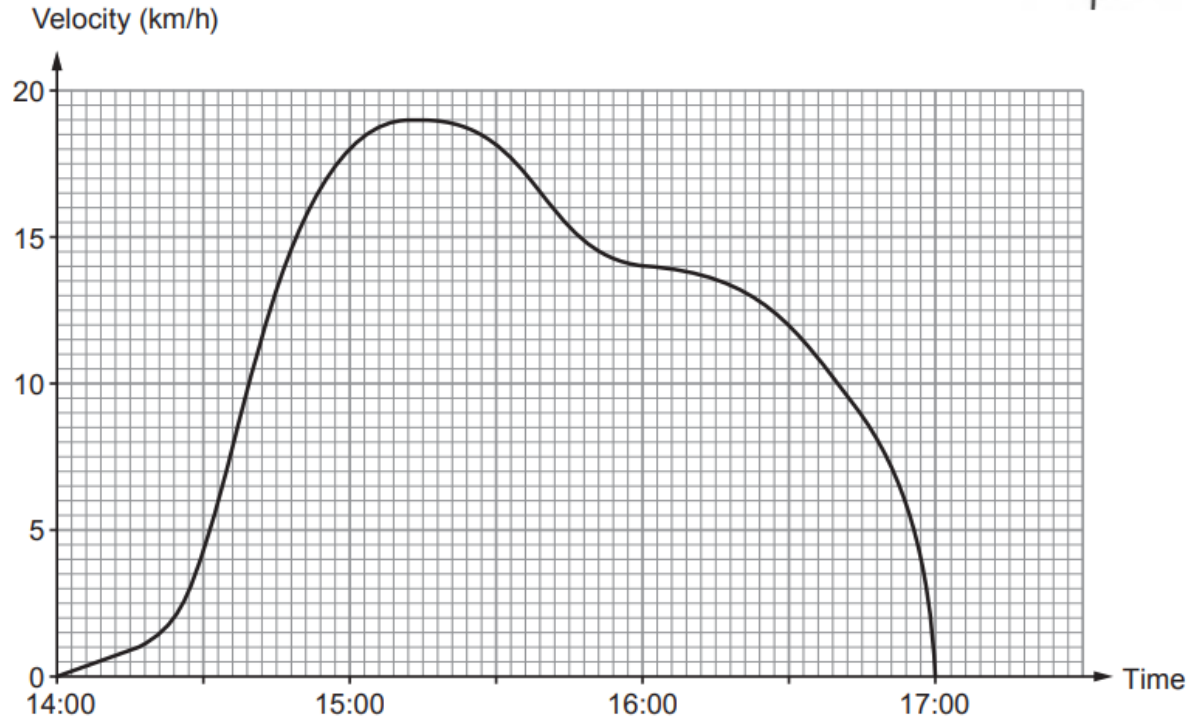
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4. Siân went for a ride on her bike.

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]

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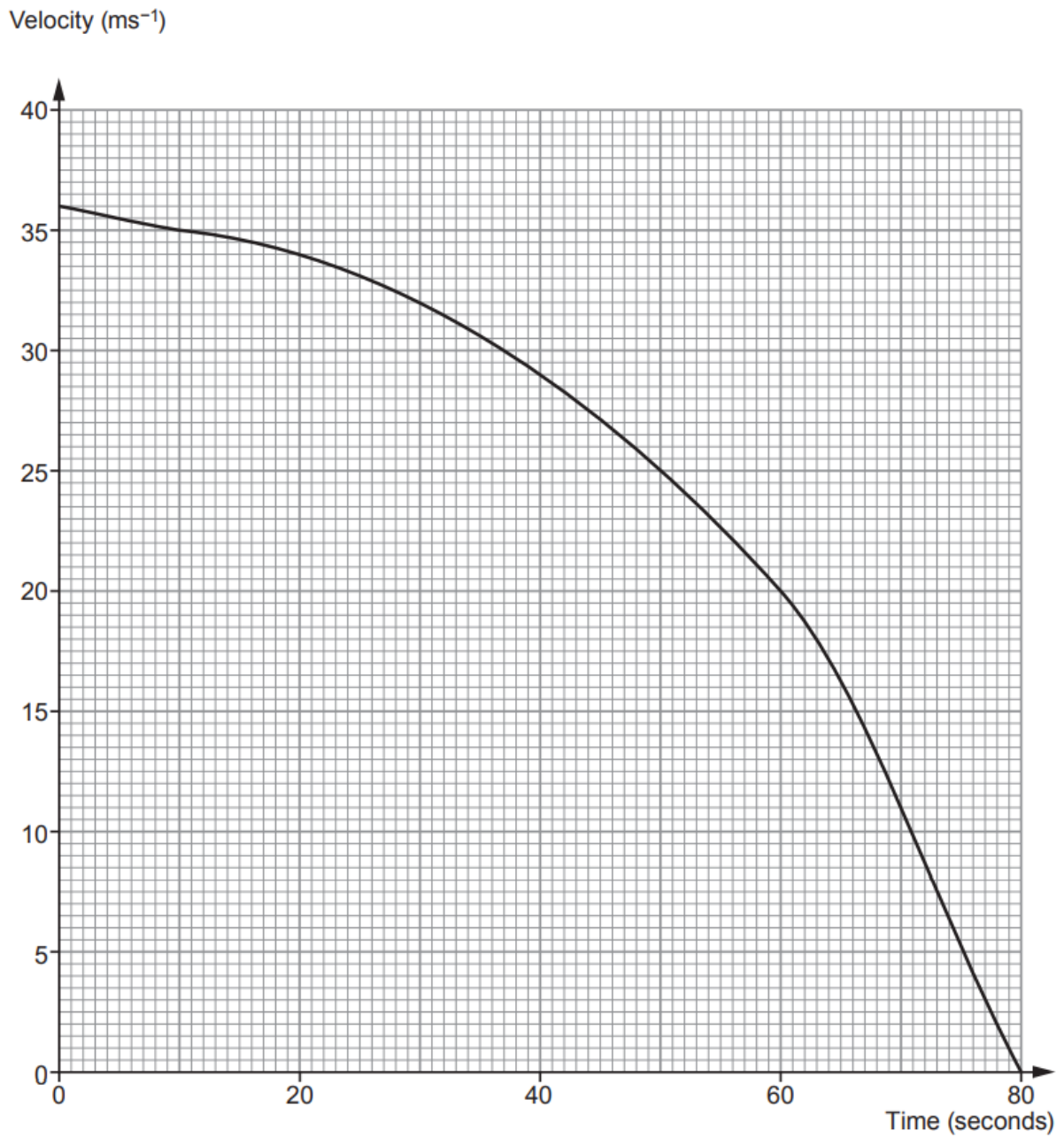
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(b) At about what time did Siân stop accelerating? [1]

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5. 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]

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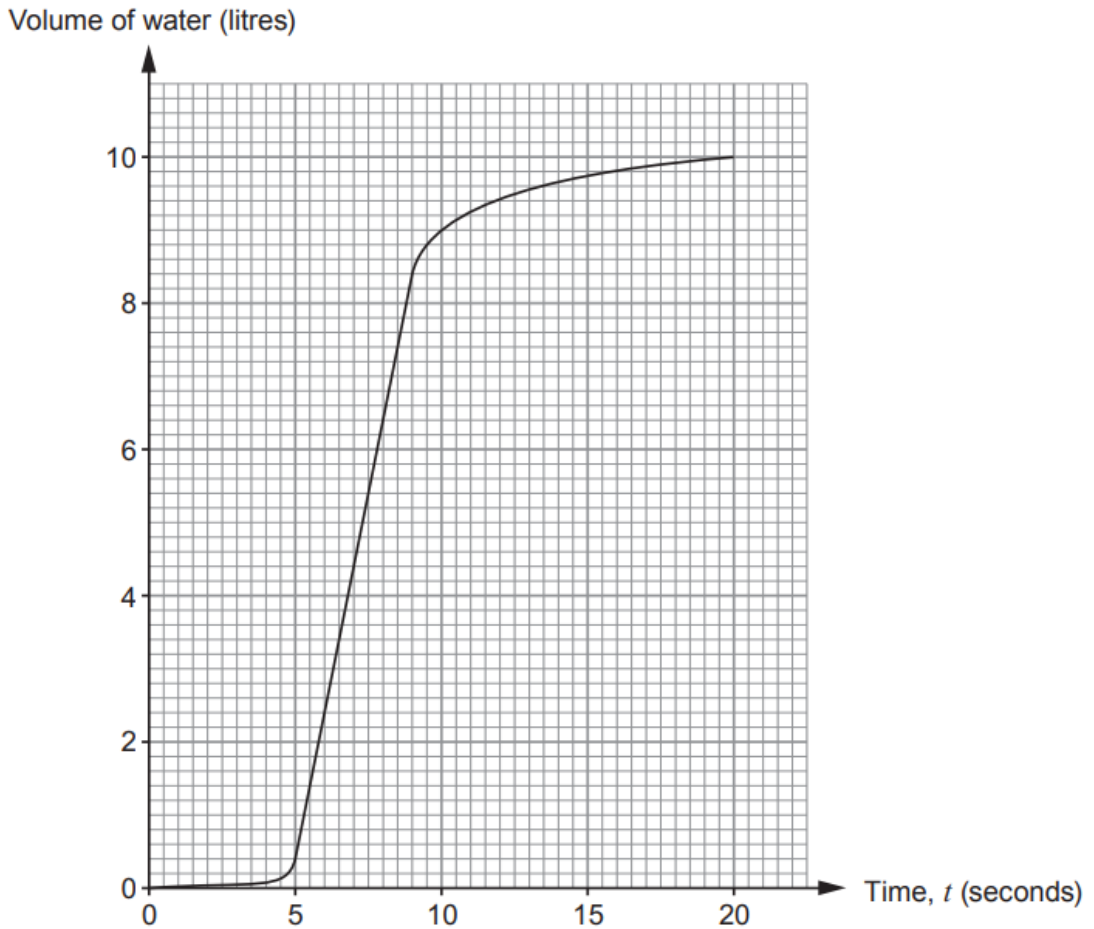
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6. Gwen fills a 10-litre bucket with water from a tap. She turns the tap until it is fully open. The bucket fills up with water, and when Gwen thinks it is close to being full, she slowly closes the tap. The bucket is full after 20 seconds.

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]

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

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