# A/A* - Velocity Time Graphs

www.bit.do/AgradeVTgraphs

| Question | Maximum Mark | Mark Awarded |
|---|---|---|
| 1 | 3 | |
| 2 | 5 | |
| 3 | 8 | |
| 4 | 5 | |
| **Total Mark** | | |

EAS
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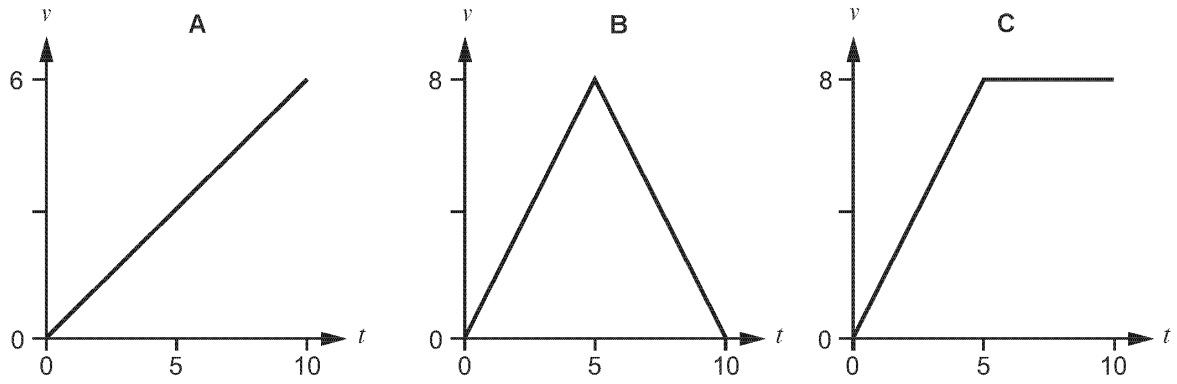
Gwasanaeth Cyflawni Addysg
i Dde Ddwyrain Cymru

**1.** The following graphs show 3 different journeys, where $v$ is velocity in metres per second, and $t$ is time in seconds.




One of these graphs shows a journey when the distance travelled in 10 seconds was 60 metres. Identify this graph and explain how you obtained your answer, showing your calculations. [3]

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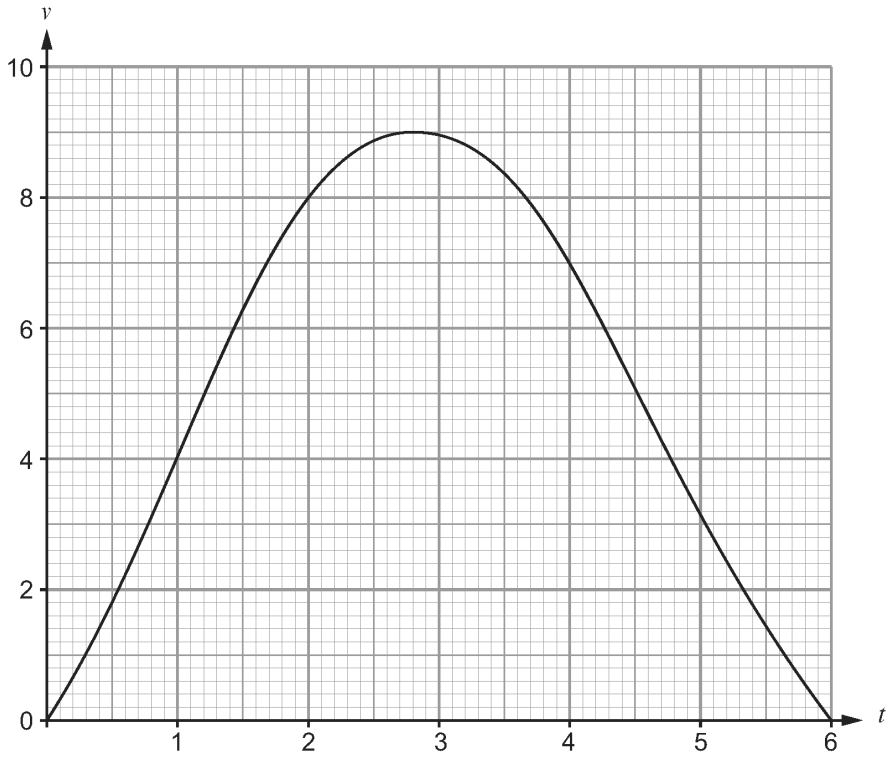
**2.**

The graph below shows the velocity, $v$, in m/s, of a particle at time $t$ seconds after the start of the experiment.

*(a)* Find an approximation for the distance travelled by the particle during the 6 seconds of the experiment using the ordinates $t = 0$, $t = 2$, $t = 4$, $t = 6$. [4]

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*(b)* Is your approximation an over estimate or under estimate of the actual distance travelled?
Tick (✓) a box.
Give a reason for your answer. [1]

Over estimate ☐ Under estimate ☐

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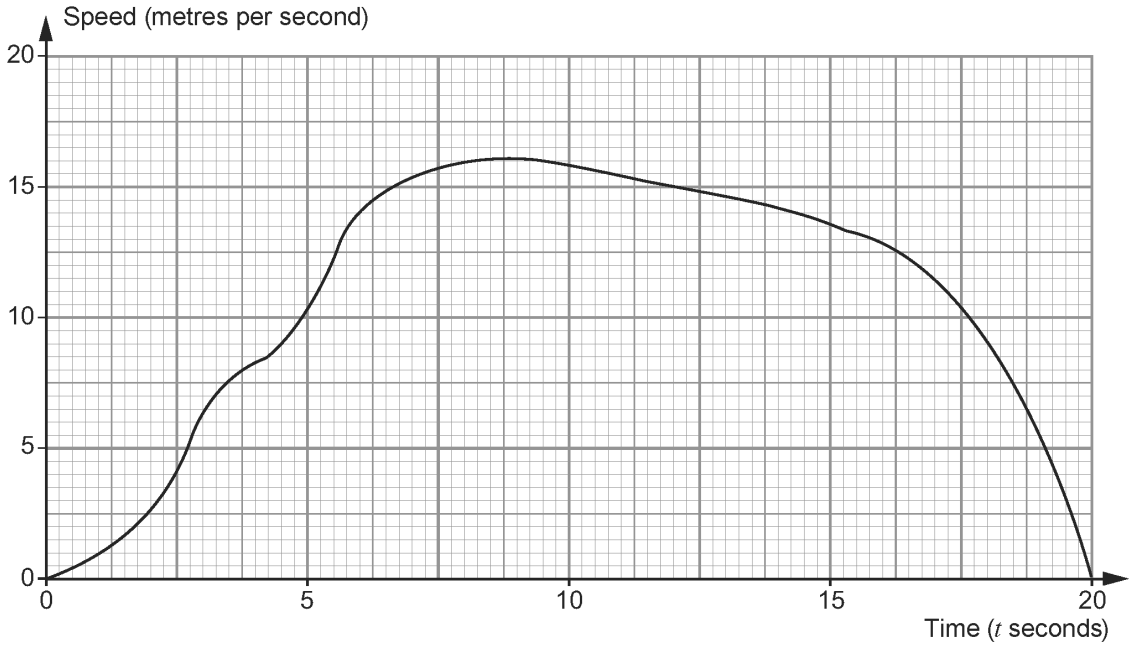
**3.**

**5.** The graph below shows the speed of a cyclist, between two sets of traffic lights.




*(a)* Calculate the acceleration of the cyclist at $t = 7{\cdot}5$ seconds.
Give the units of your answer. [4]

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*(b)* Calculate an estimate for the distance between the two sets of traffic lights. [4]

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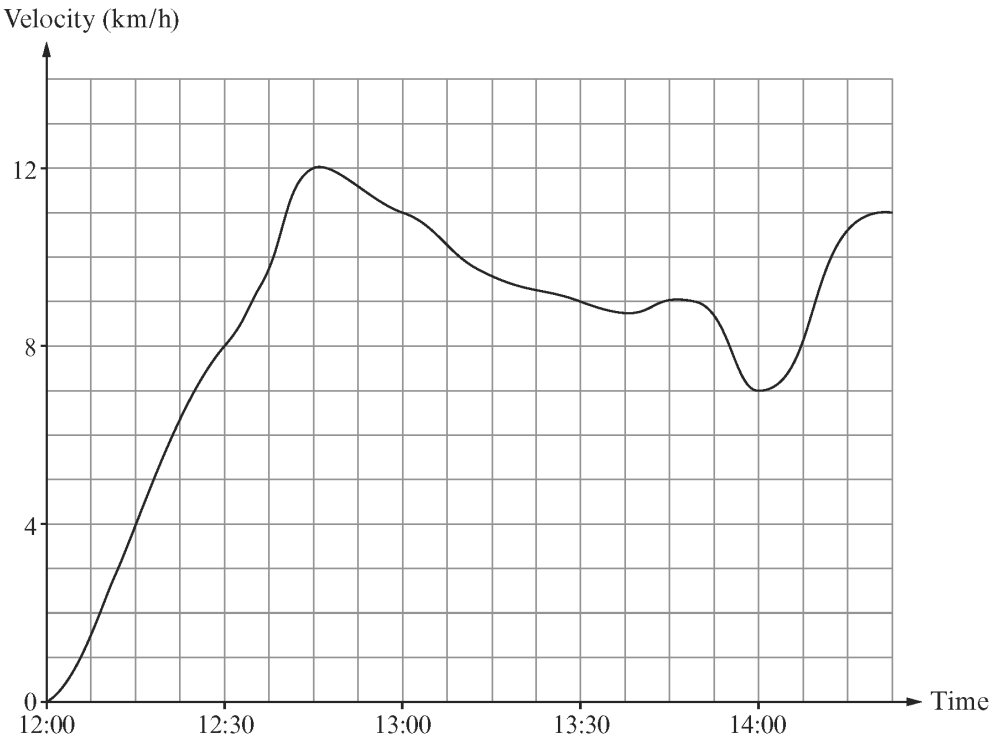
**4.** Sue rode her bike along a cycle path.
She started her ride at 12:00.
The graph shows information about her cycle ride.




By considering every $\frac{1}{2}$ hour of Sue's cycle ride, use the trapezium rule to calculate an estimate for the total distance travelled in the first 2 hours.
Give the units of your answer.

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[5]

# Marking Scheme

**1.**
**2.**

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|---|---|---|
| 15.(a) Finding the y values: (0,) 8, 7(, 0) | B1 | May be shown on their graph |
| Use of trapezium rule or splitting into the 3 areas required and attempt to sum | M1 | FT their values for y |
| Complete correct calculation for the area required | A1 | (8 + 15 + 7) |
| 30 (m) | A1 | CAO<br>Treat splitting area into 6 parts as MR-1, then follow the stages of the mark scheme |
| (b) 'Under estimate' with reason suggesting that trapezium is beneath the curve | E1<br>5 | |

**3.**
**4.**

| | | |
|---|---|---|
| 11. Idea to find 4 areas of strip width ½ hour | B1 | |
| 2 + 4.75 + 5 + 4 | M2 | M1 for any 2 of the 4 areas correct, or '2 of their areas' correctly evaluated from an incorrect interpretation of the scale or of the ½ strip requirement, e.g. use of 4 or 30 for the horizontal |
| 15.75 | A1 | Other A marks are included by sight of 15.75<br>Only award A1 for correct calculation based on 4 strips to 14:00 |
| km | U1<br>5 | Independent mark.<br>Accept other units from appropriate calculations |

## Examiner's Comments

1. Candidates who did not understand that the area under a velocity-time graph yields the distance travelled, all chose graph A incorrectly. These candidates were drawn towards the values on the axes that could be used in a simple calculation to give a value of 60.

   *This comment originally referred to question **19** on paper **4353/02 (01/07/2016)***

2. This was a routine question to calculate areas, with many candidates having an appropriate approach.

   Part (b) was simple if the candidate had engaged with the outcome of the process followed in part (a), however a number of candidates did not connect these two parts of the question.

   *This comment originally referred to question **15** on paper **4361/02 (06/01/2015)***

3. Few candidates showed the understanding needed to answer part (a), with calculations other than gradients being a common error.

   In (b) non-standard methods were often used with many candidates making arithmetic errors in their calculations.

   *This comment originally referred to question **5** on paper **4361/02 (01/02/2016)***

4. Q11 A number of candidates did not engage with finding the areas of the strips. However, many candidates gave the correct unit for their answer

   *This comment originally referred to question **11** on paper **4361/02 (06/02/2014)***