

Mark schemes

Q1.

$$\begin{aligned} & \frac{1}{2} \times 10 \times 45 \\ & \text{or } [200, 225) \\ & \text{or } \frac{1}{2} \times 5 \times 30 + \frac{1}{2} \times (30 + 45) \times 5 \\ & \text{or } 75 + 187.5 \end{aligned}$$

oe

M1

$$[225, 275]$$

A1

[2]

Q2.

(a) [6, 6.5]

B1

(b) **Alternative method 1**

$$\frac{1}{2} \times (22 + 18) \times (25 - 10) \text{ or } 15 \times 18 + \frac{1}{2} \times 15 \times 4$$

oe

M1

$$300$$

A1

Alternative method 2

$$20 \times 15$$

M1

$$300$$

A1

Additional Guidance

Alternative method 2 uses average velocity \times time

[3]

Q3.

(a) [70, 71]

B1

(b) [4.4, 4.6]

oe [4 min 24 s, 4 min 36 s] or [264 s, 276 s]

B1

(c) Tangent drawn at $T = [3.8, 4.2]$

Do not allow if line crosses curve

B1

Attempt at gradient of their tangent

eg $\frac{138 - 131}{4 - 1}$

Either numerator or denominator must be correct for their tangent

M1

[1.5, 3.5]

*SC1 Line drawn from (4, 138) that passes through vertical axis between (0, 115) and (0, 135) **and** attempt at gradient of this line with numerator or denominator correct*

A1

[5]

Q4.

- (a) Attempts to calculate an area

eg $\frac{1}{2} \times 90 \times 9.4$

*Attempts to calculate average speeds over **equal** time intervals **and** divides by number of intervals (**and** multiplies by 120)*

M1

[545, 565]

A1 [530, 580]

A2

m(etres)

Allow correct conversion to other units if supported by an area

eg 0.564 km after 564 calculated for area

B1

- (b) Tangent drawn at 70 seconds

B1

Attempt at $\frac{y_2 - y_1}{x_2 - x_1}$ for their tangent

At least one of numerator or denominator correct

M1

[0.06, 0.14]

A1

[7]

Q5.

- (a) [6, 6.5]

B1

- (b) Tangent drawn at $m = 3$

B1

vertical change \div horizontal change

For their tangent

M1

[1.8, 2.4]

ft B0 M1

ft their tangent

A1ft

[4]

Q6.

(a) $0.5 \times 20 \times 5$ or 50

or

5×50 or 250

or

$0.5 \times 40 \times 5$ or 100

or

$0.5 \times 5 \times (110 + 50)$

oe

Working may be on the diagram

e.g.1 Trapezium rule

e.g.2 Attempt to count squares and convert to a distance

For example

$0.5 \times 2 \times 5 = 5$ and their 5×10

M1

$0.5 \times 20 \times 5 + 5 \times 50 + 0.5 \times 40 \times 5 = 400$

or

$50 + 250 + 100 = 400$

or

$0.5 \times 5 \times (110 + 50) = 400$

oe

A1

(b) **Alternative method 1**

$0.5 \times 60 \times 6$ or 180

oe

Distance for first 60 seconds

M1

$0.5 \times 60 \times 6 + 50 \times 6$ or 480

oe

Distance for first 110 seconds

This mark implies the first M1

$0.5 \times (110 + 50) \times 6$ is M2

M1

480 and Yes

A1

Alternative method 2

$0.5 \times 60 \times 6$ or 180

oe
Distance for first 60 seconds

M1

$(400 - \text{their } 180) \div 6$ or [36, 37]

or

$(400 - \text{their } 180) \div 50$ or 4.4

or

Correctly builds up to a distance ≥ 400

Remaining distance \div speed \rightarrow time

or

Remaining distance \div time \rightarrow speed

M1

[96, 97] and Yes

or

4.4 and Yes

or

Correct time for their build up and Yes

A1

[5]

Q7.

$0.5 \times 20 \times 8$ or 80

or

30×8 or 240

or

$0.5 \times (50 + 30) \times 8$ or 320

oe

Attempt at any part of the area below the graph up to 50s

M1

$0.5 \times (8 + 5) \times 14$ or 91

oe

Attempt at area below the graph for time between 50s and 64s

M1

their 80 + their 240 + their 91

or

their 320 + their 91

or

411

dep on M1 M1

An attempt at total area for 64 seconds

M1dep

411 and Amina

A1

[4]