Mark schemes

Q1.

$\frac{1}{2} \times 10 \times 45$

or [200, 225)

or $\frac{1}{2} \times 5 \times 30 + \frac{1}{2} \times (30 + 45) \times 5$

or 75 + 187.5

oe

M1

[225, 275]

A1

[2]

Q2.

(a)   [6, 6.5]

B1

(b)   Alternative method 1

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

oe

M1

300

A1

Alternative method 2

20 × 15

M1

300

A1

Additional Guidance

Alternative method 2 uses average velocity × 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

AQA GCSE Maths - Pre-Calculus and Area Under a Curve (H)

Attempt at gradient of their tangent

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

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 $\dfrac{1}{2}$ × 90 × 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 $\dfrac{y_2 - y_1}{x_2 - x_1}$ 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 ÷ horizontal change
For their tangent

M1

[1.8, 2.4]
ft B0 M1
ft their tangent

A1ft

[4]

Q6.

(a)   0.5 × 20 × 5 or 50
or
5 × 50   or   250
or
0.5 × 40 × 5   or   100
or
0.5 × 5 × (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 × 2 × 5 = 5 and their 5 × 10

M1

0.5 × 20 × 5 + 5 × 50 + 0.5 × 40 × 5 = 400
or
50 + 250 + 100 = 400
or
0.5 × 5 × (110 + 50) = 400

oe

A1

(b)   Alternative method 1

0.5 × 60 × 6 or 180

oe
Distance for first 60 seconds

M1

0.5 × 60 × 6 + 50 × 6 or 480

oe
Distance for first 110 seconds
This mark implies the first M1
0.5 × (110 + 50) × 6 is M2

M1

480 and Yes

A1

Alternative method 2

0.5 × 60 × 6 or 180

oe
Distance for first 60 seconds

M1

(400 − their 180) ÷ 6 or [36, 37]
or
(400 − their 180) ÷ 50 or 4.4
or
Correctly builds up to a distance ≥ 400

Remaining distance ÷ speed → time
or
Remaining distance ÷ time → 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 × 20 × 8 or 80
or
30 × 8 or 240
or
0.5 × (50 + 30) × 8 or 320

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

M1

0.5 × (8 + 5) × 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]