M1.

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]

M2.

(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) 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
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]

M3.

(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]

M4.

(a)   Attempts to calculate an area

eg $\frac{1}{2}$ × 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]

M5.

(a)   [70, 71]

B1

(b)   [4.4, 4.6]

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

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

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]