

Subject - Math AI(Higher Level)
Topic - Function
Year - May 2021 - Nov 2022
Paper -2
Answers

Question 1

(a) $y = \frac{5}{8}x + \frac{7}{2}$ ($y = 0.625x + 3.5$)

A1A1

Note: Award **A1** for 0.625x, **A1** for 3.5.
Award a maximum of **A0A1** if not part of an equation.

[2 marks]

(b) (i) $y = -0.975x^2 + 9.56x - 16.7$
($y = -0.974630x^2 + 9.55919x - 16.6569...$)

(M1)A1

(ii) gradient of curve is positive at $x = 4$

R1

Note: Accept a sensible rationale that refers to the gradient.

[3 marks]

(c) **METHOD 1**

let $y = ax^2 + bx + c$

differentiating or using $x = \frac{-b}{2a}$

(M1)

$8a + b = 0$

substituting in the coordinates

$7.5^2a + 7.5b + c = 0$

(A1)

$4^2a + 4b + c = 6$

(A1)

solve to get

$y = -\frac{24}{49}x^2 + \frac{192}{49}x - \frac{90}{49}$ **OR** $y = -0.490x^2 + 3.92x - 1.84$

A1

Note: Use of quadratic regression with points using the symmetry of the graph is a valid method.

METHOD 2

$y = a(x - 4)^2 + 6$

(M1)

$0 = a(7.5 - 4)^2 + 6$

(M1)

$a = -\frac{24}{49}$

(A1)

$y = -\frac{24}{49}(x - 4)^2 + 6$ **OR** $y = -0.490(x - 4)^2 + 6$

A1

[4 marks]

(d) (i) $\pi \int_0^4 \left(\frac{5}{8}x + 3.5 \right)^2 dx + \pi \int_4^{7.5} \left(-\frac{24}{49}(x-4)^2 + 6 \right)^2 dx$ **(M1)(M1)(M1)A1**

Note: Award **(M1)(M1)(M1)A0** if π is omitted but response is otherwise correct.
Award **(M1)** for an integral that indicates volume, **(M1)** for their part (a) within their volume integral, **(M1)** for their part (b)(i) within their volume integral, **A1** for their correct two integrals with all correct limits.

(ii) 501 cm^3 (501.189...)

A1

[5 marks]

Total [14 marks]



Question 2

