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Name of student:

Examiners Report

Use the following codes for evaluation:

A : All Good *B : Silly Mistake* *C : Conceptual Error*

D : Hard question *E : Not Applicable*

Question Number	Marks	Remark	Question Number	Marks	Remark	Question Number	Marks	Remark	Question Number	Marks	Remark
1	A	4	E	7	E						
2	B	5	A	8	E						
3	A	6	D								

Math

Name: Maanya

① Start : 08:06
End : 09:00

② Start : 19:38
End : 20:00

Q1) a) $\tan x = \frac{\sin x}{\cos x}$

$\frac{dy}{dx} = \frac{\cos^2 x + \sin^2 x}{\cos^2 x}$ M1A1

$= \frac{1}{\cos^2 x}$

$= \sec^2 x$ AG

b) $y = \arctan x$

$x = \tan y$ M1

$\frac{dx}{dy} = \sec^2 y$ A1

(from part (a)) A1

$\frac{dy}{dx} = \frac{1}{\frac{dx}{dy}}$

$= \frac{1}{\sec^2 y}$ AG

$= \frac{1}{1 + x^2}$

7/7

Q2)

a) $f(0) = \frac{100}{51} = 1.96$ (3 s.f.) A1

b) $f(x) = 95 = \frac{100}{1 + 50e^{-0.2x}}$ M1

$x = 34.3$ (3 s.f.) A1

c) $0 < y < 100$ A1A1A1

d) $\frac{(1 + 50e^{-0.2x})(0) - 100(50e^{-0.2x} \cdot -0.2)}{(1 + 50e^{-0.2x})^2}$ M1A1A1

$\frac{-100(-10e^{-0.2x})}{(1 + 50e^{-0.2x})^2}$ A1

$f'(x) = \frac{1000e^{-0.2x}}{1 + 50e^{-0.2x}}$ AG

e) N/A

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Q3) $\frac{dy}{dx} = 8x^3 + 18x^2 + 7x - 5 = 0$ A1

$8x^3 + 18x^2 + 7x - 5 = -2$ A1M1

$x = -1$

$-8 + 18 - 7 - 5 = -2$

$8x^3 + 18x^2 + 7x - 5 = 0$

$= (x+1)(4x-1)(2x+3) = 0$ A1M1

$x = -1, x = 0.25, x = -1.5$ M1A1

7/7

Q4) N/A

Q5)

$y = x^3 - 6x^2 + kx - 4$

$\frac{dy}{dx} = 3x^2 - 12x + k$ M1A1

$3x^2 - 12x + k = 0$ (only one solution) M1

$b^2 - 4ac = 0$

$144 - 4(3)(k) = 0$ A1

$k = 12$ A1

5/5

Q6) a) $x^3 + 1 = \frac{1}{x^3 + 1}$

Using GDC

$x > (-1.26, -1)$ A1

1/1

b) N/A

Q7) & Q8) N/A