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Math Test

Name: Maanya
Start: 15:03
End: 15:34

Q1)

a) $a^2 - 2(0)a = 5 - e^0$ M1

$a^2 = 5 - 1$

$a = 2$ A1

b) $y^2 - 2xy = 5 - e^x$

$2y\frac{dy}{dx} - 2\left(x\frac{dy}{dx} + y\right) = -e^x$ M1A1A1

$= 2y\frac{dy}{dx} - 2x\frac{dy}{dx} - 2y = -e^x$

$= 2y\frac{dy}{dx} - 2x\frac{dy}{dx} = 2y - e^x$

$\frac{dy}{dx} = \frac{2y - e^x}{2y - 2x}$

$= \frac{2y - e^x}{2(y - x)}$ AG

c) gradient $= -\frac{dx}{dy}$ A1

$= -\frac{2(y-x)}{2y - e^x}$

$y = \frac{-2(y-x)}{2y - e^x}x + C$ M1

(2, 0)

$2 = \frac{-2(2-0)}{2(2) - e^0} \cdot 0 + C$

$C = 2$

$y = \frac{-2(2-0)}{2(2) - e^0} + 2$

$y = -\frac{4}{3}x + 2$ A1

d) substitute normal into C M1

$$\left(-\frac{4}{3}x+2\right)^2 - 2x\left(-\frac{4}{3}x+2\right) + e^x - 5 = 0$$

Using GDC

$x = 1.56$ (3 s.f.)

$y = -0.0779$ (3 s.f.) M1A1

$(1.56, -0.0779)$ A1

e) $\frac{dv}{dx} = 3y^2\left(\frac{dy}{dx}\right)$ M1A1

$y = 2$

$x = 0$

$= 3 \times 4 \times \frac{3}{4}$ A1

$\frac{dv}{dx} = 9$

Q21 – Q7)

Need help so N/A