BOARD OF STUDIES
NEW SOUTH WALES

Question 2

(a) $1 = e^{2(0)}$

$1 = e^{0}$

(b) (i) $y = x \sin x$

$\frac{dy}{dx} =$

(ii) $y = \frac{\ln x}{x^2}$

$\frac{dy}{dx} =$

(c)

(b) (i) $y = x \sin x$

$u = x$

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

$v = \sin x$

$\frac{dv}{dx} = \cos x$

$\frac{dy}{dx} = v\frac{du}{dx} + u\frac{dv}{dx}$

$= \sin x (1) + x \sin$

$= \sin x + x \sin$

$= 2 \sin x$

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(b)(ii) $\frac{\ln x}{x^2}$ u v

$u = \ln x$

$\frac{du}{dx} = \frac{1}{x}$

$v = x^2$

$\frac{dv}{dx} = 2x$

$\frac{dy}{dx} = \frac{V\frac{du}{dx} - U\frac{dv}{dx}}{V^2}$

$= \frac{x^2\left(\frac{1}{x}\right) - \ln x(2x)}{(x^2)^2}$

$= \frac{\frac{x^2}{x} - 2x\ln x}{x^4}$

$= \frac{x - 2x\ln x}{x^4}$

$= \frac{1 - 2\ln x}{x^3}$

(c) $\frac{x}{\sin X} + \frac{y}{\sin Y} = \frac{x}{\sin 60} + \frac{y}{\sin 45}$

$=$

b) (i) $\int \cos 3x \, dx$

(ii) $\int_0^1 (e^{5x} - 1) \, dx$