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2001096

ACHA 4006
Further maths

calvin campbell

i)

$$i) y = 7x^3 - 2x^2 + x + 2$$

$$\frac{dy}{dx} = 21x^2 - 4x + 1$$

$$ii) y = (x+3)(x+2)$$

$$y = x^2 + 2x + 3x + 6$$

$$y = x^2 + 5x + 6$$

$$\frac{dy}{dx} = 2x + 5$$

$$iii) y = \frac{1}{x^3} + \sin 3x$$

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

$$v = \frac{1}{x^3}$$

$$u = \sin 3x$$

$$\frac{du}{dx} = \cos 3x$$

$$\frac{dv}{dx} = -\frac{3}{x^4}$$

$$\frac{dy}{dx} = \left(\frac{1}{x^3}\right)(\cos 3x) + (\sin 3x)\left(-\frac{3}{x^4}\right)$$

$$\frac{dy}{dx} = \frac{1}{x^3} \cos 3x - \frac{3 \sin 3x}{x^4}$$

$$iv) y = x^4 \tan 2x$$

$$v = x^4$$

$$u = \tan 2x$$

$$\frac{dv}{dx} = 4x^3$$

$$\frac{du}{dx} = 2 \sec 2x$$

$$\frac{dy}{dx} = (x^4)(2 \sec 2x) + (4x^3)(\tan 2x)$$

$$\frac{dy}{dx} = x^4 2 \sec 2x + 4x^3 \tan 2x$$

$$v) y = \frac{e^{2x}}{\cos 2x}$$

$$v = \cos 2x$$

$$u = e^{2x}$$

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

$$\frac{du}{dx} = 2e^{2x}$$

$$\frac{dy}{dx} = \frac{(\cos 2x)(2e^{2x}) - (e^{2x})(-2 \sin 2x)}{\cos^2 2x}$$

$$vi) y = (5x^2 + 2x + 1)^5$$

$$= 10x + 2$$

$$\frac{dy}{dx} = 5(5x^2 + 2x + 1)^4 (10x + 2)$$