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Part time maths Friday afternoons
Maths Exam 1 06/11/2020 @ 1330.

(a)

$$\begin{aligned} \text{iii)} \quad y &= 3\sin 2x - 2\cos 2x + \tan \frac{x}{3} \\ \frac{dy}{dx} &= 6\cos(2x) + 4(\sin 2x) + \frac{1}{3}\sec^2\left(\frac{1}{3}x\right) \\ &= \frac{1}{3}\sec^2\left(\frac{1}{3}x\right) + 6(\cos 2x) + 4(\sin 2x) \end{aligned}$$

$$\begin{aligned} \text{v)} \quad y &= e^{2x} \tan 3x \quad (\text{Product rule}) \\ \frac{dy}{dx} &= e^{2x} (\tan 3x)' + (\tan 3x) \left(\frac{dy}{dx} (e^{2x}) \right) \\ &= e^{2x} \sec^2(3x)(3) + (\tan 3x) (e^{2x} 2) \\ &= e^{2x} (3\sec^2 3x) + 0.693(\tan 3x)(e^{2x}) \end{aligned}$$

$$\text{vi)} \quad y = \frac{\sin 5x}{x^3 + 3x + 4}$$

$$\begin{aligned} \frac{dy}{dx} &= \frac{(x^3 + 3x + 4)(\cos 5x)5 - (\sin 5x)(3x^2 + 3)}{(x^3 + 3x + 4)^2} \\ &= \frac{5x^3(\cos 5x) - 3x^2(\sin 5x) + (5\cos 5x) + 20\cos 5x - 3\sin 5x}{(x^3 + 3x + 4)^2} \end{aligned}$$