

Question 2

a) i) $y = 8x^3 - 2x^2 + x + 10$

$$\frac{dy}{dx} = 24x^2 - 4x + 1$$

ii) $y = (5x-3)(6x-1)$

~~$y = 30x^2 - 5x - 18x + 3$~~

$y = 30x^2 - 5x - 18x + 3$

$y = 30x^2 - 23x + 3$

$$\frac{dy}{dx} = 60x - 23$$

iii) $y = \frac{3}{\sqrt{x}} + \ln x$

$y = \frac{3}{x^{0.5}} + \frac{1}{x}$

$$\frac{dy}{dx} = \frac{3}{0.5x^{-0.5}} + \frac{1}{x}$$

iv) $y = 5 \sin \frac{x}{2} - 6 \cos 3x - \tan \frac{x}{3}$

~~$\frac{dy}{dx} = 5 \cos \frac{x}{2} + 18 \sin 3x + \frac{1}{3} \sec^2 \left(\frac{x}{3} \right)$~~

$$\frac{dy}{dx} = \frac{5}{2} \cos \left(\frac{x}{2} \right) + 18 \sin (3x) + \frac{1}{3} \sec^2 \left(\frac{x}{3} \right)$$

v) $y = e^{7x} \tan 3x$

$$\frac{dy}{dx} = e^{7x} 7 \tan (3x) + \sec^2 (3x) 3e^{7x}$$

vi) $y = \frac{\sin 2x}{e^{3x}}$

$$\frac{dy}{dx} = \frac{2 \cos (2x) - 3 \sin (2x)}{e^{3x}}$$

vii) $y = \sqrt[3]{4x^3 - 2x + 1}$

$$\frac{dy}{dx} = \frac{12x^2 - 2}{3(4x^3 - 2x + 1)^{\frac{2}{3}}}$$