

Arturo Vittari
Question 2

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(1903792)

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PG6

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

$$\frac{dy}{dx} = \frac{2 \cos(2x) - 3 \sin(2x)}{e^{6x}}$$

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

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

b) $y = \sin 2x$

$$\frac{dy}{dx} = \cos(2x) \cdot 2$$

$$\frac{d^2y}{dx^2} = -4 \sin(2x)$$

$$\frac{d^3y}{dx^3} = -8 \cos(2x)$$

$$d^4y = 16 \sin(2x)$$

c) $z = x^5 + 3x^3y^2 + 4y^5$

$$\frac{\partial^2 z}{\partial x^2} = 20x^3 + 18y^2x$$

$$\frac{\partial^2 z}{\partial y^2} = 80y^3 + 6x^3$$