

Intensive Mathematics

Final Exam questions of semester December 2017

Date

No.

Question 7a) Find $\frac{dy}{dx}$ for each of the following.

i. $y = 3$

$$\frac{dy}{dx} = 0$$

ii. $y = x^3$

$$\frac{dy}{dx} = 1(3)x^{3-1}$$

$$= 3x^2$$

iii. $y = \frac{2}{x}$

$$y = 2x^{-1}$$

$$\frac{dy}{dx} = 2(-1)x^{-1-1}$$

$$= -2x^{-2}$$

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

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

Checked

22/9/18.

b) Differentiate each of the following functions.

i. $y = 7x^2 + 3$

$$\frac{dy}{dx} = 7(2)x^{2-1} + 0$$

$$= 14x$$

ii. $y = \frac{2}{x^5} + 2x^2 - 3x$

$$y = 2x^{-5} + 2x^2 - 3x$$

$$\frac{dy}{dx} = 2(-5)x^{-5-1} + 2(2)x^{2-1} - 3$$

$$= -10x^{-6} + 4x - 3$$

c.) Determine the differentiation for the following functions.

i. $y = x(5 - 3x^2)$

$$y = 5x - 3x^3$$

$$\frac{dy}{dx} = 5(1)x^{1-1} - 3(3)x^{3-1}$$

$$= 5x^0 - 9x^2$$

$$= 5(1) - 9x^2$$

$$= 5 - 9x^2$$

ii. $y = \frac{6x^3 + 4x^2 - 3x}{x^2}$

$$y = \frac{6x^3}{x^2} + \frac{4x^2}{x^2} - \frac{3x}{x^2}$$

$$= 6x + 4 - 3x^{-1}$$

$$\frac{dy}{dx} = 6(1)x^{1-1} + 0 - 3(-1)x^{-1-1}$$

$$= 6x^0 + 0 + 3x^{-2}$$

$$= 6(1) + 3\left(\frac{1}{x^2}\right)$$

$$= 6 + \frac{3}{x^2}$$