

MATHEMATICS

Monday November 14 2016

Seventh Exercise Class

- 1) Find out whether the given function is continuous or discontinuous. If it is discontinuous, classify the type of discontinuity.

$$\text{a) } y = f(x) = \begin{cases} \frac{x^3-1}{1-x} & x \neq 1 \\ -3 & x = 1 \end{cases}$$

$$\text{b) } y = f(x) = \begin{cases} \frac{2x-8}{\sqrt{x-1}-\sqrt{3}} & x \neq 4 \\ 2 & x = 4 \end{cases}$$

$$\text{c) } y = f(x) = \begin{cases} x^3 + 1 & x \in (-\infty, 0] \\ \sqrt{x} & x \in (0, \infty) \end{cases}$$

$$\text{d) } y = f(x) = \begin{cases} 3 + x^2 & x \leq 0 \\ \frac{\sin(3x)}{x} & x > 0 \end{cases}$$

- 2) Calculate the first derivative of each of the following functions:

$$y = f(x) = x^2 + 2x + 1$$

$$y = f(x) = \frac{1}{4}x^4 + \frac{1}{3}x^3 + \frac{1}{2}x^2$$

$$y = f(x) = (x^2 - 5)^{\frac{7}{2}}$$

$$y = f(x) = \sqrt{1 - x^3}$$

$$y = f(x) = \sqrt[3]{3x^3 - 7}$$

$$y = f(x) = (\sqrt{x} - 1)^2 - (x^2 + 1)^4$$

$$y = f(x) = \frac{2x-1}{x+3}$$

$$y = f(x) = x^2 e^{x^2}$$

$$y = f(x) = \frac{e^x}{x^3}$$

$$y = f(x) = x \ln(x)$$

$$y = f(x) = \frac{x^2}{\ln(x)}$$

$$y = f(x) = \frac{x^2+3x-7}{x^2+x^4+1}$$

$$y = f(x) = 3 \sin \left(\frac{3}{2}x^2 + 2 \right)$$

$$y = f(x) = 3x^2 \cos(2x + 7)$$

$$y = f(x) = \sin \left(\frac{x-2}{2x+3} \right) \cos(2x^3)$$