Exam 2 - Practice 1

Notice:

- *Calculators are not allowed.*
- *Exam 2 is scheduled for Tuesday, Nov 12.*
- *A page of formula is allowed. Only formulas are allowed on the page. The page will be checked during the exam.*

Problem 1.

Find $f'(x)$.

$$f(x) = \frac{2x^3}{3} + \frac{x^5}{7} - \frac{2}{\sqrt[3]{x}} + \frac{5}{6\sqrt{x}} + 2024$$

$$f(x) = (\sqrt{x} + 1)(x + 1)$$

Simplify your answers.

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

$$f(x) = x \sin x$$

$$f(x) = \frac{x}{\tan x}$$

$$f(x) = \cos^{2024} x$$

$$f(x) = \cos(3x^2 + x + 1)$$

$$f(x) = \tan\left(\cos x + \sqrt{x}\right)$$

$$f(x) = \left(\cos x + \sin x\right)^{2024}$$

$$f(x) = 2024^x + 7^x - 2\log_9 x + 3\ln x - \frac{3\log_2 x}{5} + \frac{\log_7 x}{3} + 2024$$

Problem 2

$$y + xy - 2x^3 = 1$$

(a) Find dy/dx or y' by differentiating implicitly.

(b) Solve the equation for y as a function of x, and find dy/dx from that equation.

Problem 3

Given the equation

$$x^3 + y^3 = 3xy$$

1. Use implicit differentiation to find dy/dx or y'

2. Find an equation for the tangent line at the point (3/2, 3/2)

Problem 4

(a) Find the local linear approximation of $f(x) = \sqrt{x}$ at $x_0 = 1$

(b) Use the local linear approximation obtained in part (a) to approximate $\sqrt{1.1}$