

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 $f'(x)$.

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

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

$$f(x) = \frac{x-1}{x+1} \text{ (Simplify your answers.)}$$

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

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

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

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

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

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

$$f(x)=2024^x+7^x-2\log_9x+3\ln x-\frac{3\log_2x}{5}+\frac{\log_7x}{3}+2024$$

$$f(x)=\log_7\left(\sqrt{x}+x^2+x+1\right)$$

$$f(x) = e^{\sin x + \tan x + 2x^3}$$

$$f(x) = e^{x \sin x}$$

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 $\sqrt{1.1}$