

Test 2

MA 125-8C

October 3, 2013

Name: _____

Signature: _____

SHOW ALL YOUR WORK!

If you have time, find a way to check your answers.

Part 1

1. [6 points] Find y' if $y = \cos(x^3 + x^2 + x)$.2. [6 points] Find the derivative of the function $f(x) = 7x^3 + \frac{-2}{x^2} + 3x - \sqrt{5}$.3. [6 points] Find y' if $y = \frac{x^3}{x-3}$.4. [6 points] Let $g(t) = h(f(t))$, where $f'(2) = -1$, $f(2) = 3$ and $h'(3) = 1$. Find $g'(2)$.

5. [6 points] Find y' if $y = (\tan(x))^{45}$.

6. [6 points] Use implicit differentiation to find the derivative $\frac{dy}{dx}$ if $\sin(y) = xy$.

7. [6 points] Find the equation of the tangent line to $y = \sin(4x)$ when $x = \frac{\pi}{8}$.

Part 2

1. [9 points] Differentiate the function $v(\varphi) = \frac{\sin(\varphi)}{3} - \frac{c}{\varphi}$, where c is a constant.

2. [11 points] Find an equation of the tangent line to the curve $y = x^3 - x^2 - x - 1$ at the point $(0, -1)$.

3. [19 points] Differentiate $f(x) = \frac{1 + x \sin(x)}{x + \cos(x)}$.

4. [19 points] Let $f(x) = \frac{4}{x+2}$.

(a) Use the **limit definition of the derivative** to find $f'(0)$.

(b) Find an equation of the tangent line to $f(x)$ at the point $(0, 2)$