

# MATH 127H Practise Exam 2

November, 2006

You are allowed calculators and one page of notes. Please show all of your work and clearly mark your answer. Unless otherwise specified, all answers must be in the precise values, not numerical approximations.

1. Compute the following derivatives. (5 points each)

- (a)  $\frac{d}{dx}(x^{111} + 111 + e^{111}) =$
- (b)  $\frac{d}{dx}\left(\frac{2}{x} + \sqrt{x}\right)^{10} =$
- (c)  $\frac{d}{dx}[(3x + \sin x)(e^x + \tan x)] =$
- (d)  $\frac{d}{dx}\left(\frac{4x}{4+e^{4x}}\right) =$
- (e)  $\frac{d}{dx}[5x \arctan(5x)] =$
- (f)  $\frac{d}{dx} \ln(6x + 6^x) =$
- (g)  $\frac{d}{dx} \cos^7(5x^7 + 7) =$
- (h)  $\frac{d}{dx}(\sqrt[3]{8 + e^{\sin 8x}}) =$
- (i)  $\frac{d}{dx} \ln(\sin 9x) =$
- (j)  $\frac{d}{dx} \sin(\sin(\sin x)) =$

2.

- (a) (10 points)  $y$  is an implicit function of  $x$  given by  $xy + \sin(y^3) = x^2 - y^3$ . Find  $\frac{dy}{dx}$ .
- (b) (10 points) Use logarithmic differentiation to find the derivative of  $f(x) = \frac{e^{x-1} \cos^2 x}{(x^2+5)^x}$ .

3.

- (a) (10 points) Find the linearization of  $f(x) = \sqrt[3]{x}$  at  $x = 27$ .
- (b) (5 points) Use this linearization to find an approximation of  $\sqrt[3]{27.1}$ .

- 4. (15 points) Find the global maximum and minimum of  $f(x) = x^3 - 2x^2 + x + 5$  in  $[0, 2]$ .