

MATH 242, Fall 2007

Exam 1: October 3

Only the answer sheets will be graded. On every page, please write your name and discussion section number (30, 31, or 32). Arrange your work as clearly and neatly as possible, and cross out incorrect work. **Unless otherwise noted, you must justify all answers to receive full credit.** You may not use calculators, notes, or any other kinds of aids.

1. (5 points each) In each case, explain whether the function on the given domain is one to one. (An accurate graphical demonstration is OK.)

(a)  $f(x) = \tan^{-1}(x)$ ,  $-\pi < x < \pi$       (b)  $f(x) = \cosh(x)$ ,  $-\infty < x < \infty$

2. (10 points each) Simplify each as far as possible.

(a)  $\log_6(72) - \log_6(2)$       (b)  $\cos^{-1}[\cos(-\frac{\pi}{4})]$

3. (10 points) Sketch the graph of  $y = 2^{1-x}$ , labeling at least three points.

4. (10 points) Find  $y'$  if  $y = x^{\sinh(x)}$ .

5. (10 points each) Evaluate each limit.

(a)  $\lim_{x \rightarrow 0} \frac{x^2}{\cos(x) - 1}$

(b)  $\lim_{x \rightarrow 2^+} 10^{1/(x-2)}$

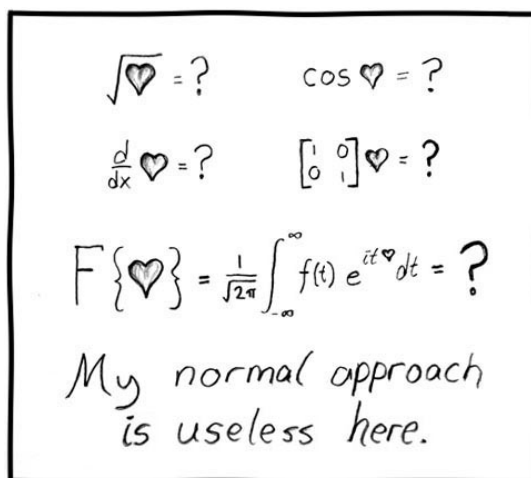
6. (15 points each) Evaluate each integral.

(a)  $\int x e^{-2x^2} dx$

(b)  $\int_0^{\pi/2} \frac{\cos x}{1 + \sin^2 x} dx$

$$\frac{d}{dx} (\sin^{-1} x) = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} (\tan^{-1} x) = \frac{1}{1+x^2}$$



(xkcd.com/55)