

## MATH 251H (Fall 2003) Diagnostic Quiz

This quiz does not count towards your grade. No books, notes, or friends!  
Show all work. Use extra paper if you need!

(1) Let  $f(x) = x^2$ .

(a) Compute  $f'(3)$

(b) What is the definition of  $f'(3)$ ?

(c) What does  $f'(3)$  mean geometrically?

(2) Find  $\int_{1/2}^2 \frac{1}{x} dx$

(3) On what intervals is  $f(x) = x^3 - 3x^2 + 7x$  increasing?

(4) Let  $f(x) = \int_5^x \sin(t^3) dt$ . What is  $f'(10)$ ?

(5) (a)  $\int_0^\infty x e^{-x^2} dx$

(b)  $\int_{-\infty}^\infty x e^{-x^2} dx$

(c)  $\int_{-\infty}^\infty e^{-x^2} dx$