

MATH 251 (Fall 2004) Diagnostic Quiz

This quiz does not count towards your grade. No books, notes, calculators or friends! **Show all work!** Write your solutions on another sheet of paper.

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

(a) Compute $f'(3)$

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

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

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

(b) $\int_0^\infty xe^{-x^2} dx$

(3) On what intervals is $f(x) = 2x^3 + 3x^2 - 12x$ increasing? Also, find the absolute maximum of f on the interval $0 \leq x \leq 3$.

(4) State the Fundamental Theorem of Calculus.

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

(6) What are $\cos \pi/6$, $\sin \pi$, $\tan \pi/4$, $\cot \pi/3$?

(7) Compute the equation of the tangent line to $y = \cos(x^2)$ at $x = \pi/3$.