

236 TEST 1

*You may use your notebook during the last half hour of this exam.
You may NOT use calculators, cell phones, loose papers, or peeking.*

Math 236
February 1, 2011

Name: _____
By printing my name I pledge to uphold the honor code.

1. Use polynomial long division to write $\frac{x^2}{(x+3)(x-2)}$ as the sum of a polynomial and a proper rational function.
2. Write $\tan(\sec^{-1} \frac{x}{2})$ as an algebraic function. Show your work with a triangle.
3. Suppose you want to use the formula $\frac{M(b-a)^3}{24n^3}$ to find the smallest value of n for which we can guarantee that an n -rectangle Midpoint Sum for $\int_0^3 x^3 dx$ will be within 0.1 of the exact answer. What is the numerical value of M in this example, and why?

4. For each integral below, describe a method that will work but DO NOT SOLVE THE INTEGRAL HERE. Here are just a few examples of proper descriptions:

substitution with $u = \underline{\hspace{2cm}}$ and $du = \underline{\hspace{2cm}}$

parts with $u = \underline{\hspace{2cm}}$, $du = \underline{\hspace{2cm}}$, $v = \underline{\hspace{2cm}}$, and $dv = \underline{\hspace{2cm}}$

partial fractions decomposition of the form $\underline{\hspace{4cm}}$ (do not solve for coefficients)

trig substitution with $x = \underline{\hspace{2cm}}$ and $dx = \underline{\hspace{2cm}}$

algebra/identity to rewrite as $\underline{\hspace{2cm}}$ and then (describe method)

a) $\int \sqrt{x} \ln x \, dx$

b) $\int \frac{x^2 + 4x + 1}{x^3 + x^2} \, dx$

c) $\int (1 - x^2)^{-\frac{3}{2}} \, dx$

d) $\int \tan x \cos^5 x \, dx$

e) $\int \frac{x}{\sqrt{3x^2 + 1}} \, dx$

f) $\int \sin^5 x \cos^2 x \, dx$

g) $\int \frac{\sec^2 x}{\tan x + 1} \, dx$

5. Solve ONE of the integrals on the previous page, showing all work very clearly from start to finish. Choose the hardest one that you can solve correctly; you will get more points for solving something difficult than for solving something easy.

Survey for 2 bonus points: How do you think you did? What is a question or topic that could have been on this exam, but wasn't?

sCRAP

(I will not be grading anything on the scrap page)