Math 3322-001 Exam I-A September 7, 2007

Answer the problems on **separate** paper. You do not need to rewrite the problem statements on your answer sheets. Do your own work. Show **all relevant steps** which lead to your solutions. Attach this question sheet to the front of your answer sheets.

1. (32 pts) For each of the following functions find $\frac{dy}{dx}$:

a. $y = \sqrt{4x^3 - x}$
Supp #1, Pr 14

b. $y = \sin^4(x - x^2)$
Supp #1, Pr 40

c. $y = x\sqrt{1-2x}$
Supp #1, Pr 11

d. $y = \frac{x}{1-x^2}$
Supp #1, Pr 9

2. (8 pts) Find, using implicit differentiation, $\frac{dy}{dx}$:

a. $x^2 - 4xy + y^3 = x$
Supp #1, Pr 30

3. (8 pts) Find the equation of the tangent line to the curve $y = (x^2 + x - 3)^2$ at $x = 1$.
Supp #1, Pr 59

4. (24 pts) Evaluate the integrals:

a. $\int \sqrt{1-x^2}\, x\, dx$
K pg 149, Pr 11

b. $\int (3 + x^2)^2\, dx$
K pg 149, Pr 25

c. $\int x\cos(2x)\, dx$
Supp #2, Pr 6

5. (8 pts) Find the partial fraction decomposition of:

a. $\frac{3x}{x(x+2)}$
K pg 459, Pr 39

6. (16 pts) Let $\alpha = 2 - 3i,\ \beta = 1 + 2i,\ \gamma = -2 + i$. Find (in rectangular form):

a. $\alpha^2 + 2i\overline{\beta}$
Supp #0, Pr 1a

b. $\frac{\alpha}{\beta - \gamma}$
Supp #0, Pr 1c

7. (8 pts) Find all of the square roots of $\alpha = 2 - 2i$.
Supp #0, Pr 2a