MAT 137 **HW #3** Name _____

2/6/09 (due Wednesday 2/11/09)

10 points

Show work or otherwise justify your answers. Unsupported answers (i.e. calculator output) will not receive full credit. You may check your answers with a calculator or computer.

1. Derive a reduction formula[1] for the integral $\int \sec^n(x)\, dx$, by first integrating by parts, then invoking a trigonometric identity, and then solving for the desired integral.

2. Find the integral $\int \frac{1}{x^2 - 4}\, dx$ by two different methods:

   (a) using a trigonometric substitution.

   (b) using a partial fractions decomposition.

[1] That is, find a formula that expresses the integral in terms of an integral of a smaller power of secant.

3. Find these integrals.

(a) $\int \arcsin(x)\, dx$

(b) $\int \frac{1}{1+\sqrt[3]{x}}\, dx$

(c) $\int \frac{27x-18}{(x-1)(x^2+x-2)}\, dx$