

**Mathematics 1553 (McGehee) Practice Test 1-1 Spring 2003**

This is a closed-book, closed-notes, no-machines test.

1. Solve this indefinite integration problem, showing your procedure:

$$\int \frac{dx}{\sqrt{x^2 - 1}} \quad (1 < x < \infty).$$

2. Evaluate each of these two definite integrals, showing your procedure:

$$\int_0^\pi \sin^2 x \, dx \quad \text{and} \quad \int_0^\pi \sin^4 x \, dx.$$

3. In this problem,  $\sin^{-1}$  denotes the inverse of the sine, also known as the arcsin.

a. Sketch the graph of  $y = \sin^{-1} x$  for  $-1 \leq x \leq 1$ .

b. Evaluate the improper integral  $\int_0^1 \frac{dx}{\sqrt{1-x^2}}$ .

4. Evaluate this definite integral, showing your procedure:

$$\int_0^1 \sin^{-1} x \, dx.$$

5. Find the derivative of the function  $f$  given by

$$f(x) = \int_0^x \frac{dt}{t^2 - 4} \quad (-2 < x < 2).$$