

Midterm I

Math 181 (Hellen Colman)

February 21, 2003

**Show all work. An unjustified answer is not correct.
Do not use calculators nor tables to solve integrals.**

Problem 1: Find the following derivative

$$\frac{d}{dx} \left(\int_3^{\sin x} e^{-t^2} dt \right)$$

Problem 2: An object is thrown upward from a 400-foot tower with initial velocity of 80 feet per second.

- When does the object reach its highest point?
- Find the maximal height reached.
- When does the object hit the ground?
- How fast is the object going when it hits the ground?

Problem 3: Find

$$\int \frac{1}{x^2 - 8x + 19} dx$$

Problem 4: Find

$$\int x^3 \sqrt{1 + x^4} dx$$

Problem 5: Find

$$\int \frac{2x - 7}{x^2 - 10x + 25} dx$$

Problem 6: Find

$$\int_0^{\frac{\pi}{2}} \sin^3 x \cos^4 x dx$$

Problem 7: Find

$$\int x^5 \ln(2x) dx$$