

MA 142-14, Honors Calculus II
16, 2000

Test-II

Wednesday Feb

Student's name _____

Be sure to show all your work. Every problem is worth 4 points.

1. State the Fundamental Theorem of Calculus, both parts I and II.

2. Find the derivative of the given function:

$$h(x) = \int_{\cos x}^{\sqrt{x}} \ln(1 - t^2) dt$$

3. Evaluate the indefinite integral

$$\int \frac{\sqrt{\ln x}}{x} dx$$

4. Evaluate the definite integral

$$\int_0^{\sqrt[3]{0.5}} \frac{x^2}{\sqrt{1-x^6}} dx$$

5. Evaluate the definite ingtegral

$$\int_0^1 e^{-x} \cos \pi x \, dx$$

6. Evaluate the indefinite integral

$$\int \frac{x^2 + 2x + 6}{x^2 - 2x - 3} \, dx$$

7. Evaluate the indefinite ingtegral (Hint: start by completing the square):

$$\int \frac{x^2}{\sqrt{2x - x^2}} dx$$

8. The following integral must be computed numerically:

$$\int_0^1 x^4 + 3x^2 + 12 dx$$

(a) How large should n be that the trapezoid method is accurate to within 0.00001?

(b) [Bonus] How large should n be that the Simpson's method is accurate to within 0.00001?

9. Evaluate the indefinite integral

$$\int \frac{x}{\sqrt{x^2 + 9}} dx$$

10. Evaluate the indefinite integral

$$\int x \sin^{-1} x dx$$

11. [Bonus] Evaluate the indefinite integral

$$\int \frac{1}{\sin 2x} dx$$

11. [Bonus] Evaluate the indefinite integral

$$\int \frac{1}{x(x^2 + 4)} dx$$