

Test IV

November 25, 2002

Math 184H

Name_____

1. State the Mean Value Theorem.

(a) For the function $f(x) = x + \frac{1}{x}$ find all numbers c in the interval $[1, 2]$ that satisfy the conclusion of the Mean Value Theorem.

2. State the Fundamental Theorem of Calculus (Part I).

3. State the Fundamental Theorem of Calculus (Part II).

4. Integrate.

$$(a) \int (x^2 + 3x - 5 + \sqrt{x}) dx =$$

$$(b) \int \frac{2x^3 - 1}{x^2} dx =$$

$$(c) \int 4x^2(1 + x^3)^5 dx =$$

$$(d) \int \frac{\sin \sqrt{x}}{\sqrt{x}} dx =$$

$$(e) \int \frac{3dx}{2x + 3\sqrt{x}} =$$

$$(f) \int (3x^2 - 1)e^{(x^3 - x + 4)} dx =$$

$$(g) \int \frac{\tan(\ln x)}{2x} dx =$$

$$(h) \int_0^1 \sin^3(\pi\theta) \cos^2(\pi\theta) d\theta =$$

$$(i) \int_2^3 \frac{x^2 dx}{2x^3 - 1} =$$

$$(j) \int_{\pi/6}^{\pi/3} \tan^3(x) \sec(x) dx =$$

5. Find the area between the curves.

(a) $f(x) = x^2 - 18$, $g(x) = x - 6$

(b) $f(x) = x^3 - x^2 + x + 1$, $g(x) = 2x^2 - x + 1$