

Name:

Discussion Section Number:

Homework 4 — Due 10/4/2010 in class

This cover sheet must be attached as the top page of your homework.

1. Solve for x :

$$\log_3 x + \log_3(2x + 1) = 1$$

2. Evaluate the following limits:

$$(a) = \lim_{x \rightarrow 0} e^{-x^3}$$

$$(b) = \lim_{x \rightarrow 1} x^2 e^{-x}$$

3. Show using the limit definition of the derivative that

$$\frac{d}{dx}(\cos x) = -\sin x$$

4. Find the derivatives of the following functions:

$$f(x) = x^3 \sec x$$

$$g(s) = \frac{s^2 - \sqrt{s}}{3s}$$

$$h(x) = \frac{x^2 + 3}{x^3 + 7}$$

$$F(x) = \ln x$$

$$G(t) = e^t \tan t + \cos t$$

5. For $f(x) = x^4 - 3x^3 + 5x^2 - x + 1$, find $f'(x)$, $f''(x)$, $f'''(x)$, $f^{(4)}(x)$, and $f^{(5)}(x)$.

6. For $g(\alpha) = \cos \alpha$, find $g'(\alpha)$, $g''(\alpha)$, $g'''(\alpha)$, and $g^{(4)}(\alpha)$.