

# Math 17A : Calculus for Biology

## Fourth Quiz

(Lewis 11/30/06)

**Name:**

**Section:**

**Score:**

This is a closed book, no notes, no laptops or no cell phones quiz. Calculators are allowed. Please show all work and write solutions on the quiz.

### 1. (15 points)

**a) 10 points** Differentiate  $\tan(3x^2 - 1)$  with respect to  $x$ .

Let  $u = 3x^2 - 1$ , then  $u' = 6x$ . Then,

$$\frac{d}{dx} \tan(u) = \sec^2(u)u' = \sec^2(3x^2 - 1)6x$$

**b) 5 points** Differentiate  $f(x) = e^{\tan(3x^2-1)}$  with respect to  $x$ .

$$f'(x) = e^{\tan(3x^2-1)} \frac{d}{dx} \tan(3x^2 - 1) = e^{\tan(3x^2-1)} \sec^2(3x^2 - 1)6x$$

**2. (15 points)** Find the tangent line approximation to  $f(x) = x^2 - x - 2$  at the point  $x = 1.1$  by using the values of  $f(x)$  and  $f'(x)$  at  $x = 1$ .

Recall the tangent line approximation:

$$f(x) \approx f(a) + f'(a)(x - a)$$

Here,  $a = 1$  and  $x = 1.1$

$f'(x) = 2x - 1$ , so  $f'(1) = 1$  and  $f(1) = -2$ . Thus,

$$\begin{aligned} f(1.1) &\approx f(1) + f'(1)(1.1 - 1) \\ &= -2 + 1(.1) \\ &= -1.9 \end{aligned}$$