Name _____

Student ID # _____

Class (circle one) 9:40

10:45

Math 1210 Fall 2009 K. M. Golden

EXAM I

Friday, September 18, 2009

Problem	Points	Score
1.	10	
2.	15	
3.	20	
4.	30	
5.	10	
6.	15	
	TOTAL	

(10 points) 1. (a) Find the equation of the line containing the two points P = (-1, 2)and Q = (1, 1) in the form y = mx + b.

(b) Find the derivative $\frac{dy}{dx}$ of the expression for y(x) you found in (a).

(15 points) 2. Find the following limits.

(a)
$$\lim_{\Delta x \to 0} (2 + 5\Delta x)$$

(b)
$$\lim_{h \to 0} \frac{4xh + 5h^3}{h}$$

(c)
$$\lim_{h \to 0} \frac{\sqrt{x+h} - \sqrt{x}}{h}$$

(20 points) 3. (a) Let $f(x) = x^2 + 5$. Using the *definition* of the derivative, calculate f'(x). Be sure to show all of your work.

(b) Using your result from (a), find the equation of the line tangent to the graph of $f(x) = x^2 + 5$ at x = 2.

(30 points) 4. Find the following.

(a)
$$\frac{d}{dx} \left(3x^5 + x^4 - 2x^2 + 6 \right)$$

(b)
$$\int (3x+2)(x-1) \, dx$$

(c)
$$v(t)$$
, where $x(t) = -16t^2 + 4t + 10$ and $v(t) = \frac{dx}{dt}$

(d)
$$\int_0^2 (x^2 + 1) dx$$

(e)
$$x(t)$$
, where $\frac{dx}{dt} = -32t + 64$ and $x(0) = 50$.

(10 points) 5. A pebble is dropped from a height of 32 feet. Its height above the ground at time t is given by $x(t) = -16t^2 + 32$. Find t^* , the time when the pebble hits the ground. Find the velocity of the pebble $v(t^*) = x'(t^*)$ when it strikes the ground.

(15 points) 6. (a) Find the antiderivative of $3x^2 - 2x + 2$ that has the value 10 when x = 2.

(b) Find the position x(t) satisfying Newton's law

$$\frac{d^2x}{dt^2} = -32$$

such that x(0) = 0 and x'(0) = v(0) = 32. Be sure to show all of your work.