**Basic Calculus Spring 2014 – Midterm Review**

Topics:

I) Limits

II) Continuity

III) Definition of the Derivative

IV) Derivatives

V) Tangent Lines

VI) Financial Problems

I) Limits:

Evaluate the following limits:

II) Continuity:

Determine where is continuous:

Determine where is discontinuous:

Evaluate:

Is continuous at ? Explain.

Evaluate:

Is continuous at ? Explain

IV) Definition of the Derivative:

Find the derivative using the 4-step method (the definition of the derivative)

IV) Derivatives:

Find the Derivate of the following functions:

V) Tangent Lines:

Find the equation of the tangent line to the functions:

Find the point(s) at which the equation of the tangent line is horizontal:

VI) Financial Problems:

The “we are robots company, inc.” has determined that their current sales price of humanoid robots is not earning them their maximum profit.

Their senior sales associate finds that current price-demand equation is; . The associate also knows that their current production cost for these robots is; .

Using this information find the current Revenue and Profit functions:

Based on this information find the Marginal Revenue and Profit functions:

How many robots should be produced to maximize Profit and what is the maximum Profit?

What is the average Profit per robot when the maximum profit is obtained?

Compare the exact Profit and the approximate Profit received from producing the 1200th robot?

The world health operation (W.H.O.) is funding a project to combat deadly viruses.

The cost of funding the anti-pandemic entity is; , where “x” represents the number of batches of vaccines produced.

Find the marginal cost of funding this project:

What is the minimum cost of the project?

Interpret the marginal cost at a production level of 100 batches of vaccines:

What is the exact cost of producing the 99th batch?

What is the approximate cost of producing the 99th batch?

Mechanical rabbits sell for the price of KD when rabbits are sold. If the cost of selling rabbits is , write the functions for:

The revenue and profit equations:

Find the number of rabbits to be sold to maximize profit and then find the maximum profit:

Interpret P’(10):

Compare the exact and approximate Profit of the 9th Rabbit: