**Basic Calculus Spring 2014 – Final Exam Review (Part 1 of 2):**

**Part 1:**

**I) Limits**

**II) Continuity**

**III) Definition of the Derivative**

**IV) Derivatives**

**V) Compound Interest**

Part 2:

VI) Tangent Lines and Implicit Differentiation

VII) Absolute Maximum and Minimum on a closed Interval

VIII) Revenue, Cost, and Profit equations

IX) First and Second Derivative Tests

X) Integration

**Part 1:**

**I) Limits:**

Evaluate the following limits:

**II) Continuity:**

Find:

Is continuous at ? Explain.

Find:

Is continuous at ? Explain.

Find:

Is continuous at ? Explain.

Find:

Is continuous at ? Explain.

Find:

Is continuous at ? Explain.

Determine where is continuous:

Determine where is discontinuous:

Evaluate:

Is continuous at ? Explain.

Evaluate:

Is continuous at ? Explain

**III) Definition of the Derivative (4-Step Method):**

Differentiate the following functions using the four step method:

a

**IV) Derivatives:**

Find the derivative of the following functions:

**V) Compound Interest:**

**(1)** Find the amount after 5 years if 200KD is invested at an annual interest rate of 9% compounded:

a) Semi-annually:

b) Quarterly:

c) Continuously:

**(2)** 750KD is invested at a bank at an annual interest rate of 11.5%. Find the amount of time for the investment to triple if interest is compounded continuously.

**(3)** A student decided to open a savings account at Bank of Fog. Their interest rate was given as 3.5% and the student invested $12000.

a) Find the amount of the investment after 10 years if the account is compounded quarterly:

b) Find the amount of the investment after 10 years if the account is compounded continuously:

c) Find how long it will take for the amount to double if the account is continuously compounded:

d) If the student can retire after the amount reaches $850,000, and the account is continuously compounded, how long will the student wait to retire?

**(4)** A bank offers a loan at the rate of 16%. A couple takes a $750,000 loan from the bank for the purchase of their first home.

a) If the interest is compounded semi-annually and they pay the loan back in 15 years, how much was the total value of the loan?

b) If the interest is compounded quarterly and the loan is paid in full in 5 years, what was the total value of the loan?

c) Suppose the loan is compounded continuously, how long will it take for the interest on the loan to be the same value of the amount borrowed (How long does the loan take to double)?