***AP Calculus BC***

**70 Total Points**

**Taylor and Maclaurin Series Assessment**

**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

*Directions: Read each question carefully and show all work.*

1) Suppose that is a function which has continuous derivatives, and that

.

1. Write the third-degree Taylor polynomial for about . **(5points)**
2. Use the polynomial you found in part (a) to approximate . **(5points)**

2) Let .

a) Find the first three non-zero terms in the Maclaurin series expansion of **(5points)**

b) Using the expansion found in part (a) compute: **(5points)**

3) a) Write the Taylor series expansion about for . Include an

expression for the general term. **(5points)**

b) For what values of does the series in part (a) converge? **(5points)**

c) Estimate the error in evaluating by using only the first five nonzero terms of

the series in part (a). Justify your answer. **(3points)**

4) Find the first four nonzero terms and then general term for the Maclaurin series

. **(7points)**

5) a) Find the first four nonzero terms of the Maclaurin series . **(5points)**

b) Use the first three nonzero terms of the Maclaurin series found in part (a) to find

the value of . **(5points)**

6. Consider the power series

a) Write the function that gives the Taylor series expansion shown above. **(5points)**

b) For what values of does the series converge? Justify your answer. **(5points)**

7. a) Suppose a function is approximated with a fourth-degree Taylor polynomial about

. If the maximum value of the fifth derivative between is 0.01,

that is , then find the maximum error incurred using the

approximation to compute f(3). **(4points)**

1. Suppose . Use your answer to (a) to find an interval in which

must reside. **(4points)**

c) Could ? Why or why not? **(2points)**

THE END!!!!!!

