**Taylor Polynomials and Approximations, Day 2**

Yesterday we learned:

|  |
| --- |
| Definition of an nth-degree Taylor polynomial:If *f* has *n* derivatives at *x* = *c*, then the polynomial is called the *n*th-degree Taylor polynomial for *f* at *c*, named after Brook Taylor, an English mathematician. |
| If *c* = 0, then  is called the *n*th-degree Maclaurin polynomial for *f*, named after another English mathematician, Colin Maclaurin. |

Ex. (a) Find the third-degree Maclaurin polynomial for .

(b) Use your answer to (a) to find:

 

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ex. Suppose that the function  is approximated near *x* = 0 by a third-degree Taylor

 polynomial .

(a) Find the value of .

(b) Does *f* have a local maximum, a local minimum, or neither at *x* = 0 ? Justify your answer.

Ex. (a) Find the eighth-degree Maclaurin polynomial for .

(b) Use your answer to (a) to approximate the value of  so that the error in your

 approximation is less than . Justify your answer.

(c) Use your calculator to find the actual value of . What is the error in the

 approximation you found in (b)?