Calculus

Date:

Items Needed: .Book,

Objective: The students will look at the relationship between the tangent line problem and the derivative of a function and discover the relationship between differentiability and continuity.

Lesson:

- Remind students of the tangent line problem and how we used secant lines to determine the slope of the line.
- Point out the definition of Tangent Line with Slope m. (Write up on the board)
- The slope of the tangent line to the graph of f at the point (c,f(c)) is also called the slope of the graph of f at x=c.

- Put up f(x) = 3x-3 and ask what the slope is.
- Verify the slope by doing this example: Find the slope of the graph of f(x) = 3x-3 at the point (2,3). Put 2 into the definition formula and solve.
- Put example two up on the board.

- The limit used to divine the slope of a tangent line is also used to define one of the two fundamental operations of calculus – **differentiation**.
- Put up the definition on the board $f'(x) = \lim_{\Delta x \to o} \frac{f(x+\Delta x) - f(x)}{\Delta x}$
- Put up the different notations for the derivatives. P. 127.
- Solve $f(x) = x^2 + 2x$ using the derivative definition of limits.
- After solving for the derivative, graph $f(x) = x^2 + 2x$
  1. Pick x=2 and find the slope.
  2. Make an equation of a line $(y - y_1) = m(x - x_1)$ using this slope found above.
  3. Graph this equation and see whether it is a tangent line.
- Look at example 4 p. 128 noting why you have to rationalize before you can solve. Remember, it was (0/0) when you first solved.

- Look at how they come up with the alternate form of the derivative (difference in y/difference in X)
- Investigate example 6 and 7
- State theorem 2.1 p.130.

Assignment: .14, 26, 29, 30, 32, 89, p. 131

Evaluation: (Could be from any one/several of the following)

Responses from classroom questions
Results of classroom sample problems
Homework responses
Check answer with Calculator
End of the section exam

Enrichment: