

ValuableTheorems.tns

Name _	 _
Class	

Problem 1 – The Intermediate Value Theorem

The Intermediate Value Theorem states the following:

If *f* is continuous on a closed interval [*a*, *b*] and *k* is any number between f(a) and f(b), inclusive, then there is at least one number *c* in the interval [*a*, *b*] such that f(c) = k.

On page 1.3, use the slider to change the value of *k* and observe the value(s) of *c* that confirm the theorem.

1. Why must the function be continuous on the interval [*a*, *b*]? Sketch a graph to support your answer.

2. For what values of *k* are there more than one value for *c*? Does this contradict the intermediate value theorem? Why or why not?

Problem 2 – The Extreme Value Theorem

The *Extreme Value Theorem* states the following:

If a function f(x) is continuous on a finite closed interval [a, b], then f(x) has both an absolute maximum and an absolute minimum on [a, b].

Examine the three graphs on page 2.2.

3. Which of the figure(s) fulfill the hypothesis of the extreme value theorem, and which figure(s) do not? Explain your reasoning.