Name $\qquad$
Class $\qquad$

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.

