**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**September 20th, 2011**

**AP Calculus 1, Mrs. Sulkes and Mrs. Duty**

**Intermediate Value Theorem**

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

**Think About It!**

1. Every polynomial of odd degree has at least one real root. Is this statement true or false? Explain your reasoning.
2. If f(x) = x2 – 4x + 3 on [-3,4], then there exists a value of *x* on [-3,4] such that f(x) = 19. Is this statement true or false? Explain your reasoning and show your work analytically.
3. If f(x) = x2 – 4x + 3 on [-3,4], then there exists a value of x on [-3,4] such that f(x) = 3. Is this statement true or false? Explain your reasoning and show your work analytically.
4. If f(x) = x2 – 4x + 3 on [-3,4], then there exists a value of x on [-3,4] such that f(x) = -2. Is this statement true or false? Explain your reasoning and show your work analytically.

**Let’s guarantee it!**

For which of the above questions does the Intermediate Value Theorem apply? For each problem, why or why not?

**Apply the IVT!**

1. Given f(x) = x3 – x2 + x – 1, verify that the Intermediate Value Theorem applies to the interval [0,3] for the function f and then find the value of c for which f(c) = 4.
2. Use the Intermediate Value Theorem to guarantee that there is a zero on [0,3] for the function f(x) = x3 – x2 + x – 1.
3. Let f(x) = x2 – 4x + 3. Find a value c on the interval [-3,4] for which f(x) = 2. Does the Intermediate Value Theorem apply? Why or why not?