**The EXISTENCE Theorems**

 These theorems guarantee the existence of a point satisfying a certain condition…

**IVT**

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The IVT tells you that if a function is continuous on a closed interval, it will take all the y-values between the two end points.

**EVT**

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The EVT tells you that if a function is continuous on a closed interval, there will be a point in that interval that is the max and a point that is the min.

**MVT**

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The MVT tells you that if a function is continuous on a closed interval and differentiable on the open one, there is a point where the instantaneous rate of change (derivative) equals the average rate of change of the function over the interval (the slope of a tangent line will be the same than the slope of the secant line joining the end points).

**Applications:**

The **IVT** is usually used to show that an equation has at least one solution.

The **EVT** is usually used to be able to give a name to a point that will be an extremum without really knowing where it is. It is useful to prove many theorems, but is extremely rare on an AP exam…

The **MVT** is usually used to show that a function has a local min or max in a certain interval.

**Examples from the AP Exam…**

Examples for **IVT:**



Example for **MVT:**

