

Last Minute AP Calculus Reminders!

- Don't forget "+C"!
- Don't forget dx !
- Don't forget correct units!
- NO LINKAGE ERRORS! If you say two things are =, they better be equal!
- Definition of the derivative: $\lim_{h \rightarrow 0} \frac{\cos(\pi+h)-(-1)}{h}$ means find the derivative of $f(x) = \cos x$ at $x = \pi$.
- Alternate definition of the derivative: $\lim_{x \rightarrow a} \frac{f(x)-f(a)}{x-a}$. So, $\lim_{x \rightarrow 3} \frac{|x|-3}{x-3}$ means to find the derivative (slope) of $f(x) = |x|$ at $x = 3$
- $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$
- There is no derivative or integral formula for absolute value—use geometry!
- IVT: Requirements: continuous on $[a, b]$
Means that a function will take on every value between $f(a)$ and $f(b)$
Means that a function will switch signs around a root
- EVT: Requirements = continuous on $[a, b]$
Means that there will be a max or min on any closed interval!
Remember to check endpoints on optimization problems (Candidates Test)!
- MVT: Requirements: continuous on $[a, b]$ and differentiable on (a, b)
Uses formula: $f'(c) = \frac{f(b)-f(a)}{b-a}$
Means that the average velocity has to equal instantaneous velocity
Also means that a secant line is parallel to a tangent line
- FTC: Part One: The derivative of an integral is the integrand function.
$$\frac{d}{dx} \int_a^{f(x)} g(t) dt = g(f(x))f'(x)$$

Part Two: The method to evaluate a definite integral:
$$\int_a^b f'(x) dx = f(b) - f(a)$$
- "Find max/min value" means find a y value!
- "Find the area" does not involve squaring functions!

- "Local linearization" means find the tangent line and use it to estimate the function.
 - If $g(x) = f^{-1}(x)$ and (a, b) is on f , then $g'(b) = \frac{1}{f'(a)}$ (find the a value first because you will be given the b value)
 - Disk Method: $\pi \int_a^b [f(x)]^2 dx$ (perpendicular to axis of revolution)
 - Washer Method: $\pi \int_a^b [(f(x))^2 - (g(x))^2] dx$ (perpendicular to axis of revolution)
 - Cross Section: $\int_a^b (\text{Area of one cross section}) dx$
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"EXPLAIN THE MEANING"

1. What does it mean?
2. What are the units?
3. What is the time (or time interval)?

"JUSTIFY YOUR ANSWER"

1. The requirements of the theorem
2. The interval (IVT) or difference quotient (MVT)
3. The theorem