

AP Calculus BC

Name: _____ Score: _____

1. The MVT on $[a, b]$ requires **which** hypotheses?

- ☐ f differentiable on (a, b)
- ☐ f continuous on $[a, b]$
- ☐ $f(a) = f(b)$
- ☐ f is a polynomial

Tick every correct option.

2. A critical point is an interior x where...

- ☐ $f''(x) = 0$ only
- ☐ $f(x) = 0$
- ☐ $f(x)$ is largest
- ☐ $f'(x) = 0$ or $f'(x)$ does not exist

3. A function is increasing on an interval exactly when...

- ☐ $f(x) < 0$ there
- ☐ $f(x) > 0$ there
- ☐ $f''(x) > 0$ there
- ☐ $f'(x) > 0$ there

4. If f' changes from positive to negative at c , then f has a...

- ☐ inflection point
- ☐ vertical asymptote
- ☐ local maximum
- ☐ local minimum

5. To find absolute extrema on $[a, b]$, evaluate f at **which** points?

- ☐ every integer in $[a, b]$
- ☐ the endpoint b
- ☐ all critical points in $[a, b]$
- ☐ the endpoint a

Tick every correct option.

6. If $f'(c) = 0$ and $f''(c) > 0$, then c is a...

- ☐ endpoint
- ☐ relative maximum
- ☐ relative minimum
- ☐ inflection point

7. Where the graph of f has a horizontal tangent, the graph of f' ...

- ☐ is undefined
- ☐ is at a maximum
- ☐ crosses zero
- ☐ is negative

8. On an interval where the graph of f' is positive, f is increasing.

- ☐ True ☐ False

9. The goal of the setup is to write the objective in terms of a _____ variable.

10. A vertical tangent occurs where the _____ of $\frac{dy}{dx}$ is zero.

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1. **f differentiable on (a, b) ; f continuous on $[a, b]$**

Continuous on the closed interval and differentiable on the open one. ($f(a) = f(b)$ is the extra Rolle condition.)

2. **$f'(x) = 0$ or $f'(x)$ does not exist**

Critical points: $f' = 0$ or f' undefined.

3. **$f'(x) > 0$ there**

Positive first derivative means increasing.

4. **local maximum**

Up then down = the top of a hill = local max.

5. **the endpoint b ; all critical points in $[a, b]$; the endpoint a**

Critical points plus both endpoints – that is the full candidate list.

6. **relative minimum**

Concave up at a flat spot = minimum.

7. **crosses zero**

Horizontal tangent $\Rightarrow$ slope 0 $\Rightarrow f' = 0$.

8. **True**

$f' > 0 \Leftrightarrow f$ increasing.

9. **single**

One variable $\Rightarrow$ an ordinary extremum problem.

10. **denominator**

Denominator zero $\Rightarrow$ slope undefined $\Rightarrow$ vertical tangent.