***** Exam will have both *calculator* and *non-calculator* sections**

Important Things to Know
Chapter 5b Test

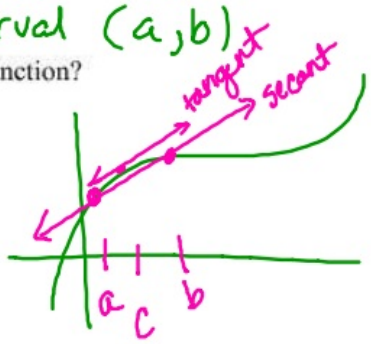
MVT: Mean Value Theorem

- What conditions must be in place for the MVT to be applied?
  - Continuous on a closed interval $[a, b]$
  - differentiable on a open interval (a, b)

What does it indicate if the MVT can be applied to a function?

$$f'(c) = \frac{f(b) - f(a)}{b - a}$$

$f'(c)$: inst. rate of change; $\frac{f(b) - f(a)}{b - a}$: average rate of change



Be sure that you can demonstrate the MVT both analytically and graphically

Optimization

- What are the 10 steps to solve an Optimization problem? (Refer to your notes)

1. Read problem
2. Draw a picture
3. Write formulas for given & optization
4. Solve the given for one of the variable
5. Substitute variable into optimization equation
6. Simplify
7. Differentiate
8. set deriv. = to zero
9. Use critical pt. to find other variables
10. answer in a sentence

Related Rates

- What are the first 3 in solving a Related Rate problem? (Refer to your notes)

1. Read the problem
2. Draw a picture
3. Write what you know and what you want

Formulas you are expected to know . . .

- Rectangle
  - Perimeter $P = 2l + 2w$
  - Area $A = l \cdot w$
- Circle
  - Circumference $C = 2\pi r$
  - Area $A = \pi r^2$
- Triangle
  - Perimeter $P = a + b + c$
  - Area $A = \frac{1}{2}bh$
  - Pythagorean Theorem $a^2 + b^2 = c^2$
- Rectangular Prism
  - Surface Area $SA = 2lw + 2lh + 2wh$
  - Volume $V = lwh$

- Right Circular Cylinder (*open ended* or *one ended* or *two ended*)
  - Surface Area $SA = 2\pi rh + 2\pi r^2$
  - Volume $V = \pi r^2 h$

Formulas that would be given to you on the test . . .

- Right Circular Cone *and* Sphere
  - Surface Area
  - Volume

Answers

- Answers should be **exact** *unless* the instructions indicate to give an approximation.
  - If you are *only* instructed to give an approximation, then your answer must be accurate to 3 or more decimal places.
  - If you are instructed to round to the nearest …. , then your answer must be accurate to the indicated number of decimal places.

Position / Velocity / Acceleration

$s(t)$ = position

$s'(t) = v(t)$ = velocity

$s''(t) = v'(t) = a(t)$ = acceleration

Velocity

Forward / Upward motion: $v > 0$

Backward / Downward motion: $v < 0$

Speed $|v|$

Displacement = $s(b) - s(a)$

Average Velocity = $\frac{\Delta \text{position}}{\Delta \text{time}} = \frac{s(b) - s(a)}{b - a}$

Instantaneous Velocity = $s' = v$

Acceleration

Speed-up: v & a are same sign

Slow-down: v & a are different signs