This quiz covers everything done in class on February 9, 11, and 13, and the types of homework problems assigned on those days.

Reminder: The quiz is on Monday February 16. There will be an optional review session on Sunday February 15 at 1pm in Bailey 207.

• The Fundamental Theorem of Calculus

A. Theorem: If $f(x)$ is continuous on $[a, b]$ and $F(x)$ is an antiderivative of $f(x)$, then

$$\int_{a}^{b} f(x) \, dx = F(b) - F(a).$$

Notation: $F(x)|_{a}^{b} = F(b) - F(a)$.

B. Calculating definite integrals using the FTC.

C. Proof of the FTC

(1) Preliminary practice: calculating an area function for a specific given function $f(x) = ax + b$ (as in the homework).

(2) The proof itself:

– Outline Three main steps:
   (1) Introduce the area function $A(x)$.
   (2) Prove the Key Claim: $A'(x) = f(x)$.
   (3) Evaluate the constant $C$ in $A(x) = F(x) + C$.

– Be able:
   * to state the theorem (including the hypotheses),
   * to give the outline of the proof,
   * to describe the area function defined in (1) and state the two facts about it,
   * to prove (2),
   * to give the argument in (3) that completes the proof of the FTC.