Quiz 16

MATH 139-01 and -02
Tuesday, November 11, 2003

Be sure to **show your work**. Unsupported answers receive no credit.

1. Complete the following statement: (Fundamental Theorem of Calculus) If F' is continuous on $[a, b]$, then

   $$\int_a^b F'(x)dx = \underline{F(b) - F(a)}.$$

2. Recall that if $F(x) = e^x$, then $F'(x) = e^x$, as well. Use this fact and the Fundamental Theorem of Calculus (with $F'(x) = e^x$) to determine $\int_1^4 e^x dx$ without using your calculator. I must see your work; a decimal answer alone is not sufficient.

   Solution: Using the fundamental theorem, we know that $\int_1^4 F'(x)dx = F(b) - F(a)$. Since $a = 1$ and $b = 4$, this is just $F(4) - F(1)$, which is $e^4 - e^1$ since $F(x) = e^x$.

3. Suppose you know that your stock portfolio lost $138 in value during October. Given that $V(t)$ represents the value of your portfolio t days after October 1, evaluate

   $$\int_0^{31} V'(t)dt.$$

   Solution: $\int_0^{31} V'(t)dt$ is the net change in $V(t)$, which in this case is -$138.