Math 134: Homework 6

Due November 5

1. Just using the definition of the Darboux integral, compute

$$\int_0^2 (2x+3)\,dx.$$

2. Using the Fundamental Theorem of Calculus, show that for all $x \in \mathbf{R}$,

$$\int_0^x (t+|t|)^2\,dt = \frac{2}{3}x^2(x+|x|)$$

3. Let f be a function for which f' is continuous on $[a,b]$. Using the Fundamental Theorem of Calculus, show that

$$\int_a^b f(t)f'(t)\,dt = \frac{1}{2}\left(f^2(b) - f^2(a)\right)\ .$$