Brownian Motion.

Q1. Let L_t be the local time at zero. Show that $\mathbb{E}[L_t] = \sqrt{2t/\pi}$.

Q2. Let $a < 0 < b < c$ and τ_a, τ_b, τ_c be the hitting times of these levels for one dimensional Brownian motion. Compute

$$P_0(\tau_b < \tau_a < \tau_c).$$

HINT: This is an easy exercise.