1. (Lawler, Exercise 8.6) Suppose X_t is a standard Brownian motion and $Y_t = a^{-1/2} X_{at}$ with $a > 0$. Show that Y_t is a standard Brownian motion.

2. (Lawler, Exercise 8.7) Suppose X_t is a standard Brownian motion and $Y_t = t X_{1/t}$. Show that Y_t is a standard Brownian motion. (*Hint*: If U and V are normally distributed, then a sufficient and necessary condition for their independence is $E[UV] = E[U]E[V]$.)

3. (Lawler, Exercise 8.8) Let X_t be a standard Brownian motion. Compute the following conditional probability:
$$P\{X_2 > 0 \mid X_1 > 0\}.$$
Are the events $\{X_1 > 0\}$ and $\{X_2 > 0\}$ independent?