MATH 541, FALL 2023, HOMEWORK 11

Due Saturday, December 2, 2023 at 5pm Eastern time on Gradescope. Solve the following exercises:

Problem 1. Lawler, exercise 8.4. You should briefly justify each answer.

Problem 2. Lawler, exercise 8.9.

Problem 3. Lawler, exercise 8.11.

Problem 4. Lawler, exercise 8.15.

Problem 5. Let $p_t(x,y)$ be the transition probability density for Brownian motion

$$p_t(x,y) = \frac{1}{\sqrt{2\pi t}} \exp\left\{-\frac{(y-x)^2}{2t}\right\}.$$

Check explicitly that

$$\frac{\partial}{\partial t} p_t(x,y) = \frac{1}{2} \frac{\partial^2}{\partial y^2} p_t(x,y).$$