Homework 10:

1. Define the processes $X(t) = 7tW(t) - t^2$ and $Y(t) = \int_0^t W(u)dW(u)$.
   (a) What is $dX(t)dY(t)$?
   (b) What is $d(X(t)Y(t))$?
2. For a 3-dimensional Brownian motion $W(t)$, we define the processes

$$X(t) = 7 + 3t - \int_0^t W_1(u)dW_1(u) + \int_0^t u^3 dW_2(u)$$

$$Y(t) = W_2(t)W_3^2(t)$$

   (a) What is $\mathbb{E}[W_2(t)X(t)]$?
   (b) What is $\mathbb{E}[Y(t)]$?
   (c) **Bonus 5pts:** What is $\mathbb{E}[X(t)Y(t)]$?

   From Shreve volume II:

3. Exercise 4.6:
4. Exercise 4.7:
5. Exercise 4.8: