Homework 9:

1. For $X(t) = W^3(t) - 3tW(t)$, find $dX(t)$
2. Simplify $\int_0^t W^3(u)dW(u)$
3. For $dY(t) = 3Y(t)dt + 2dW(t)$, determine $d(e^{-3t}Y(t))$.
4. If $X(t) = 3tW(t)$ and $Y(t) = 2+\int_0^t 6u^2dW(u)$, then determine $dX(t)dY(t)$.
5. If $Z(t) = \int_0^t 3uW(u)dW(u)+\int_0^t 6W(u)du$ and $X(t) = e^{Z^2(t)}$, find $dX(t)$.
6. Let $Y(t) = 6 + \int_0^t W(u)dW(u) + \int_0^t e^{3u}du$, find $\mathbb{E}[Y(t)]$.
7. Simplify $\int_0^p t^2W(t)dW(t)$