There are two problems from the book and two problems from our Classwork problems. Want more practice? Do more problems from the book, or see me. :)

Exercise 6.25 (about certain jointly distributed X and Y)

Exercise 6.26 (about different X and Y)

A. Do Classwork 42, about $E(\sqrt{X^2+Y^2})$. (This is not a small problem. My solution uses polar coordinates, anti-differentiation by parts, and L'Hopital's rule.)

As Section 6.8 describes, the covariance of continuous random variables X and Y is

$$\mathrm{Cov}(X,Y) = E((X-E(X))(Y-E(Y))) = \int_{-\infty}^{\infty}\int_{-\infty}^{\infty}(x-E(X))(y-E(Y))f_{X,Y}(x,y)\,dy\,dx.$$

It obeys all of the nice properties that the covariance of discrete random variables enjoys, such as $\mathrm{Cov}(aX,Y) = a\mathrm{Cov}(X,Y)$ and $\mathrm{Cov}(X,Y) = E(XY) - E(X)E(Y)$.

B. Let $X \sim \mathrm{Unif}(-1,1)$, and let $Y = X^2$. Are X and Y independent? And what is $\mathrm{Cov}(X,Y)$? (In computing the covariance, do not use the density f_Y that we discover on Day 19. You should be able to compute the covariance without that.)