Joint Distribution of Employment Status and College Graduation in the U.S. Population Aged 25 and Greater, 2008

	Unemployed ($Y = 0$)	Employed ($Y = 1$)	Total
Non-college grads ($X = 0$)	0.037	0.622	0.659
College grads ($X = 1$)	0.009	0.332	0.341
Total	0.046	0.954	1.000

a. Compute $E(Y)$.

b. The unemployment rate is the fraction of the labor force that is unemployed. Show that the unemployment rate is given by $1 - E(Y)$.

c. Calculate $E(Y|X = 1)$ and $E(Y|X = 0)$.

d. Calculate the unemployment rate for (i) college graduates and (ii) non-college graduates.

e. A randomly selected member of this population reports being unemployed. What is the probability that this worker is a college graduate? A non-college graduate?

f. Are educational achievement and employment status independent? Explain.

2.7 In a given population of two-earner male/female couples, male earnings have a mean of \$40,000 per year and a standard deviation of \$12,000. Female earnings have a mean of \$45,000 per year and a standard deviation of \$18,000. The correlation between male and female earnings for a couple is 0.80. Let C denote the combined earnings for a randomly selected couple.

a. What is the mean of C?

b. What is the covariance between male and female earnings?

c. What is the standard deviation of C?

d. Convert the answers to (a) through (c) from U.S. dollars (\$) to euros (€).

2.8 The random variable Y has a mean of 1 and a variance of 4. Let $Z = \frac{1}{2}(Y - 1)$. Show that $\mu_Z = 0$ and $\sigma_Z^2 = 1$.

2.9 X and Y are discrete random variables with the following joint distribution: