Solutions: Chapter 4 (Chapter 7)

20. a.

Experimental Outcome	Age Financially Independent	Number of Responses	Probability	
E_1	16 to 20	191	191/944 =	0.2023
E_2	21 to 24	467	467/944 =	0.4947
E_3	25 to 27	244	244/944 =	0.2585
E_4	28 or older	42	42/944 =	0.0445
		944		

b. $P(\text{Age} < 25) = P(E_1) + P(E_2) = .2023 + .4947 = .6970$

c. $P(\text{Age} > 24) = P(E_3) + P(E_4) = .2585 + .0445 = .3030$

d. The probability of being financially independent before the age of 25, .6970, seems high given the general economic conditions. It appears that the teenagers who responded to this survey may have unrealistic expectations about becoming financially independent at a relatively young age.

28. Let: B = rented a car for business reasons
P = rented a car for personal reasons

a. $P(\text{B} \cup \text{P}) = P(\text{B}) + P(\text{P}) - P(\text{B} \cap \text{P})$
$= .54 + .458 - .30 = .698$

b. $P(\text{Neither}) = 1 - .698 = .302$

32. a. Dividing each entry in the table by 500 yields the following (rounding to two digits):

	Yes	No	Totals
Men	0.210	0.282	0.492
Women	0.186	0.322	0.508
Totals	0.396	0.604	1.00

Let M = 18-34-year-old man, W = 18-34-year-old woman, Y = responded yes, N = responded no

b. $P(M) = .492$, $P(W) = .508$
$P(Y) = .396$, $P(N) = .604$

c. $P(Y|M) = .210/.492 = .4268$

d. P(*Y*|*W*) = .186/.508 = .3661

e. P(*Y*) = .396/1 = .396

f. P(*M*) = .492 in the sample. Yes, this seems like a good representative sample based on gender.

33. a.

		Undergraduate Major			
		Business	**Engineering**	**Other**	**Totals**
Intended Enrollment Status	Full-Time	.2697	.1510	.1923	.6130
	Part-Time	.1149	.1234	.1487	.3870
	Totals	.3847	.2743	.3410	1.0000

b. Let *B* = undergraduate major in business
E = undergraduate major in engineering
O = other undergraduate major
F = full-time enrollment

P(*B*) = .3847, *P*(*E*) = .2743, and *P*(*O*) = .3410, so business is the undergraduate major that produces the most potential MBA students.

c. $P(E \mid F) = \dfrac{P(E \cap F)}{P(F)} = \dfrac{.1510}{.6130} = .2463$

d. $P(F \mid B) = \dfrac{P(F \cap B)}{P(B)} = \dfrac{.2697}{.3847} = .7012$

e. For Independent, P(F/B) = P(F)
P(F/B) = .7012
P(F) = .6130
Since , P(F/B) ≠ P(F), the events are not independent