Conditional Probability

Check for understanding:

1. One standard die is rolled. Find:

a. P(5 | greater than 3)   b. P(less than 5 | even)

2. A number of selected randomly from the integers {10, 11, 12, 13, … , 50} Find:

a. P(even | greater than 40)   b. P(greater than 40 | even)

c. P(odd | less than 30)   d. P(less than 30 | odd)

Practice:

1.   Students at a school were surveyed about their favorite leisure activity. The data is shown in the table below. Find each probability below. <u>Give answers as a percent</u>.

	Sports	Hiking	Reading	Crafts	Shopping	Other	TOTAL
Female	39	48	85	62	71	33	338
Male	67	58	76	54	68	39	362
TOTAL	106	106	161	116	139	72	700

a) P(sports | female)   b) P(female | sports)

c) P(reading | male)   d) P(male | reading)

d) P(hiking | female)   e) P(hiking | male)

f) P(male | shopping)   g) P(female | shopping)

h) Are the events {male} and {hiking} associated or independent? Explain your answer.

2. An insurance company wants to charge higher rates to drivers of red cards because they believe they get more speeding tickets. That is, they believe the events {red car} and {speeding ticket} are associated. They collected the following data to investigate their claim.

	Red Cars	Non-red cars	TOTAL
Received speeding ticket	89	249	338
Did not receive speeding ticket	259	19,403	19,662
TOTAL	348	19,652	20,000

Determine if the insurance company is correct. Explain your answer.

3. Use the table below to find each probability for a randomly selected employee:

Education and Salary of Employees				
	Under $20,000	$20,000 to $30,000	Over $30,000	Total
Less than high school	71	36	2	109
High school	112	98	14	224
Some college	100	189	147	436
College degree	13	177	241	431
Total	296	500	404	1200

a. P(High School)=

b. P(Some College)=

c. P(Over $30,000)=

d. P(High School | Over $30,000)=

e. P(Some College | Over $30,000)=

f. Are the events {High School} and {Earning Over $30,000} independent or associated? Explain your answer.

g. Are the events {Some College} and {Earning Over $30,000} independent or associated? Explain your answer.