A.P. Statistics - Conditional Probability

1. Let a pair of fair dice be tossed. Find the following. Make a sample space.

a) the probability that at least one of the dice is a 4 b) the probability that the sum is 7

c) Given that the sum is 7, find the probability that one of the dice is 4

d) Given that at least one of the dice is 4, find the probability that the sum is 7

e) Are rolling two dice with at least one of them a 4 and the sum being 7 a) disjoint b) independent Explain.

2. A cooler has 12 Coke's and 15 Pepsi's. 9 of the Coke's are diet Coke's and 5 of the Pepsi's are diet Pepsi's. A bottle is chosen at random. Find the following: Make a chart.

a) the probability that the bottle is a Coke.

b) the probability that the bottle is a Pepsi

c) the probability that the bottle is a Diet Coke

d) the probability that the bottle is a Diet Pepsi

e) the probability that the bottle is a diet drink

f) the probability that the bottle is not a diet drink

g) Given that the bottle is a diet drink, find the probability that the bottle is a Coke

h) Given that the bottle is diet drink, find the probability that the bottle is a Pepsi

i) Given that the bottle is a Coke, find the probability that the bottle is a Diet Coke

j) Given that the bottle is a Pepsi, find the probability that the bottle is a Diet Pepsi

k) Are choosing a regular(non diet) and choosing a diet drink a) disjoint? b) independent? Explain.

l) Are choosing a Pepsi and choosing a diet drink a) disjoint) b) independent? Explain.

3. A box contains 8 green light bulbs of which 3 are defective. It also contains 12 red light bulbs of which 5 are defective. A bulb is chosen at random from the box. Make a chart.

a) Find the probability that the bulb is red.

b) If the bulb chosen is red, what is the probability that the bulb is defective?

c) What is the probability that the bulb is defective?

d) If the bulb is defective, what is the probability that it is red?

e) Is choosing a red bulb and choosing a defective bulb independent? Explain.

4. A woman's club has 80% of its members married. 30% of the married women are pro-choice and 75% of the single women are pro-choice. If a woman is chosen at random, find the probabilities. Make a chart.

a) she is married

b) she is single

c) she is pro-choice

d) she is pro-life

e) she is married and pro-choice

f) she is single and pro-choice

g) Given that she is married, she is pro-choice

h) Given she is married, she is pro-life

i) Given she is single, she is pro-choice

j) Given she is single, she is pro-life

k) Given she is pro-choice, she is married

l) Given she is pro-life, she is single

m) Are being married and being pro-choice independent? Explain.

CONDITIONAL PROBABILITY - Practice

1. Let a pair of fair dice be tossed. Find the following

   a) the probability that at least one of the dice is even b) the probability that the sum is 6

   c) Given that the sum is 6, find the probability that one of the dice is even

   d) Given that at least one of the dice is even, find the probability that the sum is 6

   e) Are the events (having at least one die even) and (having the sum = 6) independent? Why or why not?

2. A class has 10 girls and 5 boys. 7 of the girls are passing and 4 of the boys are passing. A student is chosen at random. Find the following probabilities. Make a chart.

   a) that the student is a boy.

   b) that the student is a girl

   c) that the student is a passing boy

   d) that the student is a passing girl

   e) that the student is passing

   f) that the student is failing

   g) Given that the student is passing, find the probability that the student is a boy

   h) Given that the student is passing, find the probability that the student is a girl

   i) Given that the student is a boy, find the probability that the student is passing

   j) Given that the student is a girl, find the probability that the student is passing

   k) Determine whether being a boy and passing are independent. Show work.

3. A class has 100 students, 70 of which are boys. 70% of the boys are involved in sports, while 40% of the girls are involved in sports. A student is chosen at random.

a) If the student chosen is a boy, what is the probability that he is involved in sports?

b) What is the probability that the student is involved in sports?

c) If the student chosen in involved in sports, what is the probability that he is a boy?

d) What is the probability that the student is a boy or involved in sports?

e) Show work to determine if being involved in sports is independent of being a boy.

4. In a certain college, 25% of the boys and 10% of the girls are on scholarships. The girls constitute 60% of the student body. If a student is chosen at random, find the probability of the following. Make a chart.

a) that the person is a boy

b) that the person is on a scholarship

c) Given that the person is a boy, find the probability that he is on a scholarship.

d) Given that the person is on a scholarship, find the probability that he is a boy.

e) Given that the person is not on a scholarship find the probability that she is a girl.

f) that the person is a boy or on scholarship

g) Show work to determine if having a scholarship is independent of being a girl.