Problems

1. The table below represents the college degrees awarded in a recent academic year by gender.

	Bachelor's	Master's	Doctorate
Men	48	20	12
Women	30	13	7

A: If one person is selected, then find the probability of the following:

1. A bachelor's degree
2. A doctorate awarded to a woman
3. Not a master's degree
4. Either master's awarded to a woman or bachelor's awarded to a man

B: If a selected person was a man, then find the probability of the following:

1. A bachelor's degree
2. Not a master's degree
3. A master's and Doctorate degree
4. All the three degrees

2. Pick two cards out of the deck sequentially (respectively) without replacement.

F: first card is an Ace

E: second card is an Ace

Are F, E independent?

3. A family has three children. Find the conditional probability of having two boys and a girl given that the first born is a boy.

4. A die is rolled find the conditional probability of obtaining an even number given that a number greater than three has shown.

5. A card is drawn from a deck. Find the following probabilities:

a. The card is a king.

b. The card is a king given that a red card has shown.

6. The following table shows the distribution by gender of workers in two factories.

	Male	Female
Factory A	8	13
Factory B	39	40

Find the following probabilities:

a. $P(A|M)$
b. $P(F|B)$
c. $P(M|A)$
d. $P(B|F)$
e. $P(M|A, B)$

7. At a university, 65% of the students use Windows computers, 50% use Mac computers, and 20% use both. If a student is chosen at random, find the following probabilities.

a. A student uses a Windows computer given that they use a Mac.
b. A student uses a Mac knowing that they use a Windows computer.

8. Which of the following pairs of events are independent?

a. drawing Hearts and drawing Black.
b. drawing Black and drawing Ace.
c. the event $\{2, 3, \cdots, 9\}$ and drawing Red

9. A single die is rolled. Use the above formula to find the conditional probability of obtaining an even number given that a number greater than three has shown.

10. Consider a family of three children. Find the following probabilities

a. P(two boys | first born is a boy)
b. P(all girls | at least one girl is born)
c. P(children of both gender| first born is a boy)
d. P(all boys | there are children of both gender)