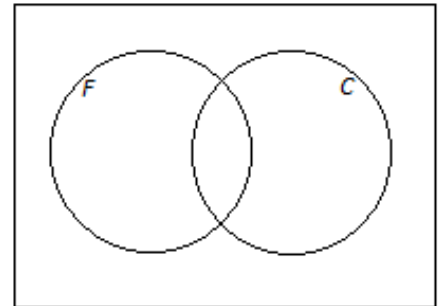


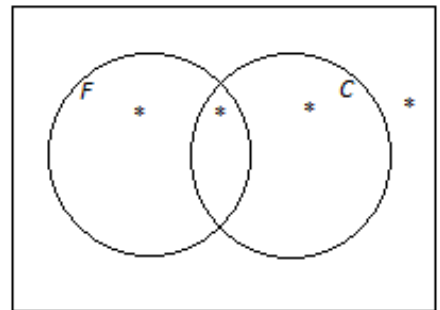
HW 8.5

1. On a flight, some of the passengers have frequent-flier status, and some do not. Also, some of the passengers have checked baggage, and some do not. Let the set of passengers who have frequent-flier status be  $F$  and the set of passengers who have checked baggage be  $C$ . Suppose that, of the 400 people on the flight, 368 have checked baggage, 228 have checked baggage but do not have frequent-flier status, and 8 have neither frequent-flier status nor checked baggage.

- a. Using a Venn diagram, calculate the following:
- i. The number of people on the flight who have frequent-flier status and have checked baggage
  - ii. The number of people on the flight who have frequent-flier status

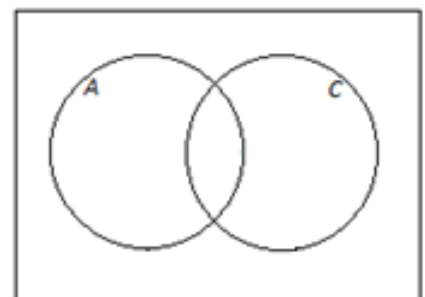


- b. In the Venn diagram provided below, write the probabilities of each of the four events associated with the regions marked with a star (\*). (Assume it is the smallest space occupied by the star.)



2. When an animal is selected at random from those at a zoo, the probability that it is North American (meaning that its natural habitat is in the North American continent) is 0.65, the probability that it is both North American and a carnivore is 0.16, and the probability that it is neither American nor a carnivore is 0.17.

- a. Using a Venn diagram, calculate the probability that a randomly selected animal is a carnivore. Use the appropriate notation to model the situation.



- b. For each situation below, express it in words and find the probability.
- i.  $P(A^C)$
  - ii.  $P(C^C|A)$
  - iii.  $P(A^C \cup C^C)$

c. Complete the table below showing the *probabilities* of the events corresponding to the cells of the table.

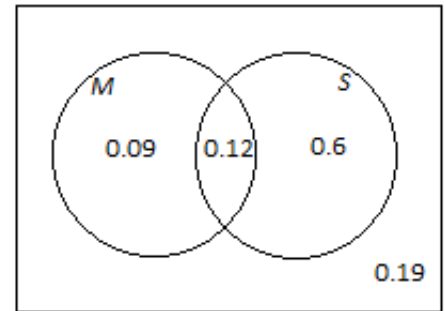
	North American	Not North American	Total
Carnivore			
Not Carnivore			
Total			

3. Now, think about the cars available at a dealership. Suppose a car is selected at random from the cars at this dealership. Let the event that the car has manual transmission be denoted by  $M$ , and let the event that the car is a sedan be denoted by  $S$ . Use the Venn Diagram to answer the questions.

a. What is the value of  $P(M \cap S)$ ?

b. Complete this sentence using *and* or *or*:

$P(M \cap S)$  is the probability that a randomly selected car has a manual transmission \_\_\_\_\_ is a sedan.



c. What is the value of  $P(M \cup S)$ ?

d. Complete this sentence using *and* or *or*:

$P(M \cup S)$  is the probability that a randomly selected car has a manual transmission \_\_\_\_\_ is a sedan.

e. What is the value of  $P(S^C)$ ?

f. Explain the meaning of  $P(S^C)$ .

g. What is the value of  $P(M|S)$ ?

h. What is the value of  $P(S^C|M)$ ?

i. Are being a sedan and having an automatic transmission independent? Explain and justify with supporting calculations.

## Answers

1ai. 140

1aii. 164

b. (left to right) .06, .35, .57, .02

2a.  $P(C) = .34$

2bi. A randomly selected animal is not North American 0.35

2bii. A randomly selected animal is not a carnivore, given it is American. 0.754

2biii. A randomly selected animal is not a carnivore, or is not American. 0.84

2c.

	North American	Not North American	Total
Carnivore	.16	.18	.34
Not Carnivore	.49	.17	.66
Total	.65	.35	1

3a. 0.12

3b. and

3c. 0.81

3d. or

3e. 0.28

3f. The probability that a randomly selected car is not a sedan.

3g. .167

3h. .429

3i. They are not independent.