5.2

Define the following from the book

Sample space:

Probability model:

Event:

Mutually Exclusive (disjoint):

For any event, what must the probability be between?

Let's build a probability model

Board games involve rolling dice. Imagine rolling two fair, six-sided dice – one that is red and one that is green.

- Problem
- Solution

Probability - long run repetitions on which that event occurs

5 Basic Probability Rules

1)

2)

3)

4)

5)

Using a two way table with probability

Students in a college stat class wanted to find out how common it is for young adults to have their ears pierced. They recorded data on two variables - gender and whether the student has a pierced ear - for all 178 people in the class. The two way table below displays the data.

	Pierced ears?		
Gender	**Yes**	**No**	**Total**
Male	19	71	90
Female	84	4	88
Total	103	75	178

Suppose we choose a student from the class at random. Find the probability that the student:

a) has pierced ears

b) is a male with pierced ears

c) is a male or has pierced ears

General Addition Rule for Two Events

If A and B are any two events resulting from some chance process, then **P(A or B) = P(A) + P(B) - P(A and B)**

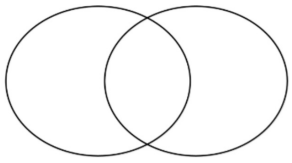
This prevents double counting - or double dipping

A standard deck of cards (with jokers removed) consists of 52 cards in four suits - clubs, diamonds, hearts and spades. Each suit has 13 cards, with denominations ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, jack, queen, king. The jack, queen and king are referred to as "face cards". Imagine that we shuffle the deck thoroughly and deal one card. Let's define events A, getting a face and B, getting a heart.

1) Find P(A and B)

2) Why does P(A or B) not equal P(A) + P(B)?
Then use the general addition rule to find P(A or B).

Venn Diagrams!



∩: Intersection

∪: Union

Fill in the table below. Remember, A = {2, 4, 6, 8, 10, 12} and B = {3, 6, 9, 12}.

	Definition	Picture	Numbers		Definition	Picture	Numbers
A^c				B^c			
$A \cap B$				$A \cup B$			

$A^c \cap B$				$A \cap B^c$			
$A^c \cup B$				$A \cup B^c$			
$A^c \cap B^c$				$\cap$: $\cup$:			

Zack has applied to both Princeton and Stanford. He thinks the probability that Princeton will admit him is 0.4, the probability that Stanford will admit him is 0.5 and the probability that both will admit him is 0.2.

a) Make a Venn Diagram marked with the given probabilities

b) What is the probability that neither university admits Zack?

c) What is the probability that he gets into Stanford but not Princeton?

d) What is the probability that he gets into Stanford or Princeton?

3200 people were surveyed about their ice cream preference. They also had to put their age on the survey. The results are below.

	Ice cream preference			
Age	Likes Chocolate Ice Cream	Likes Vanilla Ice Cream	Likes Strawberry Ice Cream	Total
Under 30	604	366	322	1292
30-51	404	424	286	1114
Over 51	336	72	386	794
Total	1344	862	994	3200

a) What's the probability that a randomly selected individual is over 51?

b) What's the probability that a randomly selected individual likes vanilla ice cream?

c) What's the probability that a randomly selected individual likes chocolate or vanilla ice cream?

d) What's the probability that a randomly selected individual likes strawberry ice cream or is under the age of 30?