Week in Review #6

Section 7.2: Definition of Probability.
Section 7.3: Rules of Probability.

- the relative frequency, $\frac{m}{n}$, means in n trials, E occurs m times.
- for large number of trials, the relative frequency will approach the empirical probability.
- probability properties
  - $0 \leq$ probability of any outcome(simple event) ≤ 1.
  - the sum of the probability of all of the outcomes is 1
- a probability distribution is a chart that shows the outcomes and the probability associated to each outcome.
- For a uniform (equally likely) sample space, each outcome will have the same probability, $\frac{1}{n(S)}$.
- To find the probability of an event E, add the probabilities of all of the outcomes in the event.
- Probability formulas
  - $P(E \cup F) = P(E) + P(F) - P(E \cap F)$
  - if E and F are mutually exclusive then $P(E \cap F) = 0$
  - $P(E \cup F \cup G) = P(E) + P(F) + P(G) - P(E \cap F) - P(E \cap G) - P(F \cap G) + P(E \cap F \cap G)$
  - $P(E) + P(E^C) = 1$ or $P(E) = 1 - P(E^C)$

1. A sample of 100 college students were asked their party affiliation and whether they favor state lottery money used for welfare.

	Favor	Not Favor	Unsure
Democrat	23	6	7
Republican	14	25	4
Independent	18	3	0

A person is selected at random from the sample. What is the probability the person

   (a) Does not favor the use of lottery money for welfare?

   (b) Is a Republican?

   (c) Is an Independent who is not sure?

2. One card is selected from a standard deck of cards. What is the probability that the card is a heart or a face card?

3. S is the sample space with events: A, B, and C. Use this information to answer these questions.

$S = \{s_1, s_2, s_3, s_4, s_5, s_6, s_7, s_8\}$
$A = \{s_1, s_2, s_5, s_6, s_8\}$
$B = \{s_1, s_2, s_4, s_5\}$
$C = \{s_3, s_5, s_7\}$
$P(C) = \dfrac{12}{43}$

outcome	s_1	s_2	s_3	s_4	s_5	s_6	s_7	s_8
prob.	$\frac{2}{43}$	$\frac{7}{43}$	$\frac{1}{43}$	$\frac{11}{43}$	$\frac{6}{43}$	$\frac{2}{43}$		

   (a) $P(s_7) =$
   $P(s_8) =$

   (b) $P(A^C) =$

   (c) $P(A \cap B) =$

4. A jar contains six red marbles numbered 1 to 6 and eleven purple marbles numbered 1 to 11. A marble is drawn at random from the jar. Find the probability that

   (a) the marble is purple.

   (b) the marble is even.

   (c) the marble is purple or even.

5. If $P(E^C) = .4$, $P(F \cap E^C) = .1$, and $P(F) = .5$ compute the following.

   (a) $P(E \cup F) =$

   (b) $P(F^C \cap E) =$