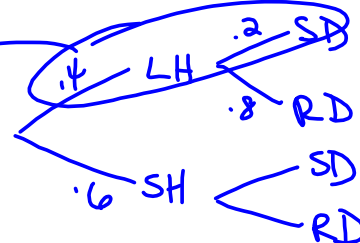
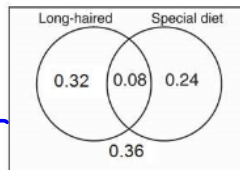


Statistics: Chapter 14 Review Sheet A – KEY

1. At a kennel, 40% of the dogs are long hair. Of the long-haired dogs, 20% are on special diets. What is the probability that a dog selected at random from this kennel is on a special diet and long-haired?

$$P(\text{diet} \cap \text{long}) = P(\text{long}) \cdot P(\text{diet} | \text{long}) = (0.40)(0.2) = 0.08$$



2. Still at this kennel, out of all the dogs, 40% are long-haired, 32% are on special diets, and some are long-haired and on a special diet as found in question 1.

a. Draw a Venn diagram to represent this information

- b. Compare what the 20% represents in question 1 and what the 32% represents in question 2.

20% in question one is a conditional probability, the probability that a dog is on a special diet given that it is a long hair. In question two, 32% represents the probability of any dog at the kennel being on a special diet.

- c. Find the probabilities that a dog selected randomly from this kennel...

i. is neither long-haired nor on a special diet.

$$\cancel{0.38} \quad 0.36$$

ii. is long-haired or on a special diet.

$$\cancel{0.62} \quad .32 + .08 + .24 = .64$$

$$\text{or } .4 + .32 - .08 = .64$$

iii. is long-haired but not on a special diet.

$$\cancel{0.30} \quad .32$$

5. The table summarizes data from the U.S. Census about children in the United States (in millions) who were living in poverty in 2008.

		In Poverty	Not in Poverty	Total
Race	White	5	36	41
	Non-white	10	26	36
	Total	15	62	77

- a. Describe in full context the meaning of the number 26 in this table.
There were 26 million non-white children not in poverty in 2008.
- b. What is the probability that a child selected at random in 2008 would be in poverty?

$$\frac{15}{77} = 0.1948$$

- c. What is the probability that a randomly selected child is white and in poverty?

$$\frac{5}{77} = 0.0649$$

- d. What is the probability that a randomly selected child is nonwhite and in poverty?

$$\frac{10}{77} = 0.1299$$

- e. What is the probability that a randomly selected child is in poverty given s/he is white?

$$\frac{5}{41} = 0.1220$$

- f. What is the probability that a randomly selected child is in poverty given s/he is not white?

$$\frac{10}{36} = 0.2778$$

- g. What is the probability that a randomly selected child of poverty is not white?

$$\frac{10}{15} = 0.6667$$

- h. Is poverty independent of Race? Use probabilities to explain.

Poverty is not independent of race. $P(\text{poverty}) = 0.1948$ and $P(\text{poverty} | \text{non-white}) = 0.2778$. If the two were independent, these probabilities would be the same. Non-white children had a much higher chance of living in poverty in 2008.

6. There are 10 playing cards in a shuffled pile of cards. 3 are black and 7 are red. A player is going to draw two cards at random, not replacing between draws. He wins the game if the two cards are different colors.

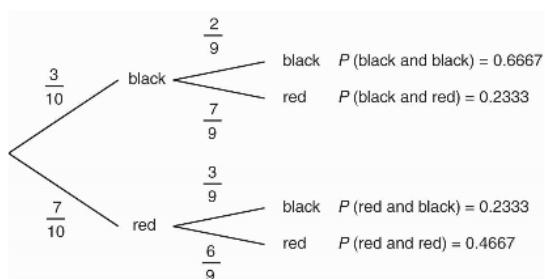
- a. Why are drawing a red card and drawing a black card on a single draw considered disjoint events?

These are disjoint events because a card is either red or black. A card may not be both.

- b. What is the probability of drawing a red card on the second draw if he has just drawn a black card on the first draw?

$$P(\text{red} | \text{black}) = \frac{7}{9} = 0.7778$$

- c. Draw a tree diagram for this game.



- d. What is the probability of winning this game?

$$P(BR \cup RB) = \frac{21}{90} + \frac{21}{90} = 0.4667$$