MAT 223, Discussion Questions 10.09

1. What conditions must all probabilities satisfy?

$0 \leq p \leq 1$ for any probability p

and the sum of probabilities must add to 1

$\sum p(x_i) = 1$

2. If the probability of an event is 2/3, what is the probability of its complement?

$1 - 2/3 = \frac{3}{3} - \frac{2}{3} = \frac{1}{3}$

3. If the probability of an event is 20%, what is the probability this event will not occur?

$100\% - 20\% = 80\%$

4. What does it mean for two events to be mutually exclusive?

They can never both occur at the same time

(their intersection is zero)

5. Give an example of two pairs of events that are mutually exclusive.

getting both a head and a tail on the same flip of a coin.

6. Here is the distribution of ethnicity for students taking German at a particular school.

Ethnicity	African American	Caucasian	Latino	Native American	Asian
Probability	0.42	0.43	.13	0.01	0.01

What is the probability that a student taking German is Latino?

$.42+.43+.01+.01=.87$

$1-.87=.13$

7. A department store sells shirts in three sizes and in three patterns (small, medium and large; plaid, print and stripes). The table below gives the number of shirts of each type sold on a particular, typical day.

Size	**Plaid**	**Print**	**Stripes**	
Small	3	2	3	8
Medium	10	5	7	22
Large	4	2	8	14
	17	9	18	44

What is the probability of being Plaid or Medium?

$\frac{17}{44}+\frac{22}{44}-\frac{10}{44}=\frac{29}{44}\approx .659$

65.9%

8. What does the article at http://esciencenews.com/articles/2014/02/15/a.strategy.narrows.academic.achievement.gap.63.percent mean by 63%? Is this a probability or something else?

This 63% is a ratio or %change