

STATISTICS I

SECTION R3

SPRING 2010

MARCH 17, 2010

TODAY'S PLANS

- **Reminder about retest for Test 1**
- **Projects**
- **Review homework**
 - **Correlation and regression**
 - **Probability**
- **Continue probability**

Projects

- **Collect data**
 - **Gina, Michelle, Kyle, Richard, Robert**
- **Define projects**
 - **Jeff, Marques, Camille, Emmanuel, KeShawna, Eva, Adeline, Joel**

Definitions

- Two events are *mutually exclusive* if they cannot occur at the same time; i.e. they have no outcomes in common
- Two events *A* and *B* are *independent* if the fact that *A* occurs does not affect the probability of *B* occurring
- Two events *A* and *B* are *dependent* if the occurrence of event *A* changes the probability of event *B*

Calculating Probabilities

- **Addition rule for calculating P(A or B)**
 - **Mutually exclusive events:**
 - $P(A \text{ or } B) = P(A) + P(B)$
 - **Events that are not mutually exclusive**
- **Multiplication rule for calculating P(A and B)**
 - **Independent events:**
 - $P(A \text{ and } B) = P(A) \cdot P(B)$
 - **Dependent events**

Conditional Probability

- **$P(B|A)$ = the probability of event B, *given that* event A has occurred**
- **If A and B are independent, then:**
 - **$P(B|A) = P(B)$**
- **If A and B are dependent, then:**
 - **$P(B|A) = P(A \text{ and } B)/P(A)$**
 - **Alternate formulation: $P(A \text{ and } B) = P(A) \cdot P(B|A)$**

Counting Rules

- **Fundamental Counting Rule**
 - The number of ways a sequence of events can occur is the product of the number of ways each individual event can occur
- **Permutations**
 - Order matters
 - Example: Selecting a president and a vice-president
- **Combinations**
 - Order does not matter
 - Example: selecting members of a committee