

**Statistics 300:
Introduction to
Probability and Statistics**

Section 4-3

Probability

- **Chapter 4**
 - Section 2: Fundamentals
 - Section 3: Addition Rule
 - Section 4: Multiplication Rule #1
 - Section 5: Multiplication Rule #2
 - Section 6: Simulating Probabilities
 - Section 7: Counting

Addition Rule

- **$P(A \text{ or } B) = ?$**
 - One die: **$P(2 \text{ or } 5) = ?$**
 - One die: **$P(\text{odd or } >4) = ?$**

The Addition Rule

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

		Value of Die #1					
		1	2	3	4	5	6
Value of Die #2	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

Concept of “Mutually Exclusive” outcomes

**If event A and event B
cannot happen together,
then A and B are
“mutually exclusive”
and
 $P(A \text{ and } B) = 0$**

**On one roll of a die:
 $P(3 \text{ and } 4) = 0$
mutually exclusive
 $P(4 \text{ and “even”}) > 0$
not mutually exclusive
 $P(A \text{ and } B) = 0$**

**Using complementary events
can make our lives easier!**

**Probability Rules for
Complementary Events**

$$P(A) + P(\bar{A}) = 1$$

$$P(\bar{A}) = 1 - P(A)$$

$$P(A) = 1 - P(\bar{A})$$
