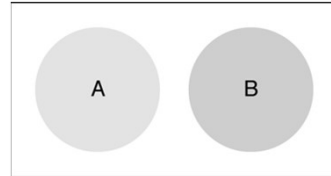## Mutually Exclusive vs. Overlapping

✹ If two or more events cannot occur at the same time they are termed _**mutually exclusive**_.

   ✹ They have **no** common outcomes.

✹ _**Overlapping**_ events have **at least one common outcome.**

1

Mutually Exclusive Formula

$$P(A \textbf{ or } B) = P(A) + P(B)$$

2

OR Means you ADD

3

Sum of Rolling 2 Dice

	1	2	3	4	5	6
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

4

Example 2:

✹ When rolling two dice find

P(sum 4 or sum 5)

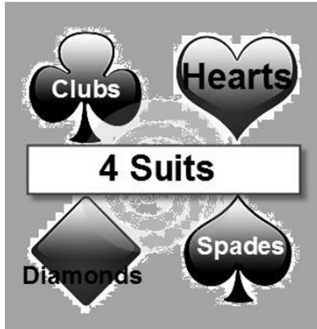|	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

5

Example 1:

✹ Find the probability that a girl's favorite department store is **Macy's** or **Nordstrom**.

✹ Find the probability that a girl's favorite store is **not** JC Penny's.

Macy's	0.25
Saks	0.20
Nordstrom	0.20
JC Penny's	0.10
Bloomingdale's	0.25

6

Deck of Cards

- 52 total cards
- 4 Suits
- 13 cards in each suit
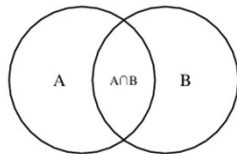- 3 Face cards in each suit

7

Example 3:

☀ In a deck of cards, find

P(Queen or Ace)

8

Overlapping Events Formula

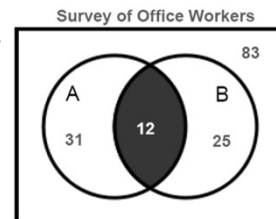$$P(A \text{ or } B) = P(A) + P(B) - P(A \cap B)$$

9

Example 4:

☀ Find the probability that a person will drink **both**.

☀ A = drink coffee

☀ B = drink soda

Survey of Office Workers

10

Example 5:

☀ Find the P(A ∪ B)

☀ A = band members

☀ B = club members

☀ A = 195 students

☀ B = 565 club members

☀ 35 students do both band and a club.

☀ 1200 total students at the High School

11

Example 6:

☀ In a deck of cards find

P(King or Club)

12

Example 7:

* Find the P(picking a **female** or a person from **Florida**).

	Female	Male
FL	8	4
AL	6	3
GA	7	3

13

Example 8:

* When rolling 2 dice, find P(an **even sum** or a number **greater than 10**).

	1	2	3	4	5	6
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

14

Example 9: Complementary Events

Find $P(\overline{A \cup B}) =$

* A = band members
* B = club members
* A = 195 students
* B= 565 club members
* 35 students do both band and a club.
* 1200 total students at the High School

15

Example 10: Complementary Events

A = plays volleyball (26 students)

B = plays softball (37 Students)

There are 454 total athletes

What is the probability that someone does **not** play volleyball?

$P(\overline{A}) =$

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