Name _____ Date _____

Day 3 – Compound Probability: Mutually Exclusive vs. Overlapping

Vocabulary:

- ☆ A compound event combines two or more events, using the word **and** or the word **or**.
- ☆ 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.**
  - Also known as inclusive events.

Mutually Exclusive

The probability that one or the other of several events will occur is found by summing the individual probabilities of the events:

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

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

   .25 + .20 = **.45**

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

   .25 + .20 + .20 + .25 = **.90**

Macy's	0.25
Saks Fifth Ave.	0.20
Nordstrom	0.20
JC Penny's	0.10
Bloomingdale's	0.25

2. When rolling two dice, what is probability that your sum will be 4 or 5?

   total = 36 $P(4) = \frac{3}{36}$ $P(5) = \frac{4}{36}$

   $\frac{3}{36} + \frac{4}{36} = \boxed{\frac{7}{36}}$

+	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

3. What is the probability of picking a queen or an ace from a deck of cards?

   total = 52 $P(\text{Queen}) = \frac{4}{52}$ $P(\text{Ace}) = \frac{4}{52}$

   $\frac{4}{52} + \frac{4}{52} = \frac{8}{52} = \boxed{\frac{2}{13}}$

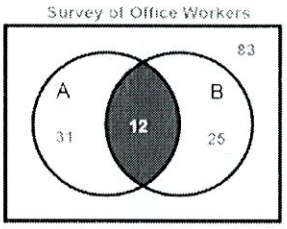
- **52 total cards**
- **4 Suits**
- **13 cards in each suit**
- **3 Face cards in each suit**

Overlapping Events

Probability that non-mutually exclusive events A and B or both will occur expressed as: P(A or B)

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

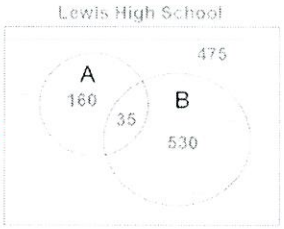
4. Find the probability that a person will drink both.



total = 151

$\frac{12}{151}$

5. Find the P(A ∪ B).



total = 1200

$\frac{195}{1200} + \frac{565}{1200} - \frac{35}{1200} = \frac{725}{1200} =$ $\frac{29}{48}$

6. Find the probability of picking a king or a club in a deck of cards.

P(king) = $\frac{4}{52}$ P(club) = $\frac{13}{52}$

$\frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13}$

7. Find the probability of picking a female or a person from Florida out of the committee members. P(female) = 21/31 P(fl) = 12/31

$\frac{21}{31} + \frac{12}{31} - \frac{8}{31} = \frac{25}{31}$

	Female	Male	
Florida	8	4	12
Alabama	6	3	9
Georgia	7	3	10
	21	10	31

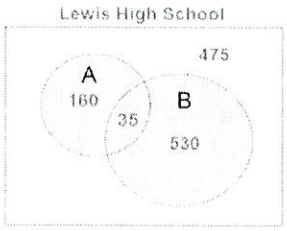
8. When rolling 2 dice, what is the probability of getting an even sum or a number greater than 10?

P(even) = 18/36 P(sum > 10) = 3/36

$\frac{18}{36} + \frac{3}{36} - \frac{1}{36} = \frac{20}{36} = \frac{5}{9}$

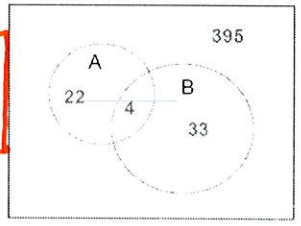
+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

9. Find the $P(\overline{A \cup B})$.



$\frac{475}{1200} = \frac{19}{48}$

10. Find the $P(A)'$.



$\frac{33 + 395}{454} = \frac{428}{454} = \frac{214}{227}$