Name: _____ Date: _____

Compound Probability: Mutually Exclusive vs. Overlapping

UNIT QUESTION: How do you use probability to make plans and predict for the future? (Standard: MM1D1-3)

Today's Question: When do I add or multiply when solving compound probabilities? (Standard: MM1D2.a,b.)

Vocabulary:

- ☆ Compound Event
  - An event made up of two or more simple events
- ☆ Mutually Exclusive
  - Events that cannot both occur in the same trial
- ☆ Overlapping
  - Events that have one or more outcome in common

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. .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?

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

+	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?

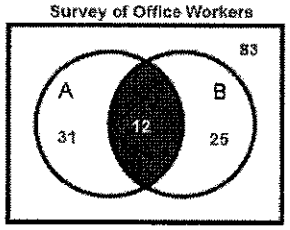
$\frac{4}{52} + \frac{4}{52} = \frac{8}{52} = \frac{2}{13}$

Overlapping Events

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

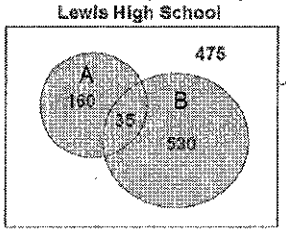
$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

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



151 $\frac{12}{151}$

5. Find the P(A ∪ B).



1200 $\frac{195}{1200} + \frac{540}{1200} - \frac{35}{1200}$ $\frac{700}{1200} = \frac{70}{120}$

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

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

7. Find the probability of picking a female or a person from Florida out of the committee members.

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

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

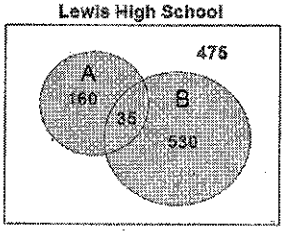
8. When rolling 2 dice, what is the probability of getting an even sum or a number greater than 10?

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

+	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

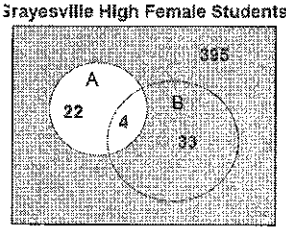
9. Find the $P(\overline{A \cup B})$.

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



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

$\frac{428}{454} = \frac{214}{227}$



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