

Name: _____ Date: Key

Compound Probability: Mutually Exclusive vs. Overlapping

Vocabulary:

☆ Compound Event

○ 2 or more events occur at once

☆ Mutually Exclusive ex. heads or tails

○ 2 or more events cannot occur at the same time.

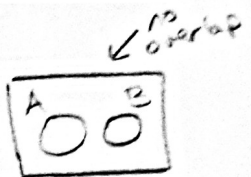
☆ Overlapping ex. blue eyes + brown hair

○ at least one event in common

"OR"
= Add

"OR" means to **Mutually Exclusive**
Add

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.

Mutually Exclusive
so no overlap.

$$.25 + .20 = \boxed{.45}$$

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

Methods:

$$\textcircled{1} 1 - .1 = \boxed{.9}$$

$$\textcircled{2} .25 + .20 + .20 + .25 = \boxed{.9}$$

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

Total 1

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

$$P(4) + P(5)$$

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

Fill in Table
Total #'s = 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?

$$P(Q) + P(A)$$

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

Total # of cards = 52

Standard Deck of 52 Playing Cards

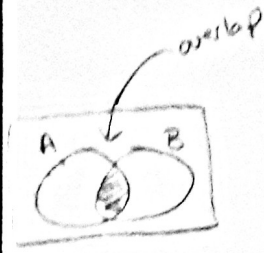
Suits	Hearts	Spades	Clubs	Diamonds
Card	Jack	Jack	Jack	Jack
Card	Queen	Queen	Queen	Queen
Card	King	King	King	King
Card	Ace	Ace	Ace	Ace
Card	2	2	2	2
Card	3	3	3	3
Card	4	4	4	4
Card	5	5	5	5
Card	6	6	6	6
Card	7	7	7	7
Card	8	8	8	8
Card	9	9	9	9
Card	10	10	10	10
Card	Joker	Joker	Joker	Joker
Card	Wild	Wild	Wild	Wild

Overlapping Events (Not Mutually Exclusive)

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

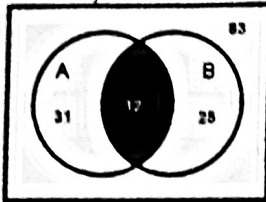
$$P(A \text{ or } B)$$

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



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

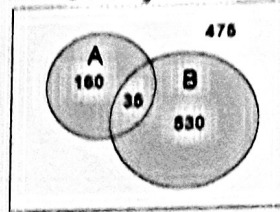
Survey of Office Workers



Total # of workers
 $31 + 12 + 28 + 83 = 151$

$$\frac{12}{151}$$

Lewis High School



Total # of students
 $160 + 35 + 530 + 475 = 1200$

5. Find the $P(A \cup B)$

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

$$\frac{175}{1200} + \frac{565}{1200} - \frac{35}{1200} = \frac{725}{1200} = \frac{29}{48}$$

Standard Deck of 52 Playing Cards

Suits	Spades	Hearts	Clubs	Diamonds
♠	A♠	A♥	A♣	A♦
♠	2♠	2♥	2♣	2♦
♠	3♠	3♥	3♣	3♦
♠	4♠	4♥	4♣	4♦
♠	5♠	5♥	5♣	5♦
♠	6♠	6♥	6♣	6♦
♠	7♠	7♥	7♣	7♦
♠	8♠	8♥	8♣	8♦
♠	9♠	9♥	9♣	9♦
♠	10♠	10♥	10♣	10♦
♠	J♠	J♥	J♣	J♦
♠	Q♠	Q♥	Q♣	Q♦
♠	K♠	K♥	K♣	K♦
♠	Ace	Ace	Ace	Ace

5. Find the $P(A \cup B)$.

6. Find the probability of picking a king or a club in a deck of cards. 52 total cards

$$P(\text{King or Club}) = \frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13}$$

7. Find the probability of picking a female or a person from Florida out of the committee members. $P(F) + P(FI) - P(F \cap FI)$

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

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

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

$$P(\text{even}) + P(x > 10) - P(\text{even} \cap x > 10)$$

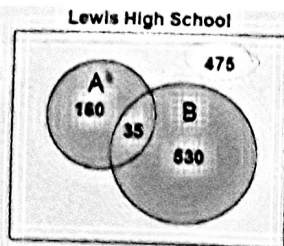
$$\frac{18}{36} + \frac{3}{36} - \frac{1}{36} = \frac{20}{36} = \frac{5}{9}$$

Fill in
 Total #s 36

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

9. Find the $P(A \cup B)$. Complement (Not)

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

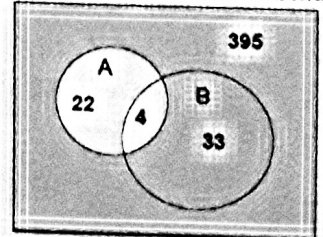


total $160 + 35 + 530 + 475 = 1200$

10. Find the $P(A)$ Complement

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

Grayesville High Female Students



Total
 $22 + 4 + 33 + 395 = 454$