

Good morning!

1. "Here"
2. Notes on Mutually Exclusive Events
3. Practice
4. Submit homework to CTLS

Set Notation Handout

CCGPS Geometry

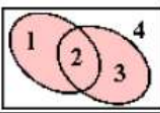
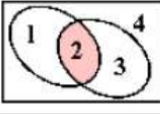
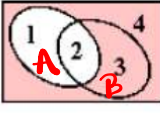
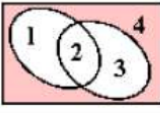
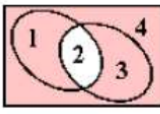
9 – Probability

Set Notation

Name: _____

Date: _____

= OR
AND
"NOT"

Set Notation	Pronunciation	Meaning	Venn Diagram	Answer
$A \cup B$	"A union B"	Everything in both sets		{1, 2, 3}
$A \cap B$	"A intersect B"	Only what is in common with both sets		{2}
\bar{A} or A'	"A complement"	Everything NOT in set A		{3, 4}
$(A \cup B)'$	"not A union B"	Everything NOT in set A and set B		{4}
$(A \cap B)'$	"not A intersect B"	Everything NOT in common between set A and set B		{1, 3, 4}

Compound Probability

☀️ A **compound event** combines two or more events, using the word **and** or the word **or**.

\cap \cup

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**.

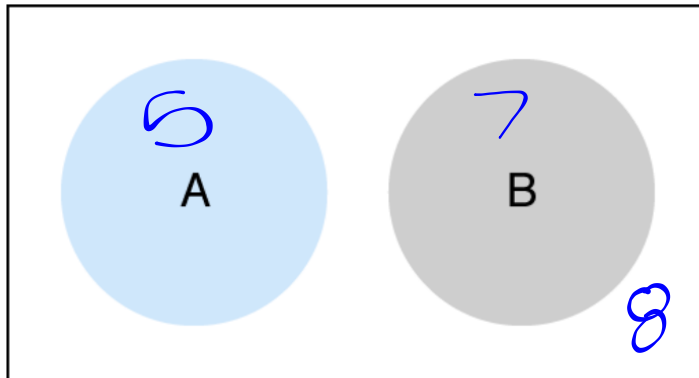


Mutually Exclusive Formula

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

U add +

$\frac{5}{20} + \frac{7}{20} = \frac{12}{20} = \frac{3}{5}$ or $.6$



OR

Means

you ADD +

Sum of Rolling 2 Dice

1st
2nd

	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+2

36 Possible Outcomes

Example 2:

☀ When rolling two dice find

P(sum 4 or sum 5)

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

$$\frac{7}{36} \text{ or } .19$$

	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

Example 1:

- ☀ Find the probability that a girl's favorite department store is **Macy's** or **Nordstrom**. $.25 + .2 = 1.45$

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

- ☀ Find the probability that a girl's favorite store is not JC Penny's. $.25 + .2 + .2 + .25 = .9$

$$1 - .1 = .9 \quad \text{or} \quad 1 - .1 = .9 \quad \text{or} \quad \text{or}$$

$$+ \quad \underline{\underline{1.00}}$$

Deck of Cards



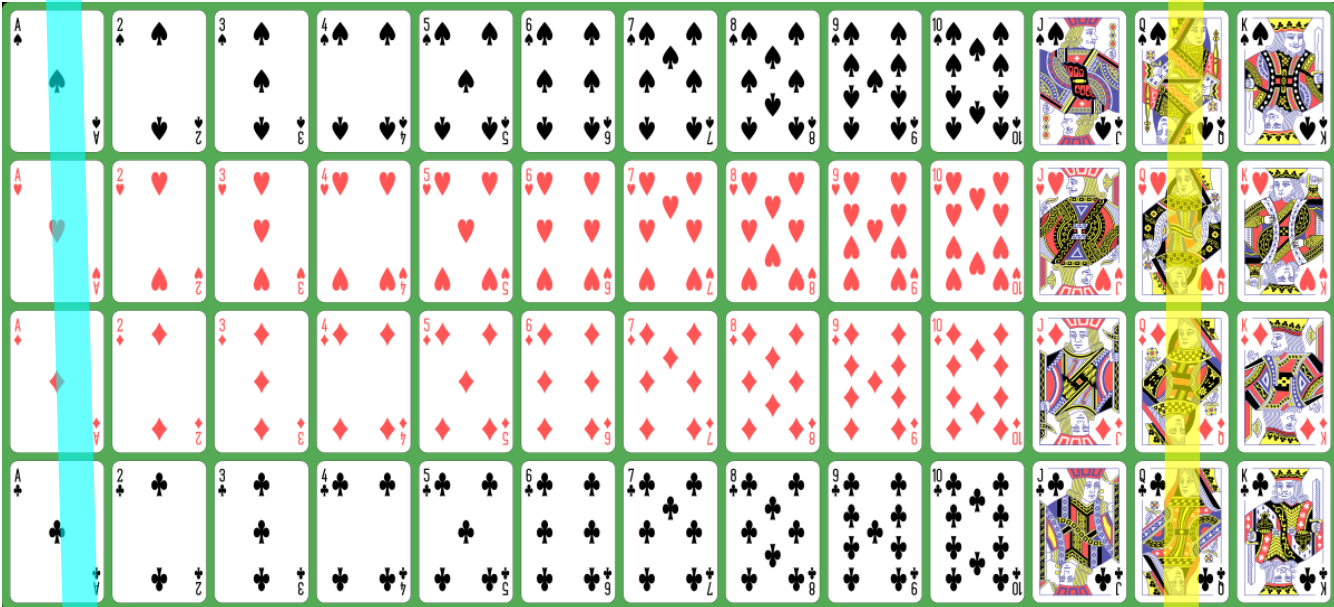
- 52 total cards
- 4 Suits
- 13 cards in each suit
- 3 Face cards in each suit J, Q, K

Example 3:

☀ In a deck of cards, find

P(Queen or Ace)

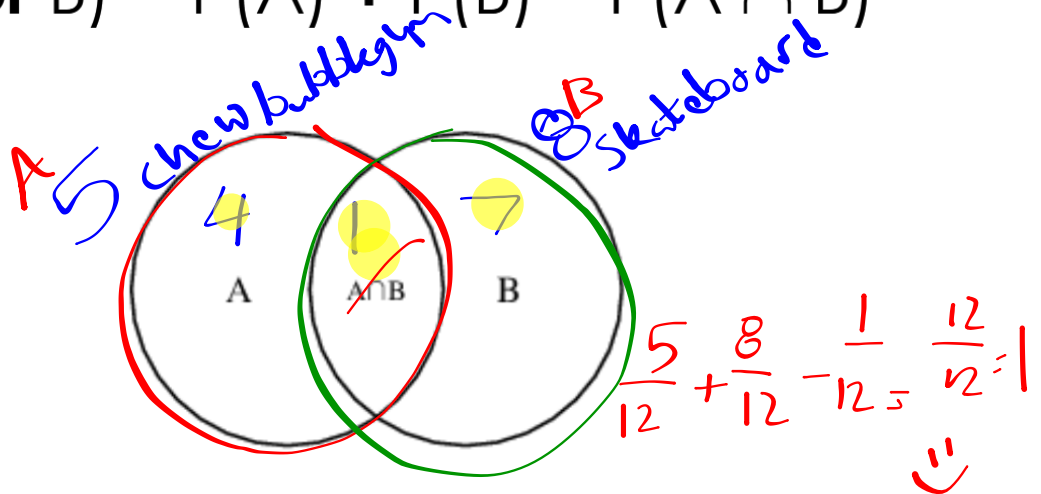
$$\frac{4}{52} + \frac{4}{52} = \frac{8}{52} = \left(\frac{2}{13} = .15 \right)$$



Overlapping Events Formula

$4 + 1 = 5 \rightarrow \frac{5}{12}$ $7 + 1 = 8 \rightarrow \frac{8}{12}$ Kids interviewed

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



Example 4:

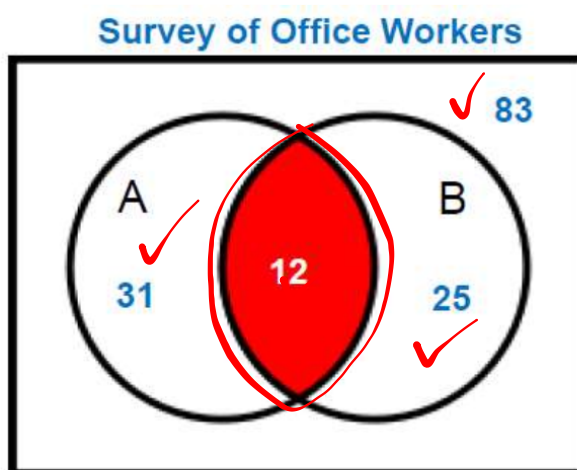
☀ Find the probability that a person will drink **both**.

☀ A = drink coffee

☀ B = drink soda

$$P(A \cap B) = \frac{12}{151}$$

or ~~.08~~



$$31 + 12 + 25 + 83 = 151$$

Example 5:

$$\begin{array}{r}
 \text{BAND } 195 \\
 - \quad 35 \\
 \hline
 \text{only BAND } 160
 \end{array}
 \qquad
 \begin{array}{r}
 \text{club } 565 \\
 - \quad 35 \\
 \hline
 \text{only club } 530
 \end{array}$$

* Find the $P(A \cup B)$

* A = band members

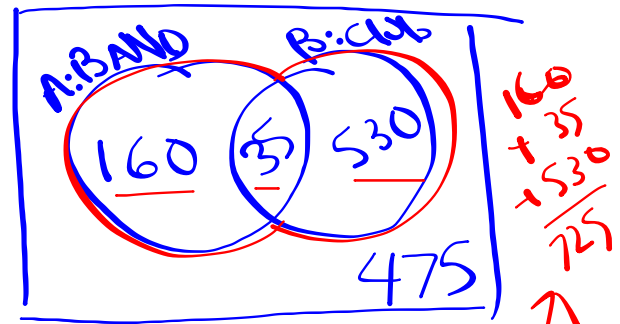
* B = club members

* A = 195 students

* B = 565 club members

* 35 students do both band and a club.

* 1200 total students at the High School



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

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

$$\begin{array}{r}
 1200 \\
 - 160 \\
 - 35 \\
 - 530 \\
 \hline
 725
 \end{array}$$

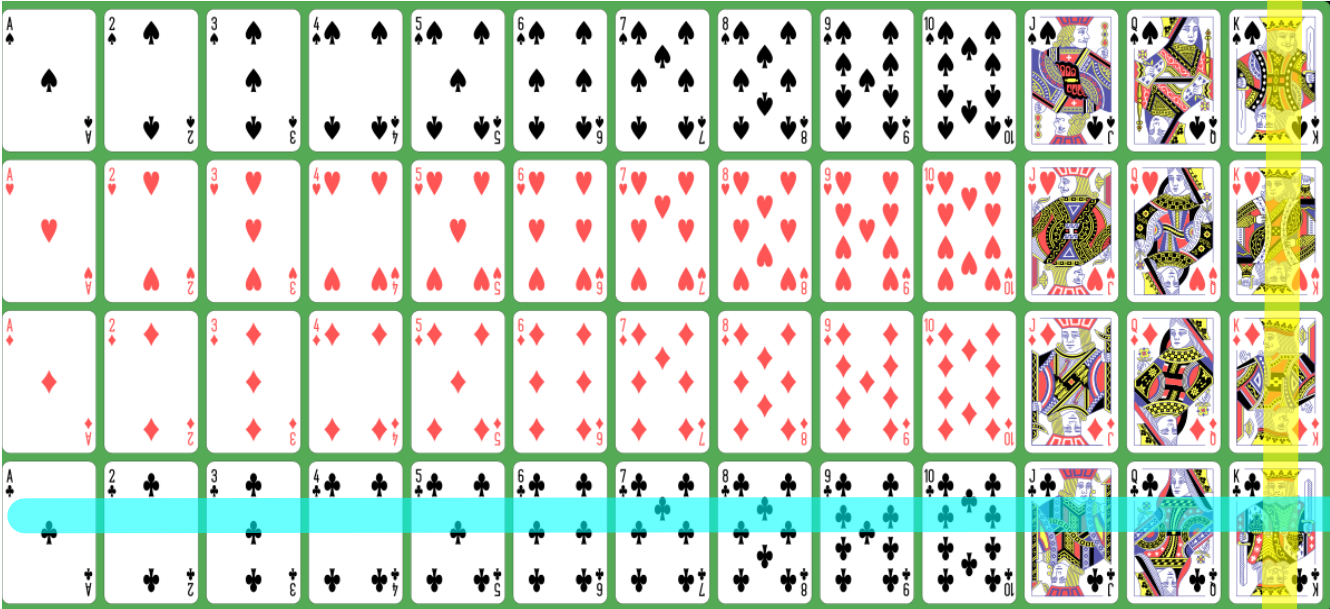
Example 6:

☀ In a deck of cards find

P(King or Club)

$$\frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{14}{52} = \frac{4}{13}$$

$$\frac{4}{13} \text{ or } .31$$



Example 7:

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

	Female	Male
FL	8	4
AL	6	3
GA	7	3

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

$$\frac{25}{31} \text{ or } .81$$

21 | 10 | 31

Example 8:

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

$$\frac{18}{36} + \frac{3}{36} - \frac{1}{36}$$

$$\frac{20}{36} = \frac{5}{9} = .56$$

	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

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

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?

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

CCGPS Geometry

Unit 10 – Probability

10.2 – Homework

Name: _____ Date: _____

Suppose that you select a person at random from your school. Are these pairs of events mutually exclusive?

_____ 1. has ridden a roller coaster; has ridden a Ferris wheel

_____ 2. has brown hair; has brown eyes

_____ 3. is left-handed; is right-handed

_____ 4. owns a classical music CD; owns a jazz music CD

_____ 5. is a senior; is a junior

_____ 6. has shoulder-length hair; is male

_____ 7. A group of senior citizens have won free vacation packages. The vacation to Bermuda is chosen by 25% of them, 60% choose Alaska, and 15% choose Costa Rica. What is the probability that one randomly chosen senior citizen chooses to vacation in Bermuda or Costa Rica?

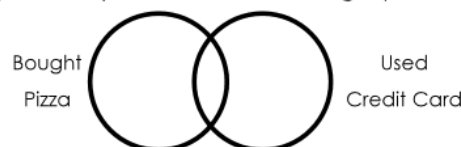
Use the general addition rule to compute the probability that if you roll two six-sided dice,

_____ 8. you get odd sum or a sum greater than 10.

_____ 9. you get even sum or a sum of 11.

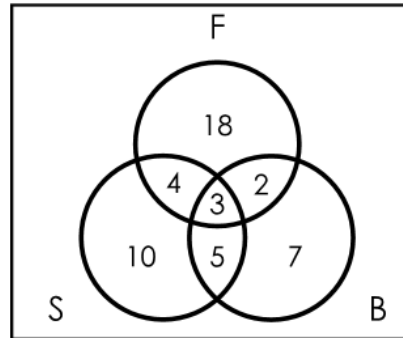
+	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

_____ 10. Of the 220 people who came into the Italian deli on Friday, 104 bought pizza and 82 used a credit card. Half of the people who bought pizza used a credit card. What is the probability that a customer bought pizza or used a credit card?



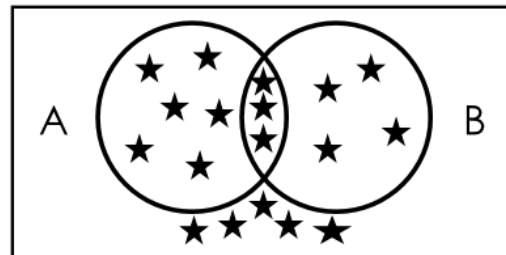
A group of 60 students were asked if they played field hockey (F), basketball (B) or soccer (S). The diagram below displays the results. Use the information given to find the following probabilities.

- _____ 11. $P(B \cap S)$
- _____ 12. $P(F \cup B)$
- _____ 13. $P(F)'$
- _____ 14. $P(F \cup B \cup S)$
- _____ 15. $P(F \cup B \cup S)'$



Given the Venn Diagram below with set A and set B determine the following:

- _____ 16. $P(A \cap B)$
- _____ 17. $P(A \cup B)$
- _____ 18. $P(\bar{A} \cup B)$
- _____ 19. $P(A \cap \bar{B})$



- _____ 20. Suppose 80% of people can swim. Suppose 70% of people can whistle. Suppose 55% of people can do both. What percentage of people can swim or whistle?

- _____ 21. At Harrison, 60% of the students carry a backpack or a wallet. 40% carry only a backpack, and 30% carry only a wallet. If a student is selected at random, find the probability that the student carries both a backpack and a wallet.

CCGPS Geometry

Unit 10 – Probability

10.2 – Practice

Name: _____ Date: _____

Mutually Exclusive Practice

Determine if the following events are mutually exclusive or overlapping.

- _____ 1. The experiment is rolling a die.
The 1st event: the number is greater than 3
The 2nd event: the number is even.
- _____ 2. The experiment is year in school.
The 1st event: the person is a senior.
The 2nd event: the person is a junior.
- _____ 3. The experiment is answering multiple choice questions.
The 1st event: the correct answer is chosen
The 2nd event: the answer A is chosen.
- _____ 4. The experiment is selecting a chocolate bar.
The 1st event: the bar has nuts
The 2nd event: the bar has caramel.
-
- _____ 5. One card is randomly drawn from a deck of 52 cards. The card is face down on the table. What is the probability of getting a Jack or a Spade?

Use the general addition rule to compute the probability that if you roll two six-sided dice.

_____ 6. you get doubles or a sum of 4

_____ 7. you get doubles or a sum of 7

_____ 8. you get a 5 on the first die or you get a 5 on the second die.

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

Use the Venn Diagram to answer the following questions.

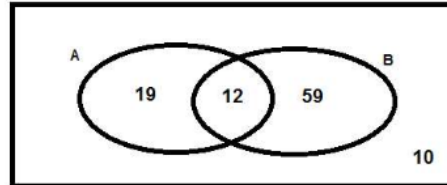
_____ 9. $P(A)$

_____ 10. $P(B)$

_____ 11. $P(B)'$

_____ 12. $P(A \cup B)$

_____ 13. $P(A \cap B)$



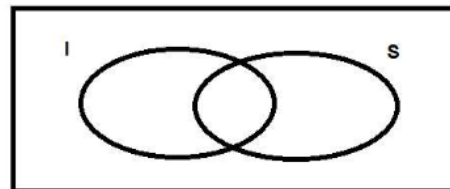
When you arrive home today, you find 27 cupcakes in a large circular plate. There are 13 that have icing 11 have sprinkles, and 4 have both.

_____ 14. $P(I)$

_____ 15. $P(S)$

_____ 16. $P(I \cup S)$

_____ 17. $P(I \cap S)$



Use the data below to find each of the following probabilities.

Coollest Deals Sold at Ike's

Topping choice	Ice cream choice			
	Vanilla	Chocolate	Cookie dough	Mint chip
Sprinkles	9	12	16	14
Hot fudge	11	4	16	15
Caramel	10	12	18	15

_____ 18. $P(\text{Chocolate})$

_____ 19. $P(\text{Chocolate})'$

_____ 20. $P(\text{Sprinkles} \cap \text{Cookie Dough})$

_____ 21. $P(\text{Caramel} \cup \text{Vanilla})$

