

Introductory Probability

Types & terminology | Basic formula | Activating prior learning | Sum and product rule | Independent AND| OR | Venn Diagrams | Dependent Probability



Can classified intelligence be gleaned from public information?

TED Ideas worth Spreading

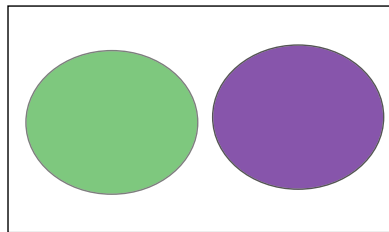
Enemy news services report major casualties in a mining village after recent allied air strikes. Several independent news reports claim death tolls of 900. From these various reports it has also been determined that of these, 615 were women, 345 were over 30 years old, 482 were married, 295 were married women, 187 were married and over 30 years old, 190 were women over 30 years old, and 120 were married women over 30 years old.

Allied commanders are trying to determine the number of enemy soldiers killed in the strike, but for obvious reasons, this number is not being disclosed.

If enemy soldiers are predominantly unmarried men under the age of 30, how many of these were killed?

Venn Diagrams

Cats Dogs



Computer Mouse
Chair

Hammers
Nails

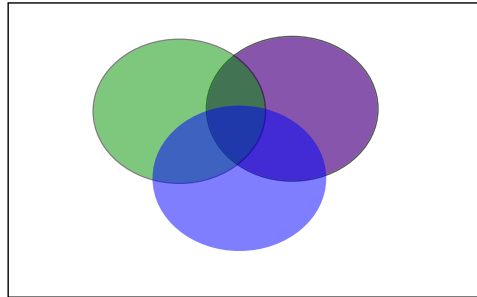
Mukluk
Gazebo

This is what we covered yesterday.

Venn Diagrams

Peanut Butter Treats
Chocolate Treats
Granola

Data Students
Economics Students
English



Father
Brother
Uncle

Liquid
Metal
Solid

What are elements that belong to all sets?

What are elements that belong to only one or two sets?

At Iroquois Ridge, there are 12 players on the school **basketball team**, 11 players on the **volleyball team**, and 20 are on the **soccer team**.

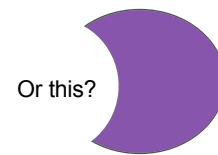
How many players could show up at a party for all teams if exactly 5 students play both **basketball** and **volleyball** teams, 6 play both **basketball** and **soccer**, 4 play **volleyball** and **soccer**, and 3 students play all three sports?



What would this be?

3

13



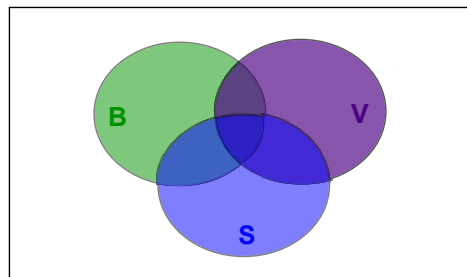
Or this?

1

what's this?



4



3

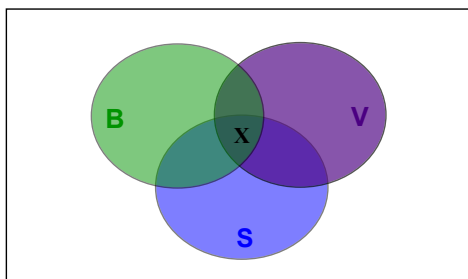
Or this?



2

5

What if you don't know the middle number?



Apply the principle of inclusion and exclusion.

$$n(\text{total}) = n(\text{B}) + n(\text{V}) + n(\text{S}) - n(\text{B \& V}) - n(\text{B \& S}) - n(\text{S \& V}) + n(\text{B \& V \& S})$$

1. At the year-end math clinic party, toppings for the 50-foot party sub must be chosen. The options being considered are green peppers, tomatoes and lettuce. On the sign-up lists (one list for each item), 36 students want lettuce, 27 want tomatoes, and 32 want green peppers. The students include 16 who want green peppers and tomatoes, 19 who want tomatoes and lettuce, 18 who want green peppers and lettuce, and 11 who want all three. How many students are attending the party?

2. A grade 12 student is selected at random to sit on a university liaison committee. Of the students enrolled in the grade 12 university-preparation mathematics courses,
- 28 are enrolled in data management only
 - 40 are enrolled in calculus only
 - 15 are enrolled in functions only
 - 16 are enrolled in both data management and calculus
 - 12 are enrolled in both calculus and functions
 - 6 are enrolled in both functions and data management
 - 3 are enrolled in all three of data management, calculus and functions
- a) Draw a Venn diagram to illustrate this situation
- b) Determine the probability that the student selected will be enrolled in either data management or calculus
- c) Determine the probability that the student selected will be enrolled in only one of the three courses.

3. Jeffrey works as a DJ at a local radio station. On occasion, he chooses some of the songs he will play based on the phone-in requests received by the switchboard the previous day. Jeffrey's list of 200 possible selections includes
- All the songs in the top 100
 - 134 hard-rock songs
 - 50 phone-in requests
 - 45 hard-rock songs in the top 100
 - 20 phone-in requests in the top 100
 - 24 phone-in requests for hard-rock songs
- Use a Venn Diagram to determine
- a) how many phone-in requests were for hard-rock songs in the top 100
- b) how many of the songs in the top 100 were neither phone-in requests nor hard-rock selections

4. Enemy news services report major casualties in a mining village after recent allied air strikes. Several independent news reports claim death tolls of 900. From these various reports it has also been determined that of these, 615 were women, 345 were over 30 years old, 482 were married, 295 were married women, 187 were married and over 30 years old, 190 were women over 30 years old, and 120 were married women over 30 years old.

Allied commanders are trying to determine the number of enemy soldiers killed in the strike, but for obvious reasons, this number is not being disclosed.

a) If enemy soldiers are predominantly unmarried men under the age of 30, how many were killed?

b) If it is also known that 200 enemy fighters were thought to be in the area, what is the probability that they were all eliminated?

c) Would knowing the size of the village be important?

Quiz

<http://www.shodor.org/interactivate/activities/vdiagram/>

Answer Clues

1. 53
2b). ~86.1%
c). ~76.9%
3. a). 5
b). 40
4a). 10