How are Venn Diagrams similar to sets? How are they different?

Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question

Week 11, Lesson 1
1. Warm-up
2. Venn Diagrams
3. ICA- Shadings
4. Homework
5. IB project

Venn Diagrams
How are Venn Diagrams similar to sets?
How are they different?

81

Warm-up: Given

$$U = \{x \mid -5 \le x \le 5 \text{ , where x is an integer}\}$$

$$A = \{0, 2, 4\}$$

$$B = \{-5, -4, -3, -2, -1\}$$

U={-5,-4,-3,-2,-1,0,1,2,3,4,5}

Find the following compliments

$A` =$ {-5,-4,-3,-2,-1,1,3,5}

$A \cup B` =$ {0,1,2,3,4,5}

$B` =$ {0,1,2,3,4,5}

$(A \cup B)` =$

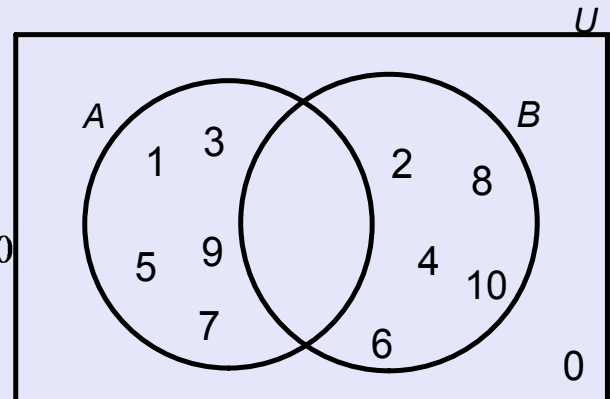{-5,-4,-3,-2,-1,0,2,4}

{1,3,5}

Venn Diagrams

Standard

3.5

Venn Diagrams can be used to analyze and compare sets

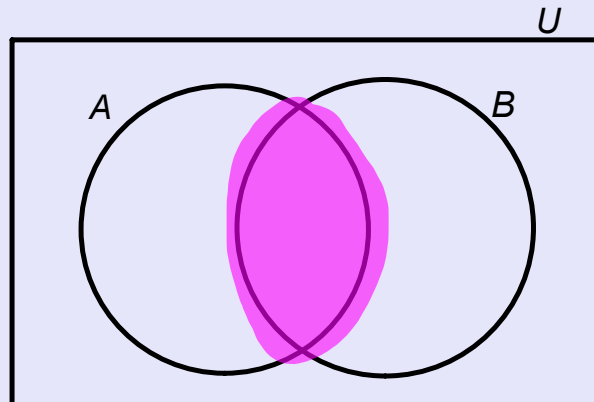They are a visual representation of sets

$U = \{0,1,2,3,4,5,6,7,8,9,10\}$

$A =$ ALL ODD NUMBERS ≤ 10

$B =$ ALL EVEN NUMBERS ≤ 10

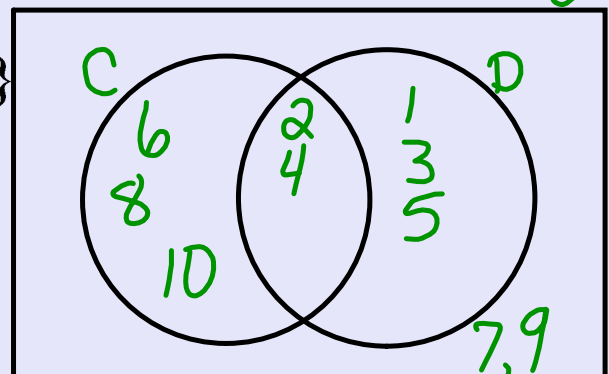The intersection of two sets would be where the two circles cross

i.e.- $A \cap B$

Example 1 - Sets C and D are subsets of U, the universal. Draw a Venn Diagram for the following sets

$U = \{1,2,3,4,5,6,7,8,9,10\}$

$C = \{\text{all even numbers}\}$
         $\{2,4,6,8,10\}$

$D = \{1,2,3,4,5\}$

Venn Diagrams

Standard
3.5

Example 2- *A, B,* and *C* are all subsets of the universal. Draw the Venn Diagram for the following sets
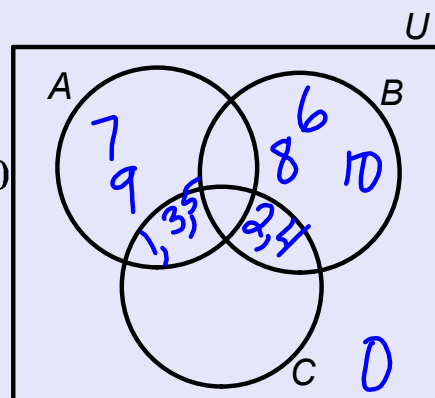
$U = \{0,1,2,3,4,5,6,7,8,9,10\}$

$A =$ ALL ODD NUMBERS ≤ 10
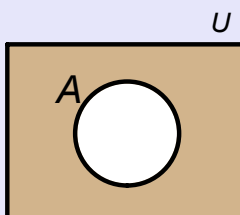$\{1,3,5,7,9\}$

$B =$ ALL EVEN NUMBERS ≤ 10
$\{2,4,6,8,10\}$

$C = \{1,2,3,4,5\}$

We can also use Venn Diagrams to see compliment sets.

If you are looking for the compliment of A, shade everything BESIDES A

i.e.- $A\grave{}$ would be

Example 3- On the following Venn Diagram, shade in $A\grave{}$
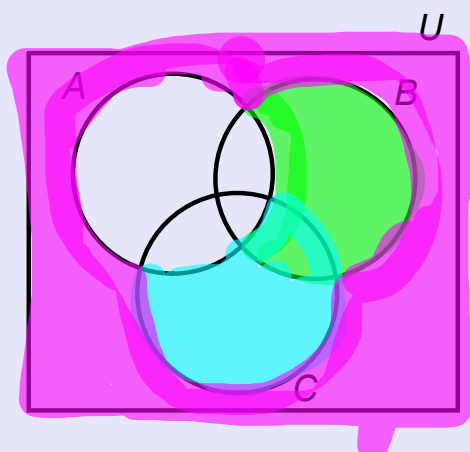
Summary:

Venn Diagram Shadings

You will be given different descriptions of sets. You need to shade in the sets properly according to the descriptions

When you finish, try to write the descriptions of the Venns Below.

U

A   B

C

U

A   B

U

P   Q
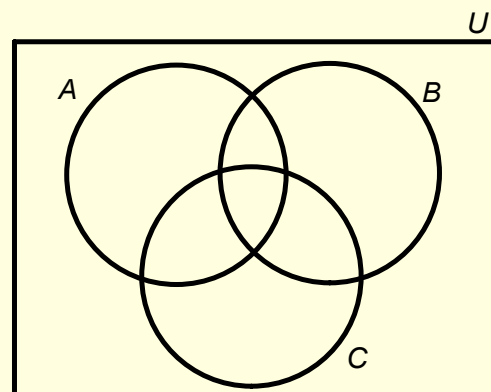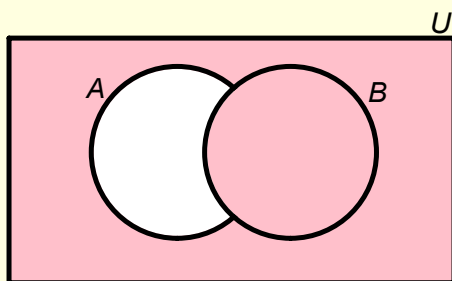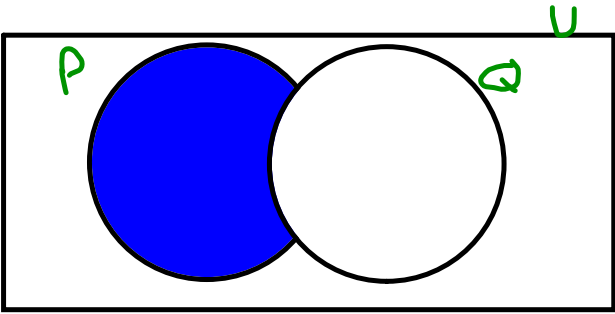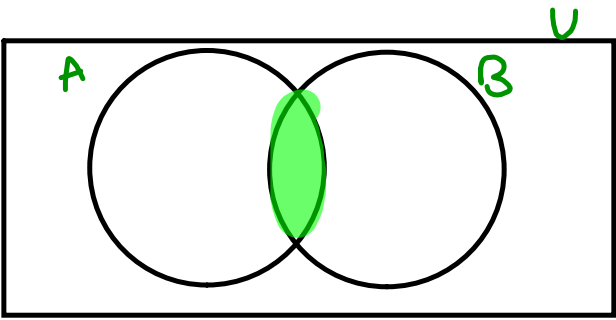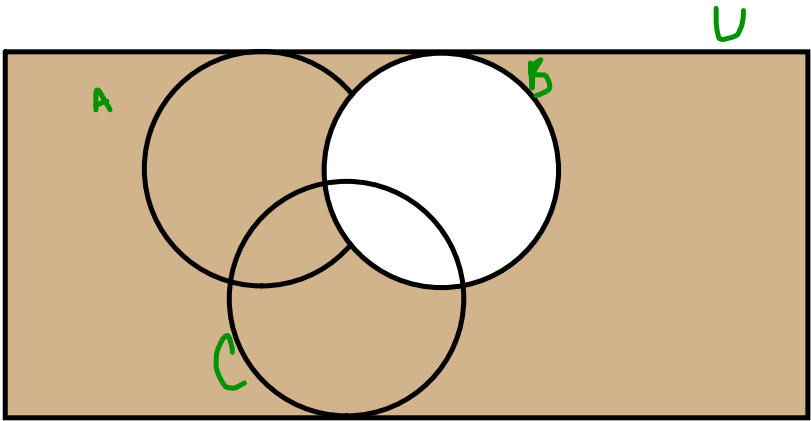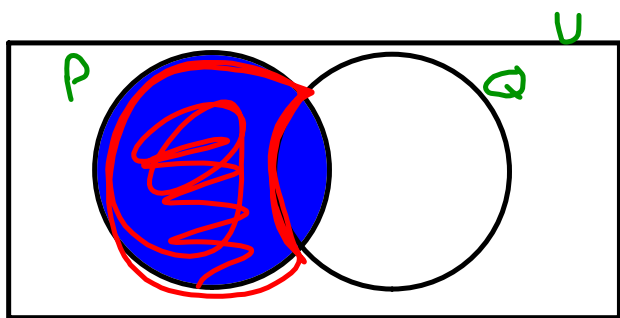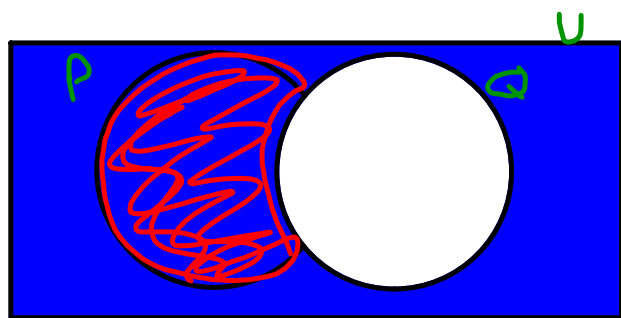
P ∩ Q'

Right Side...

Write a summary that explains the essential question?

Left Side...

In order to successfully solve the problems we discusses in class, what are the key words that you are looking for?

How can Venn Diagrams be used for problem solving?

Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question

Week 11, Lesson 2
1. Warm-up
2. Venn Diagrams (2)
3. ICA
4. Homework
5. IB Project

Venn Diagrams (2)
How can Venn Diagrams be used for problem solving?

83

Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up Warm-up

Warm-up: Given the Venn Diagram, find the following.

A 8 7 5
2
U   3

A 2 4   B 5 9 6
8   7   1 3
U
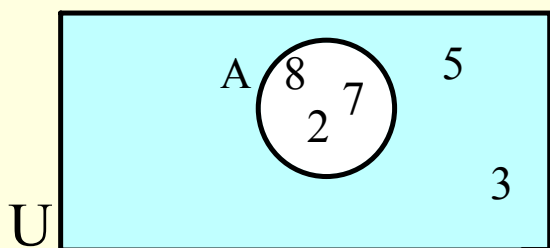
1. $U = \{2, 3, 5, 7, 8\}$
   $A = \{2, 7, 8\}$
   $A' = \{3, 5\}$
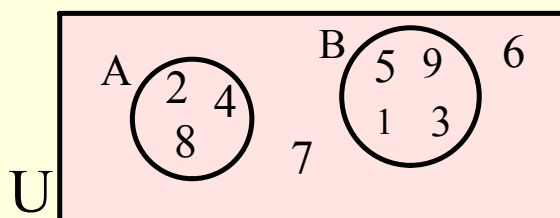
2. $A \cap B = \emptyset$

Problem Solving - Venn Diagrams

Standard
3.5a

Sometimes we do not need to show all the elements on a Venn Diagram. All we need is the <u>number of elements</u> of *U* that are in each region.

A   (7) (4) (6)   B
(3)
U
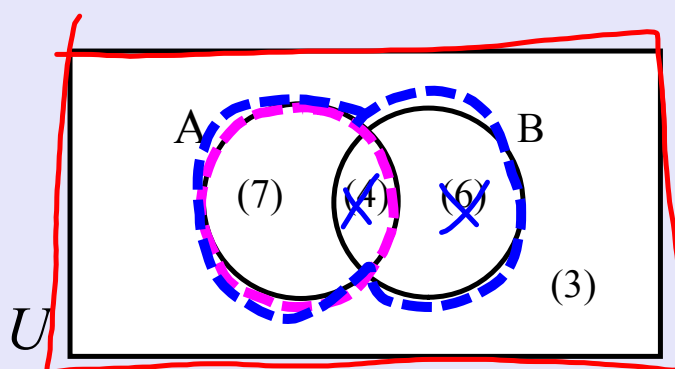
$n(A) = 7 + 4 = 11$

$n(A \cup B) = 7 + 4 + 6 = 17$

$n(U) = 7 + 4 + 6 + 3 = 20$

$n(B') = 7 + 3 = 10$

Example 1:   A squash club has 27 members. 19 have black hair, 14 have brown eyes, and 11 have both black hair and brown eyes.

a. Place this information on a Venn Diagram.

A   (8) (11) (3)   B
(5)
U
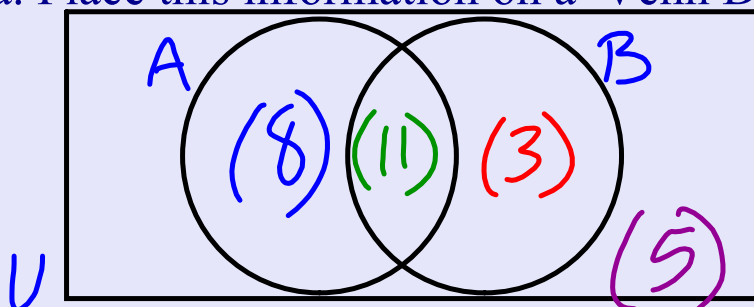
$14 - 11 = 3$

$19 - 11 = 8$

$8 + 11 + 3 = 22$

b. Find the number of members with

   - black hair or brown eyes 22

   - black hair, but not brown eyes 8

Problem Solving -Venn Diagrams

Example 2:

In a car club, 13 members drive a manual and 15 members have a sunroof on their car. 5 have manual cars with a sunroof, and 4 have neither.

a. Display information on a Venn diagram

M   S
(8) (5) (10)
U   (4)

13-5
15-5
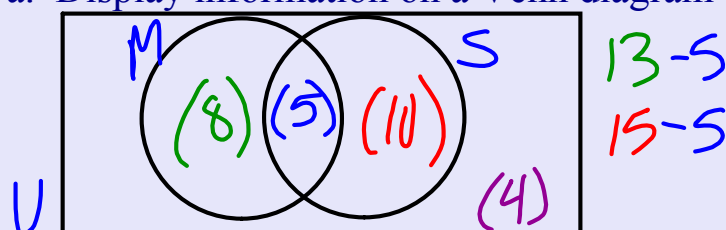
b. How many members:

- are in the club $8+5+10+4 = 27$

- drive a manual car without a sunroof 8

- do not drive a manual $10+4=$

Example 3:

At a conference, the 58 delegates speak many different languages. 28 speak Arabic, 27 speak Chinese, 39 speak English. 12 speak Arabic and Chinese, 16 speak both Chinese and English, 17 speak Arabic and English. 2 speak all three languages. How many delegates speak:

U   A   C
(1) (10) (n)
(2)
(15) (14)
(8)   (7)
E

17-2
16-2
12-2
39-15-14-2
27-10-14-2
28-10-15-2
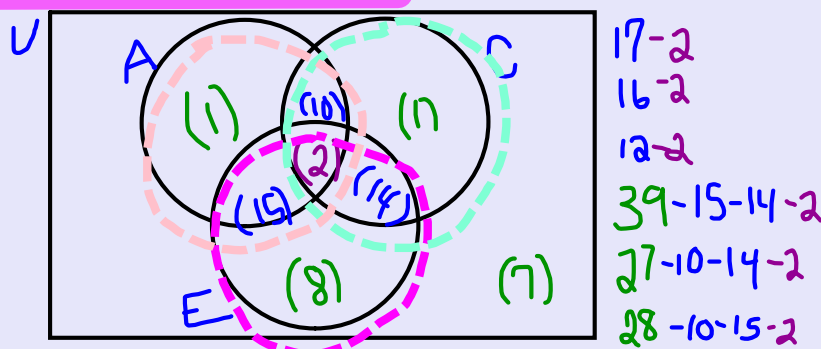
a. Chinese only   I

b. none of these languages   7

c. neither Arabic nor Chinese? $8+7=15$

Summary:

Example 1 - Out of 40 students, 14 are taking English and 29 are taking Chemistry. 5 students are taking both classes.

How many students are taking English only?

How many students are taking Chemistry only?

How many student are NOT taking Chemistry?

How many students are taking neither English nor Chemistry?

Example 2- 100 college freshman were surveyed about their selection in classes. The results were found below:

28 took PE
31 took BIO
42 took ENG
9 took PE and BIO
10 took PE and ENG
6 took BIO and ENG
4 took all three subjects

How many students took PE *only*?
How many students didn't take any of the three subjects?

Example 3- Mr. Morris conducts a study to see why his students drive so reckless. He gathers information on their speeding tickets for a single month. Here is what he finds:

-6 tickets were given for speeding
-12 tickets were given for red light infractions
-15 tickets were given for texting while driving
-2 tickets were given for speeding and running a red light, but the driver was not texting
-2 tickets were given for speeding and texting, but not for red light infractions
-1 student got a ticket for speeding, running a red light, and texting while driving

If there were a total of 24 tickets given out, how many tickets were given out for red light infractions and texting?

Right Side...

Write a summary that answers the essential question.

Left Side...

In order to successfully solve the problems we discusses in class, what are the key words that you are looking for?

How can Venn Diagrams be used for problem solving?

Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question

Week 11, Lesson 3

1. Warm-up
2. Quiz
3. Notebook Check

00:00.00

85

Warm-up: Define the following:

1. $\mathbb{N}$, $\mathbb{Q}$, $\mathbb{Z}$, $\mathbb{Q}'$

2. Write using set notation.

   -11 is an element of set W

3. P = { m, a, t, h, r, u, l, e, s}

   L = {s, t, u, d, i, e, s}

   the union of set S and set M

   Find P ∪ L

Quiz Time!!

Only!
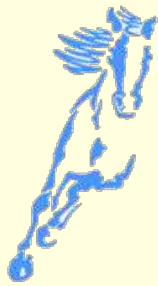
Notebook Check

Name: _____ Per: ____

Notebook Check Unit 3

Unit 3 Set-Up	Vocabulary, tab, study guide	10 pts.	
W10 L1	Notes/ HW	5 pts.	**5**
W10 L2	Notes/ HW	5 pts.	5 pts.
W10 L3	Notes/ HW	5 pts.	5 pts.
W10 L4	Notes/ HW	5 pts.	5 pts.

How can Venn Diagrams be used for problem solving?

Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question Essential Question

Week 11, Lesson 4

1. Warm-up
2. Sample IB Intro
3. Write IB Intro

00:00 00

Rubric For IB Grading

Criterion A	2 points	Introduction
Criterion B	3 points	Information / Measurement
Criterion C	5 points	Mathematical processes
Criterion D	3 points	Interpretation of results
Criterion E	2 points	Validity
Criterion F	3 points	Structure and communication
Criterion G	2 points	Commitment

Sample Projects:

MATH PROJECT
A Study into Stress levels in _____ College in Second Year

Introduction
Statement of the Task:

The idea of this project came from the observation that students at College go through dramatic ups and downs of stress during second year. The purpose of this project is to investigate the stress levels of students at significant points during the second year. It will be interesting to discover the nature of the rise and decline of stress when comparing males and females, evaluating if gender has any effect.

I will need to establish at which points during the term to measure stress. I will then collect data by means of a questionnaire. This will ask, on a scale of 1-lowest to 10-highest, their stress levels at each given time. The data collected will then be translated and analyzed using tables, chi-squared testing, graphs and statistics. I hope to find out the relationship between stress levels compared to time and gender.

By the end of the project I aim to be able to rank the time periods in order of low to high stress. I intend also to look into whether stress levels in the different periods (using data from males and females) are in general correlated in any way. I also hope to show whether there is a difference is stress between males and females. Lastly, I will look into whether there is a difference in how drastically stress levels of males and females change during the periods.

One factor to consider when drawing conclusions is the subjective nature of stress making it very difficult to measure universally and accurately.

Statement of Intent:

My aim is to discover whether the weight of any particular car determines its environmental impact measured by CO_2 output and fuel consumption. I will also explore the relationship between CO_2 output and fuel consumption. I am interested in this because I will soon have my licence and will need to decide which car will be most fuel efficient and environmentally friendly.

In order to collect my data and control the variables, I will be only collecting data on cars that are 2 wheel drives with 2.0L petrol engines and automatic transmission. I will be collecting data on the fuel consumption (L/100km) and CO_2 emissions (gm/km) as well as the curb weight (kg) of the cars (curb weight is the total weight of a vehicle with standard equipment, all necessary operating consumables such as motor oil and coolant, a full tank of fuel, and not loaded with either passengers or cargo). I will be obtaining this information primarily from the internet, car brochures and calling up car dealerships.

Firstly, to discover whether there is a relationship between each of the variables (fuel consumption and weight; CO_2 emissions and weight; and finally CO_2 emissions and fuel consumption). I will be plotting scatter-plots, and finding the correlation coefficient and a regression equation if appropriate. I will use this regression equation or 'line of best fit' to make some predictions and compare them to already recorded values and calculate the percentage error. This will tell me how reliable the regression equation is in predicting data. I will then test the null hypothesis, that the two variables are independent, for all the variables using the chi-squared test. To work out the groups to use in my hypothesis testing, I will use uni-variate statistics to find the averages of the different groups of data. I will then divide my groups into 'below average' and 'above average'.

Now its your turn!!

Think about your topic. Why did you pick that topic? Do you want to modify it? What is the purpose of your investigation? Where are you getting your data from and how will you analyze it?

You will need: a clear statement of the task

a clear description of the plan

Attachments

Percentile ND Week 2 L1 HW.docx