Sets and Venn Diagrams

ow can we represent mathematical information more simply on a diagram or in a set?

What classifies s a finite set?	* A set is a collection of numbers or objects $A = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$ • Written within brackets • Seperated by commas • Use capital letters to represent sets

ow do I epresent ie info a venn diagram?	* The numbers or objects in a set are called ELEMENTS or MEMBERS of the set
	   − $\in$ = element of − Q = rational #'s $\frac{p}{q}$ and $q \neq 0$
	   − $\notin$ = not an element of − R = set of all real #'s

* The set $\{\ \}$ or $\emptyset$ is called the EMPTY SET and contains no elements

$N = \{0, 1, 2, 3, 4, 5, 6, 7 \dots\}$ Natural counting numbers
$Z = \{0, \pm1, \pm2, \pm3, \pm4, \dots\}$ Integers
$Z^+ = \{1, 2, 3, 4, 5, 6, 7, \dots\}$ Positive Integers
$Z^- = \{-1, -2, -3, -4, -5, \dots\}$ Negative Integers

Counting Elements of Sets

* The number of elements in Set A is written $n(A)$
ex) $A = \{2, 3, 5, 8, 13, 21\}$ = 6 elements so $n(A) = 6$
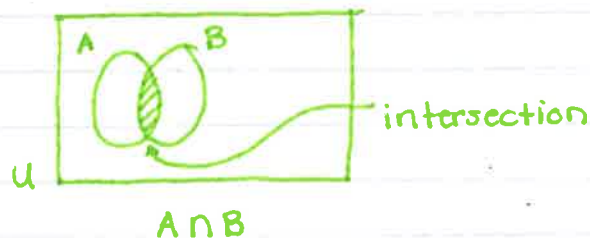
* A set which has a finite # of elements is called a finite set
ex) $A = \{2, 3, 5, 8, 13, 21\}$ is a finite set
         $\emptyset$ is also a finite set, since $n(\emptyset) = 0$

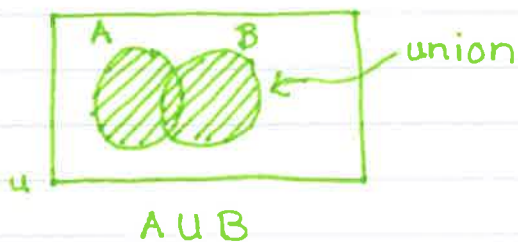* Infinite sets are sets which have infinitely many elements

Intersection

*A ∩ B consists of all elements common to both A and B. It is the shaded region where the circles representing A and B overlap.
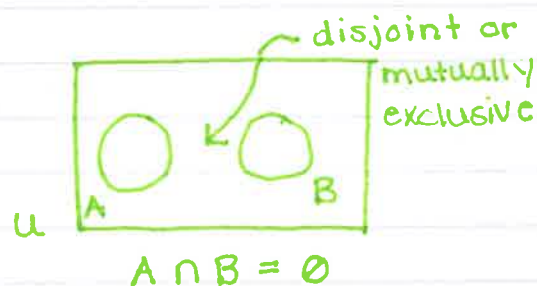
A ∩ B

intersection

Union

*A U B consists of all elements in A or B or both. It included both circles

A U B

union

Disjoint or Mutually Exclusive Sets.

*Disjoint sets do not have common elements. They are represented by non overlapping circles.

disjoint or mutually exclusive
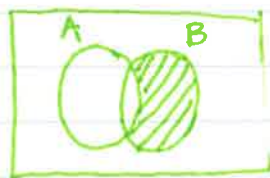
A ∩ B = ∅

* $n(A \cup B) = n(A) + n(B) - n(A \cap B)$
* $n(A \cap B) = n(A) + n(B) - n(A \cup B)$

Subsets

P is a subset of Q if every element of P is also an element of Q

ex) $P = \{1, 2, 3, 4\}$, $Q = \{1, 2, 3, 4\}$
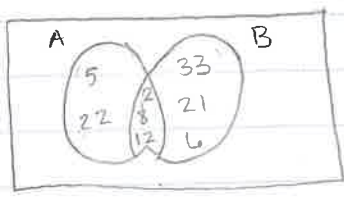
$P \subseteq Q$

Shading Diagrams

A' ∩ B   (A ∩ B)'

$A = \{2, 5, 8, 12, 22\}$
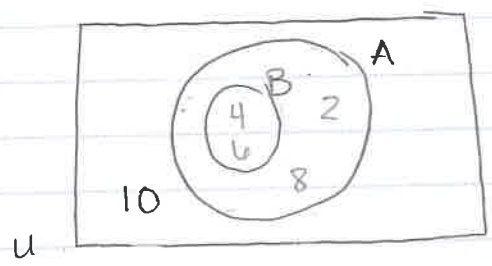
$B = \{2, 6, 8, 12, 21, 33\}$

A B

5 33
22 2 21
8
12 6

$n(A \cap B) = 3$

number of intersection #

$u = \{2, 4, 6, 8, 10\}$

$A = \{2, 4, 6, 8\}$

$B = \{4, 6\}$

A

B
4
6   2
8
10

u

BCA

ACU

BCU