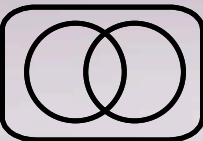
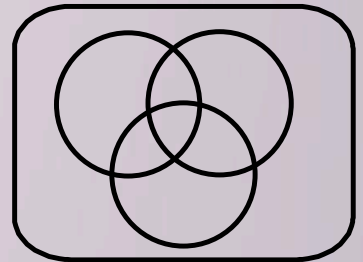


\approx $\{ \}$ $\sqrt{\quad}$  ∞ Σ π

$\{U, \cap, \emptyset\}$ Math 1030 #1a



Sets and Venn Diagrams

Introduction

Sets ~ Vocabulary

set — a collection of objects

ex $A = \{1, 2, 3\}$

- sets are usually denoted by capital letters
- we use curly braces to denote the "container"

element — one of the objects of a set

ex 1 is an element of A ($1 \in A$)
2 " " " " " "
↑
element of

subset — a set that contains only some or all of the elements of another set.

ex $B = \{1\}$, then B is a subset of A

$B \subseteq A$
↑
subset of

disjoint sets — A and B are disjoint sets if they have nothing in common, i.e. they have no common elements

ex $A = \{1, 2, 3\}$, $C = \{4, 5\} \Rightarrow A$ and C are disjoint

overlapping sets — A and B are overlapping sets if they have some common element(s)

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

A and D overlap

E and A overlap

E and D overlap

EX 1: List some elements of these sets.

a) First letter of the days of the week

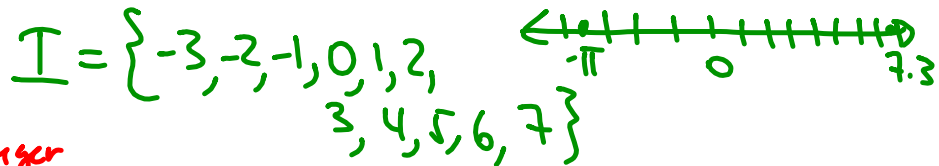
$$L = \{M, T, W, F, S\}$$

b) Colors

$$C = \{ \text{blue, red, pink, white, yellow} \}$$

c) Integers between $-\pi$ and 7.3

$$-\pi \approx -3.14$$



d) Multiples of 3

$$M = \{ \dots, -9, -6, -3, 0, 3, 6, 9, \dots \}$$

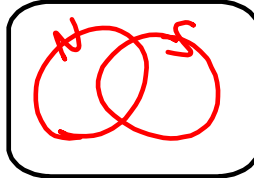
(... is called ellipsis)

Venn Diagram ~ A visual way to represent the relationship between sets.

EX 2: Draw a Venn Diagram that represent these pairs of sets.

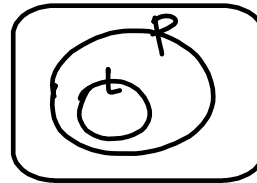
a) Nurses and skydivers

(overlapping sets)



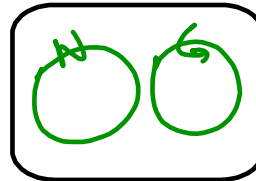
b) Limericks and poems

(all limericks are poems)



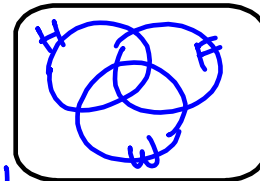
c) Navy Seals and Green Berets

(disjoint sets)

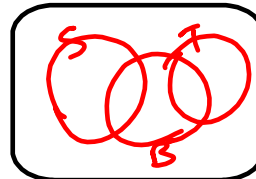


d) Hockey players, figure skaters, women

(need 3 circles to represent 3 sets)



e) Blue vehicles, sedans, trucks

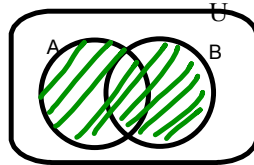


Some sedans are blue
" trucks " "
no sedans are trucks

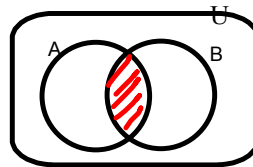
A typical Venn Diagram

U = The universe

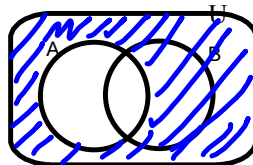
$A \cup B$ The union of two sets.
(all elements that are
in A OR B)



$A \cap B$ The intersection of two sets.
(all elements that are
in both A and B)

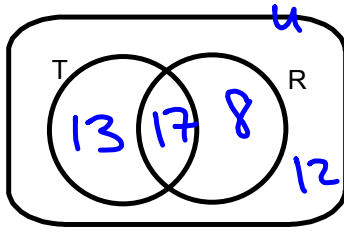


\bar{A} The complement of the set.
(A^c) (set of all elements
that are NOT in A)



EX 3: Determine how many are in each region of this VennDiagram

- ✓ Fifty people were surveyed about a certain political ad. (U)
 - ✓ 30 said they saw it on TV.
 - ✓ 25 heard it on the radio.
 - ✓ 12 did not see or hear the ad at all.
- notice: $30 + 25 + 12 = 67$



How many are in the intersection of T and R? 17

How many are in the union of T and R? $13 + 17 + 8 = 38$

How many are in the complement of R? $12 + 13 = 25$

$13 + 17 = 30 \checkmark$
check: $13 + 17 + 8 + 12 = 50 \checkmark$