10-26-21

Sets + Venn Diagrams

Eq: how can you use Venn diagrams to organize + communicate quantitative info?

Set = collection of numbers or objects

$A = \{1, 3, 5, 7\}$ $U = \{a, e, i, o, u\}$

the numbers or objects in a set are called the **elements** or **members** of the set

$n(A) = 4$ $n(U) = 5$

$3 \in A$ = 3 is an element of A

$12 \notin A$ = 12 is NOT an element of A

$e \in A$

$K \notin A$

The set $\{\}$ or $\varnothing$ is called the **empty set** + contains no elements

N = natural or counting numbers $\{0, 1, 2, 3, 4, 5, 6, 7\}$

Z = set of **ALL** Integers $\{\pm 1, \pm 2, 0, \pm 3, \pm 4\}$

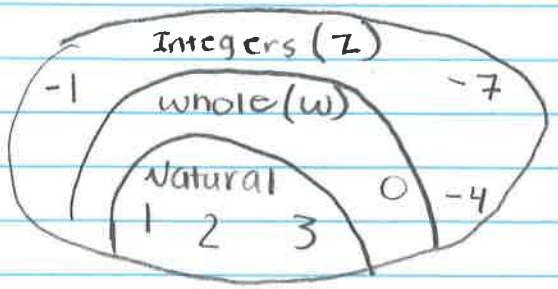
Z^+ = set of all positive integers = $\{1, 2, 3, 4, 5, 6\}$

Z^- = set of all negative integers = $\{-1, -2, -3, \}$

Irrational numbers (P) $\pm\pi$, $\sqrt{2}$, $\sqrt{17}$, e

Rational Numbers (Q)

$\frac{1}{2}$ $-\frac{3}{22}$



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subset problem Practice

$P\{2,3,5\}$ $\underline{C}$ $\{1,2,3,4,5,6\}$

↓ subset symbol

say P is a proper subset

$A = \{1,2,5,7,9,10\}$

$B = \{2,3,4,5,6,7\}$

$P(A \cap B) = \{2,5,7\}$ number of $(P \cap B) = 3$

$P(A \cup B) = \{1,2,3,4,5,6,7,9,10\}$ $n(P \cup B) = 9$

NOTES CONT

Proper subset + Improper subset

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

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

$B \subset A$ (B is a proper subset of A) $C \subseteq A$ (C is a subset of A)

A is proper subset of C: $A \subsetneq C$

C is not subset of B: $C \not\subseteq B$

Infinite sets: infinitely many elements $\{B / B \geq 0\}$ $\{1 \ldots\}$

finite: finite or set number of elements $\{1, 2, 3, 4\}$

$\mathbb{N}, \mathbb{Z}, \mathbb{Z}^+, \mathbb{Z}^-, \mathbb{Q}$, + $\mathbb{R}$ are all infinite sets

Union + Intersection

- If P + Q are two sets then
  - $P \cap Q$ is the intersection of P + Q, and consists of all elements which are in both P + Q
  - $P \cup Q$ is the union of P + Q, and consists of all elements which are in P or Q

union