

FINITE MATH : Collection of
real-world applications that build on Math 11

Course Overview

Ch 3-5 Probability

Ch 1-2 Linear Programming

e.g. How to maximize profit with
fixed amount of capital and raw materials?

Ch 6-7 Matrices and Markov Chains

e.g. Predict a company's marketshare
5 years from now

Ch 8 Financial Math

Ch 9 Logic

3.1 Sets

A set is a collection of objects, called elements.

Some sets:

$$A = \{x, y, z\}$$

$$B = \{\text{all odd numbers between 2 and 10}\}$$
$$= \{3, 5, 7, 9\}$$

$C = \{\text{possible outcomes from tossing a coin twice}\}$

$$= \{HH, HT, TH, TT\}$$

H = heads
T = tails

Union of A and B, written $A \cup B$,

is the set of elements that belong to
A or B (or both)

Intersection of A and B, written $A \cap B$, is the set of
elements in both A and B.

Ex: $A = \{-3, -1, 1, 3, 5\}$

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

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

OR

$A \cap B = \{-1, 3\}$

AND

Ex: $A = \{1, 2, 3\}$

$B = \{3, 4, 5\}$

$C = \{0, 1, 5, 6\}$

Find $(A \cup B) \cap C$

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

$(A \cup B) \cap C = \{1, 5\}$

B is a subset of A, written $B \subseteq A$, if every element of B is contained in A

Ex: $\{1, 3\} \subseteq \{1, 2, 3\}$

$\{1, 3\} \subseteq \{1, 3\}$

$\{1, 3\} \subseteq \{3, 1\}$

$\{3, 4\} \not\subseteq \{1, 2, 3\}$

not a subset

The empty set, written \emptyset , contains no elements. It is a subset of every set.

$$\{1,3\} \cap \{2,4\} = \emptyset$$

$$\emptyset \subseteq \{1\}$$

$$\emptyset \subseteq \{1,3,4\}$$

$$\emptyset \subseteq \emptyset$$

Ex: List all subsets of $\{x, y, z\}$

$$\{x, y, z\}$$

$$\{x, y\}, \{x, z\}, \{y, z\}$$

$$\{x\}, \{y\}, \{z\}$$

$$\emptyset$$

The complement of A, written A' , is the set of all elements in the universal set U that are not in A .

Ex: $U = \{a, b, c, d, f\}$

$$A = \{b, c\}$$

$$B = \{c, d, f\}$$

Find:

a) A'

$$A' = \{a, d, f\}$$

b) $(A \cup B)'$

$$A \cup B = \{b, c, d, f\}$$

$$(A \cup B)' = \{a\}$$

c) $A' \cup B$

$$A' \cup B = \{a, c, d, f\}$$

b is an element of set A

Written: $b \in A$

Ex: $-1 \in \{-2, -1\}$

$$\{-1\} \subseteq \{-2, -1\}$$

$$-3 \notin \{4, 5\}$$

$$\{-3\} \not\subseteq \{4, 5\}$$

$$1 \notin \emptyset$$

$$0 \notin \emptyset$$