MAT120
Math for Liberal Arts

Test – Chapter 2 - Section 2

Subsets

- A set B is a subset of a set A if every element in set B is an element of set A.
  - A = {1, 2, 3, 4, 5, 6,7} and B = {2,7}
  - B is a subset of A
- The notation for a subset is B $\subseteq$ A.
- A set B is a proper subset of a set A if B is a subset of A and if n(B) < n(B.
- The notation for a proper subset is B $\subset$ A.

In-class Assignment 2 - 1

Subset or Element

- It is important to know the distinction between an element and a subset.
- To use the element sign, the element must be in the set braces or implied to be in the set braces.
  - $7 \in x | x$ is an odd number   or $4 \in 1,2,3,4,5$
- To use the subset sign, $\subseteq$ or $\subset$ either one, both sides of the sign must be sets.
  - $2,4 \subset 1,2,3,4$ or $A \subseteq D$
- Both signs can be negated. $\notin$ and $\not\subset$

In-Class Assignment, 2 – 2

How Many Subsets for a Set?

- To determine the number of subsets a given set, *S*, may have use the formula below.

  $$2^{n(S)}$$

  - 2 because each element has 2 choices – it is in the set or it is not in the set.
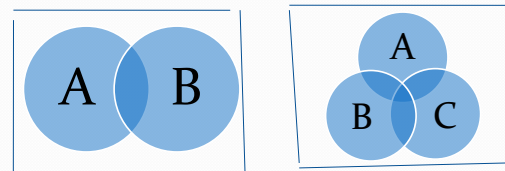
In-class Assignment 2 - 3, 4

Venn Diagrams

- A Venn diagram is a way of visualizing the relationship among several sets.
  - A closed area – usually a rectangle – represents the universal set.
  - Circles – or closed areas – within the universal set represents the sets under discussion.

No in-class assignment problem

Venn diagram

No in-class assignment problem

Sets to Know

- The set of natural numbers, N, is the set that you naturally count with. This set is also known as the set of counting numbers.

  N = {1, 2, 3, 4, 5, ...}

- The set of whole numbers, W, is the set of natural numbers along with the number 0.

  W = {0, 1, 2, 3, 4, ... }

- Note that N is a proper subset of W. N $\subset$ W

- These are the numbers used in first and second grades.

No in-class Assignment problem

More Sets to Know

- The set of integers, I, is the set of natural numbers, 0, and the negatives of the natural numbers.

  I = {...,−3, −2, −1, 0, 1, 2, 3, ...}

  Notice that all the whole numbers, and therefore, all the natural numbers are in I.   N $\subset$ W $\subset$ I

- The set of rational numbers, Q, is the set of all fractions.

  Q = {x| x maybe written as $\frac{a}{b}$ where $a \in I$ and $b \in N$ }.

  - Notice that the definition says that 0 can not be in the denominator.

- These sets of numbers are called nested sets. That is

  N $\subset$ W $\subset$ I $\subset$ Q.

In-class Assignment 2 – 5, 6, 7