2.2 Subsets
Subsets

- A set is a subset of a given set if and only if all elements of the subset are also elements of the given set.

- Symbol: $\subseteq$

- To show that set $A$ is not a subset of set $B$, one must find at least one element of set $A$ that is not an element of set $B$. 
Determining Subsets

Example:
Determine whether set $A$ is a subset of set $B$.

$A = \{ 3, 5, 6, 8 \}$
$B = \{ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 \}$

Solution:
All of the elements of set $A$ are contained in set $B$, so $A \subseteq B$. 
Proper Subset

- All subsets of a set $S$ are proper subsets except the subset containing all of the given elements of $S$. That is, $S$ is NOT a proper subset of $S$.

- Symbol: $\subset$
Determining Proper Subsets

Example:
Determine whether set $A$ is a proper subset of set $B$.

$A = \{ \text{dog, cat} \}$
$B = \{ \text{dog, cat, bird, fish} \}$

Solution:
All the elements of set $A$ are contained in set $B$, and sets $A$ and $B$ are not equal, therefore $A \subsetneq B$. 
Determining Proper Subsets continued

Example:

Determine whether set $A$ is a proper subset of set $B$.

$A = \{ \text{dog, bird, fish, cat} \}$

$B = \{ \text{dog, cat, bird, fish} \}$

Solution:

All the elements of set $A$ are contained in set $B$, but sets $A$ and $B$ are equal, therefore $A \not\subset B$. 
Number of Distinct Subsets

(OMIT THIS SECTION)
Next Steps

- Study Examples 1-3 in Sec. 2.2
- Work Problems 7-23, odds, p. 55 of textbook
- Do online homework corresponding to this section