

# SETS

A set is a collection of objects.  
An object in the set is called  
an element.

Ex.

<u>Set Name</u>	<u>Description</u>	<u>Set Notation</u>
C	Students in Calculus	$C = \{ \text{Hayley, Duangjai, Sandra} \}$
N	Natural Numbers	$N = \{ 1, 2, 3, \dots \}$

If an element belongs to a Set, we use  $\in$  to show the relationship.

$$12 \in N$$

↑  
"is an element of"

$$\text{Sterling} \notin C$$

Write the elements.

$N$  is the set of whole numbers greater than 12 and less than 16.



$$N = \{13, 14, 15\}$$

Is  $15 \in N$ ? Yes.



$X$  is the set of numbers on a die.



$$X = \{1, 2, 3, 4, 5, 6\}$$

Is  $4 \in X$ ? Yes.

If all of the elements in one set are contained in another set, then it is a subset of that set.

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

$$B \subset A.$$

↑

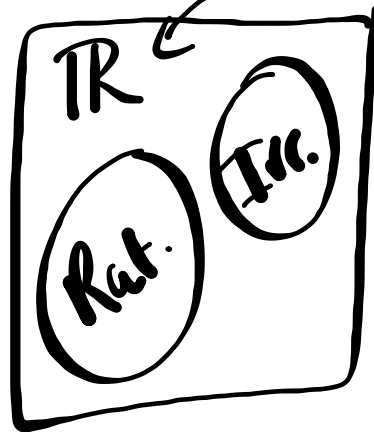
"is a subset of"

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

$$C \not\subset A$$

*problem*

The set of all possible elements for a situation is the universal set,  $U$ .



real numbers  
are  
universal

The set of all elements not in  $A$  is the complement of  $A$ , denoted as  $A'$ .

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

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

$$C = \{6, 7, 8\}$$

$$D = \{7, 8\}$$

Is  $D \subset C$ ?  
yes.

Find  $U$ .

$$U = \{1, 2, 3, 4, 5, 6, 7, 8\}$$

Find  $A'$ .

$$A' = \{5, 6, 7, 8\}$$

Find  $B'$ .

$$B' = \{1, 2, 7, 8\}$$

The union of sets  $A$  and  $B$ , or  $A \cup B$ , are the elements in all of  $A$  and  $B$ .

$$A \cup B = \{1, 2, 3, 4, 5, 6\}$$

$$A \cup C = \{1, 2, 3, 4, 6, 7, 8\}$$

The intersection of  $A$  and  $B$ , or  $A \cap B$ , are the elements in both  $A$  and  $B$ .

$$A \cap B = \{3, 4\}$$

$$C \cap D = \{7, 8\}$$

$$A \cap D = \emptyset \quad \text{— The empty set}$$