

**Lecture Examples**

**Ex 1** Let  $U$  be the set of all real numbers. Consider the sets  $R = \{1, \pi, 10\}$ ,  $S = \{3, 9\}$ , and  $T = \{x \mid x \text{ is a whole number between } -3 \text{ and } 500\}$ .

(a) What is  $R \cup S$ ?

(b) What is  $R \cap T$ ?

(c) What is  $R \cap S$ ?

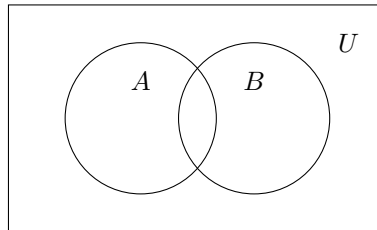
**Ex 2** With universe  $U$  being the set of all whole numbers, consider the sets  $A = \{1, -3, 4, -2, 0\}$  and  $B = \{3, 2, 0, 1\}$ , find

(a)  $A \cap B$

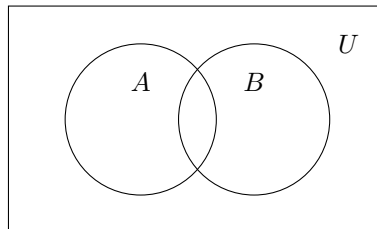
(b)  $n(A \cup B)$

**Ex 3** Given  $n(U) = 200$ ,  $n(A) = 80$ , and  $n(B) = 70$ , do the following:

(a) If  $n(A \cap B) = 45$ , find  $n(A \cup B)$  and draw a Venn diagram illustrating the composition of the universal set  $U$ .

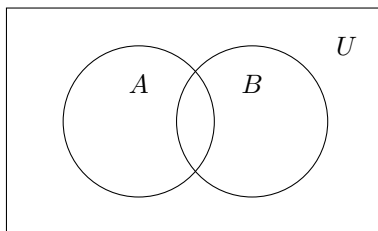


(b) If  $n(A \cup B) = 150$ , find  $n(A \cap B)$  and draw a Venn diagram illustrating the composition of the universal set  $U$ .

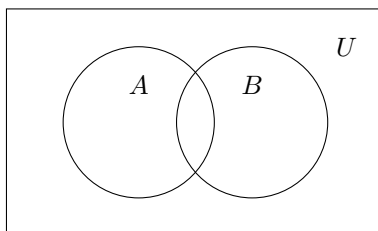


**Ex 4** In each Venn diagram, shade the given set.

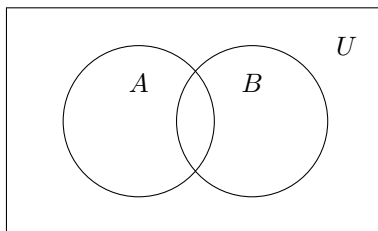
(a)  $B'$



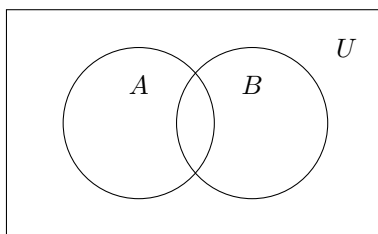
(b)  $A \cap B'$



(c)  $(A \cap B)'$



(d)  $A' \cup B'$



**On-Your-Own Examples**

**Ex 1** If  $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$ ,  $A = \{2, 4, 6, 8\}$ ,  $B = \{7, 8, 9\}$ , and  $C = \{1, 3, 5\}$ , find the following:

(a)  $A \cap B$

(b)  $B \cap C$

(c)  $(A \cap B) \cap C$

(d)  $A \cup B$

(e)  $B \cup C$

(f)  $A'$

(g)  $B'$

(h)  $C'$

(i)  $B \cap C'$

(j)  $A' \cap B'$

(k)  $(A \cup B)'$

**Ex 2** Suppose  $n(U) = 120$ ,  $n(A) = 45$ , and  $n(B) = 80$ .

(a) If  $n(A \cup B) = 95$ , find  $n(A \cap B)$  and draw a Venn diagram illustrating the sets  $A$  and  $B$  in  $U$ .

(b) If  $n(A \cap B) = 45$ , find  $n(A \cup B)$  and draw a Venn diagram illustrating the sets  $A$  and  $B$  in  $U$ .

**Ex 3** A transportation survey of 300 college students (the universal set  $U$ ) yielded the following information: 211 students own a bicycle, 145 students own an automobile, and 34 students own neither.

(a) How many students in the sample own either a bicycle or an automobile?

(b) What percentage of students own either a bicycle or an automobile?

(c) How many students own a bicycle but not an automobile?