Section 6.2 - The Number of Elements in a Finite Set

Let A be a set, then n(A) is the

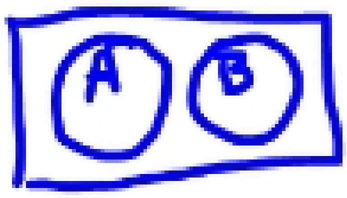
Example 1: Let A = {1, 2, 3, …, 19, 20} and B = {q, s, t, v}.

Find:

a. n(A) = 20

b. n(B) = 4

c. n(Ø) = 0



Given two sets A and B:

1. If A and B are disjoint then $n(A \cup B) = n(A) + n(B)$.

2. If A and B are not disjoint then $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

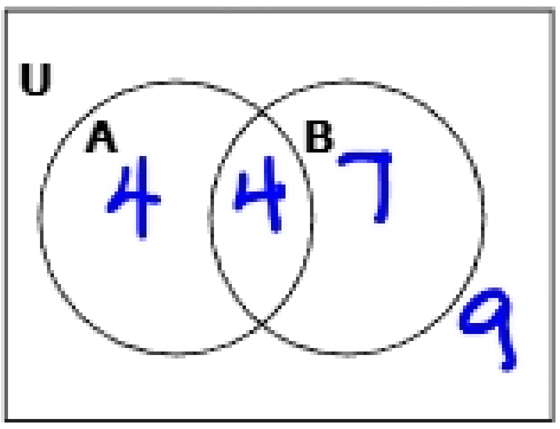
Example 2: Let A and B be subsets of a universal set U. Given that n(B) = 9, n(A ∩ B) = 5, and n(A U B) =20, find n(A).

$n(A \cup B) = n(A) + n(B) - n(A \cap B)$

$20 = n(A) + 9 - 5$

$n(A) = 20 - 9 + 5 = 16$

Example 3: Let A and B be subsets of a universal set U. Given that $n(A)=8$, $n(A^C \cap B) = 7$, $n(A \cap B) = 4$, **and** $n(A \cup B)^C = 9$, **find** $n(A \cup B^C)$.



$n(A \cup B^c) = n(A) + n(B)^c - n(A \cap B^c)$

$= 8 + (4+9) - 4$

$= 17$

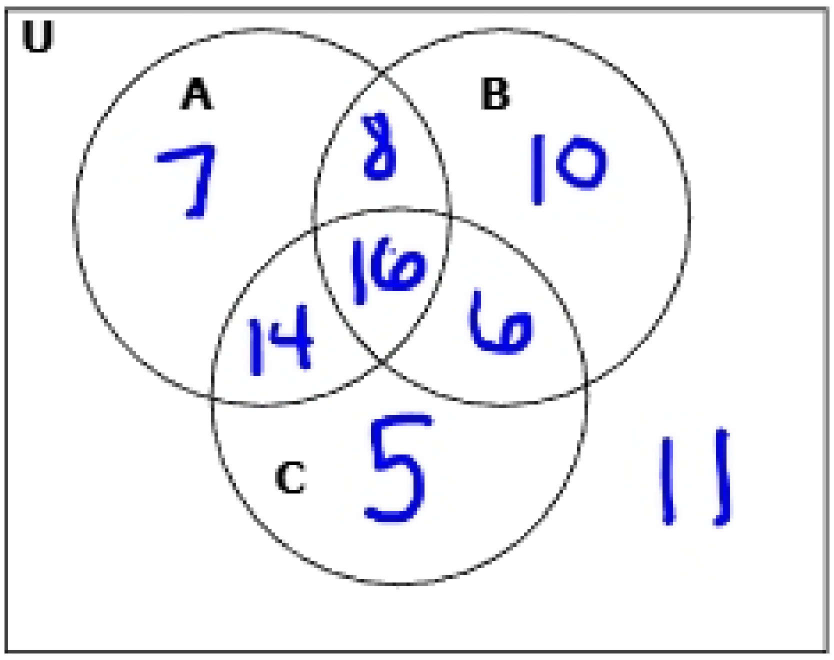
or

$n(A) = 4 + 4$

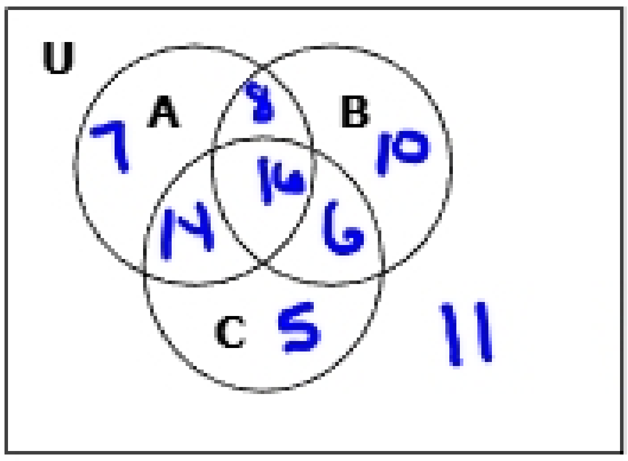
$n(B^c) = 4 + 9$

$8 + 9 = 17$

Example 4: Let n(U) = 77, n(A) = 45, n(B) = 40, n(C) = 41, n(A⋂B) = 24, n(B⋂C) = 22, n(A⋂C) = 30, and n(A⋂B⋂C) = 16. Find the number in each of the following sets.



a. n[(A⋃B) ⋂C] =

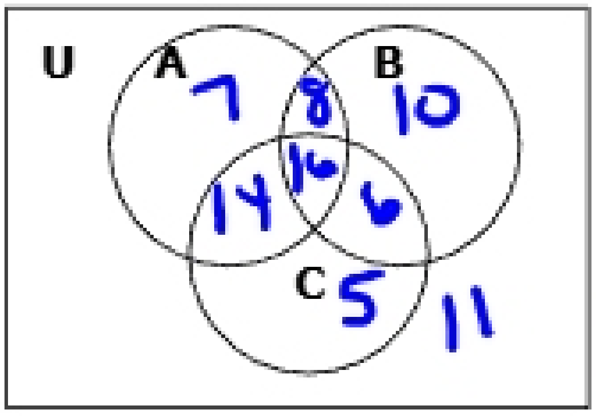


$n(A\cup B) = 7+8+10+14+16+6$ in both

$n(C) = 14+16+6+5$

$n[(A\cup B)\cap C] = 14+16+6 = 36$

b. n[(B⋂C)^C ⋃A] =

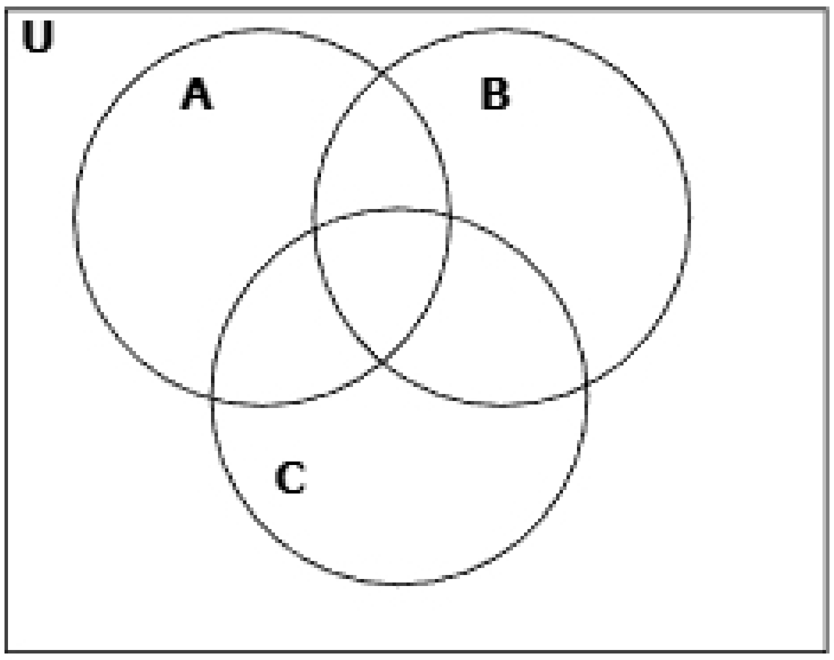


$n(B\cap C)^c = 7+8+10+14+5+11$ no duplicates

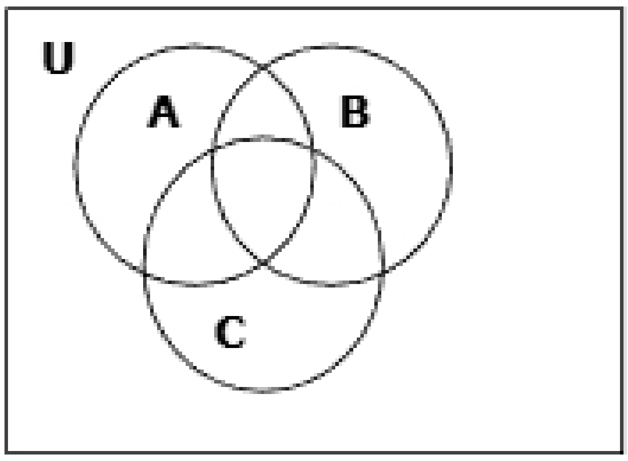
$n(A) = 7+8+14+16$

$n[(B\cap C)^c \cup A] = 7+8+10+14+5+11$
$+16 = 71$

Example 4: Let $n(U) = 77$, $n(A) = 45$, $n(B) = 40$, $n(C) = 41$, $n(A \cap B) = 24$, $n(B \cap C) = 22$, $n(A \cap C) = 30$, and $n(A \cap B \cap C) = 16$. Find the number in each of the following sets.



a. $n[(A \cup B) \cap C] =$



b. $n[(B \cap C)^C \cup A] =$