

**MATH 1500/MATH1551****Section 5.3 HW Solutions: 1, 3, 9, 11, 13, 15, 31, 49, 51**

1.  $5 + 6 = 11$

3.  $6 + 5 + 15 + 20 = 46$

9.  $10 + 5 + 15 = 30$

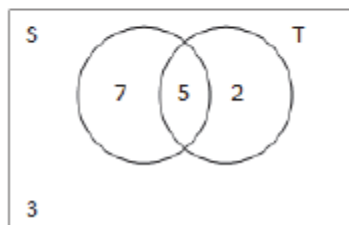
11.  $n(S \cap T') = n(S) - n(S \cap T) = 12 - 5 = 7$

$n(S' \cap T) = n(T) - n(S \cap T) = 7 - 5 = 2$

$n(S \cup T) = n(S) + n(T) - n(S \cap T)$

$= 7 + 2 + 5 = 14$

$n(S' \cap T') = n(U) - n(S \cup T) = 17 - 14 = 3$



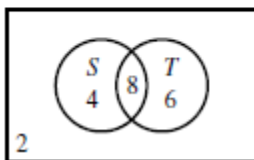
13.  $n(S \cap T) = n(S) + n(T) - n(S \cup T)$

$= 12 + 14 - 18 = 8$

$n(S \cap T') = n(S) - n(S \cap T) = 12 - 8 = 4$

$n(S' \cap T) = n(T) - n(S \cap T) = 14 - 8 = 6$

$n(S' \cap T') = n(U) - n(S \cup T) = 20 - 18 = 2$

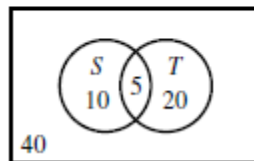


15.  $n(S \cup T) = n(U) - n(S' \cap T') = 75 - 40 = 35$

$n(S \cap T) = n(S) + n(T) - n(S \cup T) = 15 + 25 - 35 = 5$

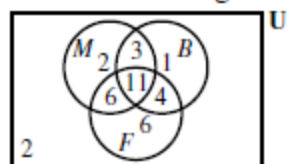
$n(S \cap T') = n(S) - n(S \cap T) = 15 - 5 = 10$

$n(S' \cap T) = n(T) - n(S \cap T) = 25 - 5 = 20$



31. Let  $U = \{\text{students in finite math}\}$ ,  
 $M = \{\text{male students}\}$ ,  $B = \{\text{students who are business majors}\}$ , and  $F = \{\text{first-year students}\}$ .  
 $n(U) = 35$ ;  $n(M) = 22$ ;  $n(B) = 19$ ;  $n(F) = 27$ ;  
 $n(M \cap B) = 14$ ;  $n(M \cap F) = 17$ ;  
 $n(B \cap F) = 15$ ;  $n(M \cap B \cap F) = 11$

- a. Draw a Venn diagram as shown.



- b.  $n(F' \cap M' \cap B') = 2$   
 There are two upperclass women nonbusiness majors.
- c.  $n(M' \cap B) = 1 + 4 = 5$   
 There are five women business majors.

49.  $L \cup S \cup F' = 4000 - 250 = 3750$

51. Let  $U = \{\text{college students surveyed}\}$ ,  
 $F = \{\text{first-year students}\}$ ,  
 $D = \{\text{voted Democratic}\}$ ,  
 $n(U) = 100$ ;  $n(F) = 50$ ;  $n(D) = 55$   
 $n(F' \cap D') = n((F \cup D)') = 25$   
 $n(F \cup D) = n(U) - n((F \cup D)') = 100 - 25 = 75$   
 $n(F \cap D) = n(F) + n(D) - n(F \cup D)$   
 $= 50 + 55 - 75$   
 $= 30$   
 30 freshmen voted Democratic.