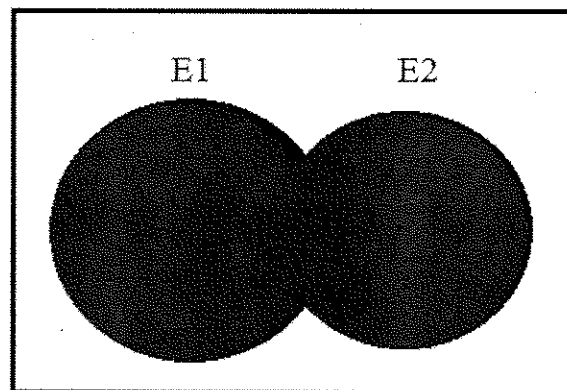


## Chapter 2

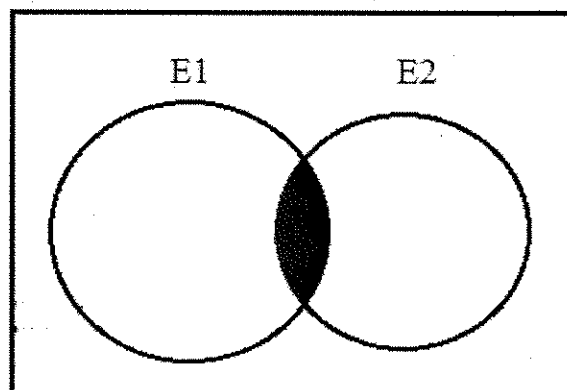
# Introduction to Probability

### 2.2 Sample Spaces, Events, and Set Operations

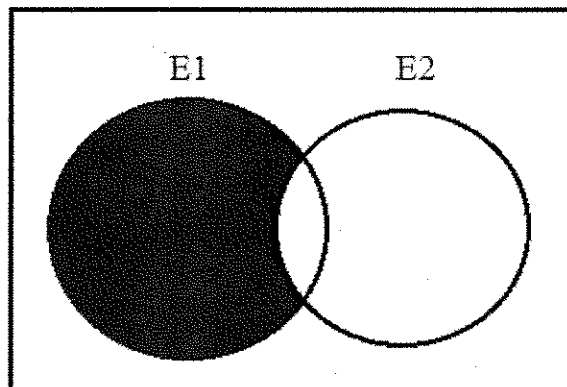
1. (a) The sample space is  $\{(1, 1), (1, 2), \dots, (1, 6), \dots, (6, 1), (6, 2), \dots, (6, 6)\}$ .  
(b) The sample space is  $\{2, 3, 4, \dots, 12\}$ .  
(c) The sample space is  $\{0, 1, 2, \dots, 6\}$ .  
(d) The sample space is  $\{1, 2, 3, \dots\}$ .
2. (a) The Venn diagram is shown as



- (b) The Venn diagram is shown as



(c) The Venn diagram is shown as



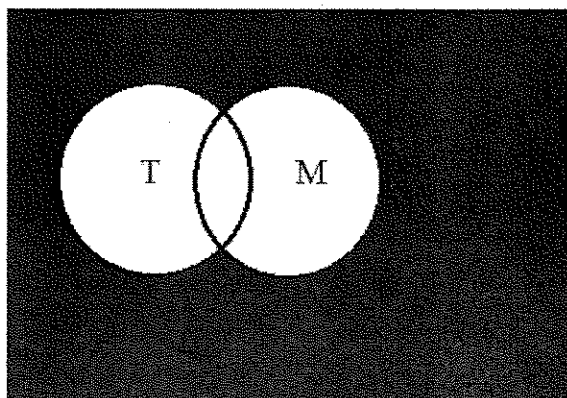
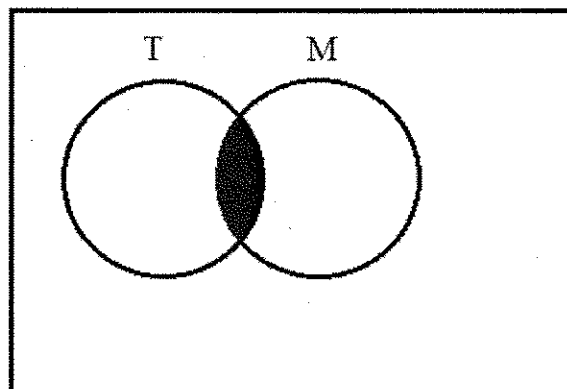
3. (a) The events are represented as

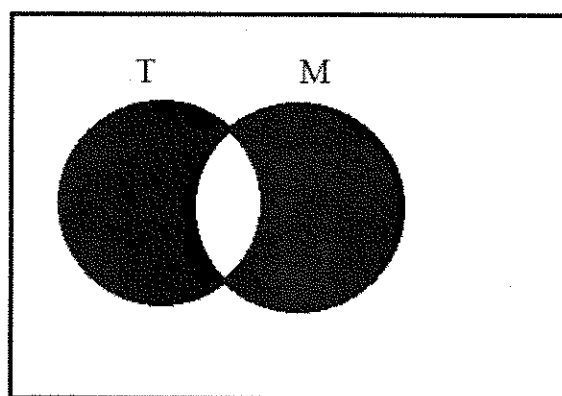
(i)  $T \cap M$

(ii)  $T^c \cap M^c$

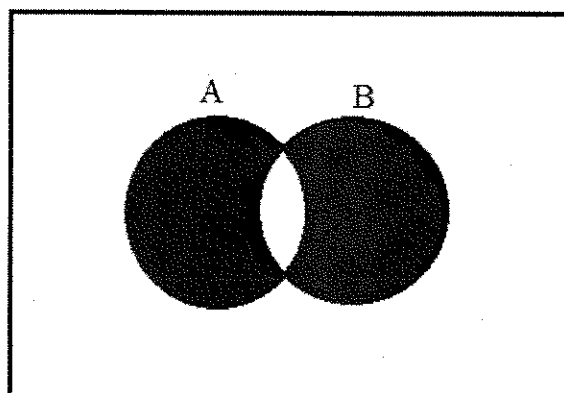
(iii)  $(T \cap M^c) \cup (T^c \cap M)$

(b) The Venn diagrams for part (a) are shown as



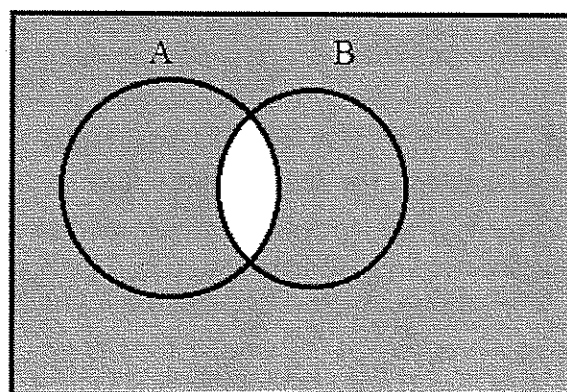


4. Both of the Venn diagrams should be similar to

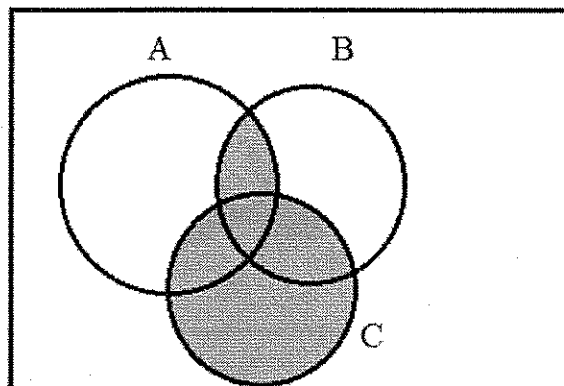


5. (a)  $A^c = \{x|x \geq 75\}$ , the component will last at least 75 time units.  
 (b)  $A \cap B = \{x|53 < x < 75\}$ , the component will last more than 53 units but less than 75 time units.  
 (c)  $A \cup B = S$ , the sample space.  
 (d)  $(A - B) \cup (B - A) = \{x|x \geq 75 \text{ or } x \leq 53\}$ , the component will last either at most 53 or at least 75 time units.

6. Both of the Venn diagrams should be similar to



7. Both of the Venn diagrams should be similar to

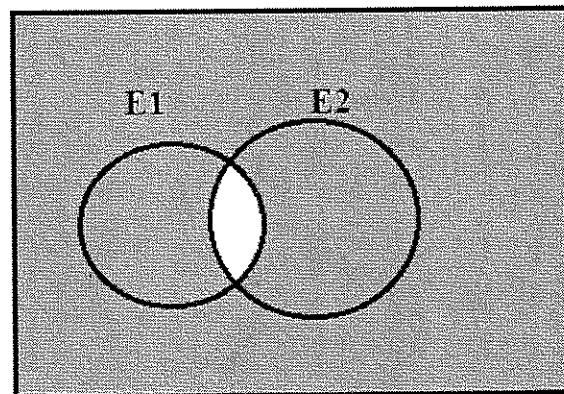



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2.3 Experiments with Equally Likely Outcomes 39

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10. (a) The number of disks in  $E_1$  is  $5+16=21$ , the number of disks in  $E_2$  is  $5+9=14$ , and the number of disks in  $E_3$  is  $5+16+9=30$ .  
 (b) Both of the Venn diagrams should be similar to



- (c)  $E_1 \cap E_2$  is the event that “the disk has low hardness and low shock absorption,”  
 $E_1 \cup E_2$  is the event that “the disk has low hardness or low shock absorption,”  
 $E_1 - E_2$  is the event that “the disk has low hardness but does not have low shock absorption,” and  $(E_1 - E_2) \cup (E_2 - E_1)$  is the event that “the disk has low hardness or low shock absorption but does not have low hardness and low shock absorption at the same time.”  
 (d) The number of disks in  $E_1 \cap E_2$  is 5, the number of disks in  $E_1 \cup E_2$  is 30, the number of disks in  $E_1 - E_2$  is 16, and the number of disks in  $(E_1 - E_2) \cup (E_2 - E_1)$  is 25.