C: ANSWERS TO SELECTED PROBLEMS

Chapter 2.1, Sets and Subsets

1. Washington, West Virginia, Wisconsin, Wyoming.
3. This is not a well-defined set.
5. All students with blue eyes. All students who are male. All students who own a dog.
7. $\{1,3,5,7,9,11,13,15,17,19\}$.
9. [a] False, [c] True.
11. $\{x \mid$ you add the two adjacent elements to get the next element between 0 and 100$\}$
13. 6.
15. [a] $\subseteq$, [c] $=$, [e] $=$.
17. Yes, the empty set is always a subset of any set.
19. [b] and [c] are well-defined sets.
21. $B = \{6, 8, 10, 12\}$.
23. [a] True, [c] False.
25. $W = \{1, 2, 3, 4\}$.
27. There are 29 different coin combinations.
29. 4 possible subsets: {}, {a}, {b}, {a, b}.
31. There are 16 possible subsets.
33. $\{1,2,3,4,5,6,8,9,10,12,15,16,18,20,24,25,30,36\}$.
35. $\{0,1,2,3,4,5,6\}$.
37. 60 wolves are on the island.
39. {(Y, Y, Y, N), (Y, Y, N, Y), (Y, N, Y, Y), (N, Y, Y, Y), (Y, Y, Y, Y)}.

Chapter 2.2, Set Operations

1. $A \cup B = \{a,b,c,e,g,r,t,w\}$, $A \cap B = \{b,e,t\}$.
3. $C = \{$Jose, Beverly, Tom, Phil, Sue$\}$.
5. {}, The empty set.
7. $M - N = \{$Mike, Jody$\}$.
9. $P - Q = \{3,7\}$, $Q - P = \{9\}$.
11. [a] $(H \cup K)' = \{c,d,e,o\}$, [b] $H' \cap K' = \{c,d,e,o\}$,
    [c] $(H \cap K)' = \{b,c,d,e,o,u\}$, [d] $H' \cup K' = \{b,c,d,e,o,u\}$.
13. [a] True, [b] True, [c] False.
15. {Nick, Linda, Mike, Jody}.
17. [a] $(A')' = \{1,2,3,4\} = A$, [b] $(A \cap B) \cup (B \cap C) = \{3,4,5,6\} = B$, [c] $A \cup B \cap C = \{5,6\}$.
19. $W = \{(1, 1), (2, 2), (3, 3), (4, 4), (5, 5), (6, 6)\}$.
21. [a] $\{c,e,f\}$, [b] $\{e\}$, [c] $\{(a,a),(a,f),(e,a),(e,f)\}$.
23. $S = \{(H, H), (H, T), (T, H), (T, T)\}$.
25. $A = \{1, 3, 5, 7, 9\}$, $B = \{2, 3, 5, 7\}$, $C = \{6, 7, 8, 9\}$.
27. 17.
29. $S = \{HHH, HHT, HTH, THH, HTT, THT, TTH, TTT\}$.

Chapter 2.3, Venn Diagrams

1. $\{x,y,z\}$.
3. $(A \cup B)'$ or $A' \cap B'$.
5. $\{w\}$.
7. 2.
9. No.
11. The region shaded is outside both subsets.
13. You cannot find the complement to any set without knowing the elements in the universal set.
15. 19.
17. 50.
19. $(12 + 18) - 25 = 5$.
21. $72 - (37 + 32 - 9) = 12$.
23. 20.
25. $45 = n(A) + 2 \cdot n(A) + 3 \cdot (2 \cdot n(A))$, $n(A) = 5$.
27. 15.
29. [a] 34, [b] 15, [c] 24.
31. 12.
33. $4 \cdot 5 \cdot 3 = 60$.

35. 50.

Chapter 2.4, Chapter Review

Mastery Quiz

1. [a, c, d], 2. [b, c, d], 3. [b], 4. [d], 5. [d], 6. [d], 7. [c], 8. [d], 9. [a], 10. [a]

Review

1. {(c, a), (c, e), (c, u), (u, a), (u, e), (u, u)}.
3. [a] {4, 6}, [c] {(2, 4), (2, 5), (2, 6), (3, 4), (3, 5), (3, 6), (5, 4), (5, 5), (5, 6), (7, 4), (7, 5), (7, 6)}, [e] {3, 5, 7}.
5. 2^k, where k is the cardinality.
7. 48.
9. {1,2}.
11. $39 + 43 - 27 = 55$.
13. 19.
15. The element (a,a) is the only one.
17. 22.
19. [a] 40, [b] 10.
21. A = {3, 4, 5, 8, 9, 11}, B = {2, 5, 6, 8, 10}, C = {3, 6, 7, 8, 11}.