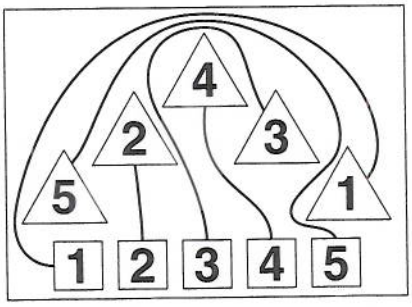
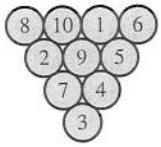
green socks. Since the other two boxes were mislabeled, switch the remaining label to the other box and place the label that says *red and green socks* on the unlabeled box. No other choice guarantees a correct relabeling because you can remove only one sock. **16.** Because you are the bus driver, the answer is *your* age.

17. One example of a solution follows:

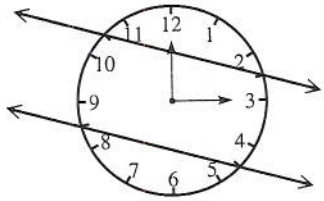


18. You must place the O in the bottom-left square. No other choice guarantees you a win.

21. Here is one solution.



22. Each region has a sum of 26.



27. One possible sequence is shown here. The numbers represent the number of gallons in each bucket in each successive step.

Big	7	4	4	1	1	0	7	5	5
Small	0	3	0	3	0	1	1	3	0

34. It will be darkest at 1:11 and brightest at 10:08. See the diagram.

35. A kilogram of $10 gold pieces is worth twice as much as half a kilogram of $20 gold pieces. (The denomination has nothing to do with the answer!) **48.** It is a *palindrome* because it reads the same backward and forward. **50.** B because either Bill or Bob must be the tallest person.

54.

6	**1**	8
7	5	**3**
2	**9**	4

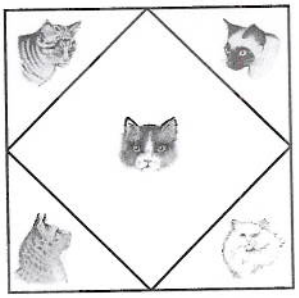
55.

6	12	7	9
1	15	4	14
11	**5**	10	**8**
16	2	13	**3**

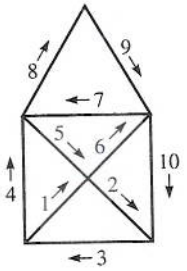
57. 25 pitches (The visiting team's pitcher retires 24 consecutive batters through the first eight innings, using only one pitch per batter. His team does not score either. Going into the bottom of the ninth tied 0–0, the first batter for the home team hits his first pitch for a home run. The pitcher threw 25 pitches and loses the game by a score of 1–0.)

58. For three weighings, first balance four against four. Of the lighter four, balance two against the other two. Finally, of the lighter two, balance them one against the other. To find the bad coin in two weighings, divide the eight coins into groups of 3, 3, 2. Weigh the groups of three against each other on the scale. If the groups weigh the same, the fake is in the two left out and can be found in one additional weighing. If the two groups of three do not weigh the same, pick the lighter group. Choose any two of the coins and weigh them. If one of these is lighter, it is the fake; if they weigh the same, then the third coin is the fake.

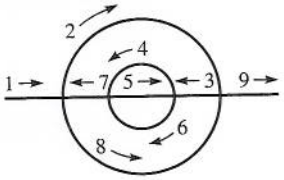
60.



61. Here is one solution.



62. Here is one solution.



73. 6

	X	X
X		X
X	X	

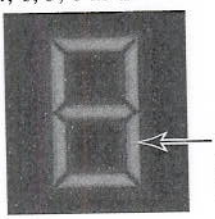
possibilities
One of several

74. One solution is $1 + 2 + 3 + 4 + 5 + 6 + 7 + (8 \times 9) = 100$.

1.4 Exercises (pages 38–41)

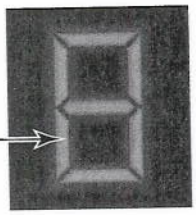
36. A cycle will form that has its sixth number equal to the first number chosen. For example, choosing 5 and 6 gives 5, 6, 1.4, .4, 1, 5, 6 as the first seven terms.

42. (a)



This part is used most frequently, 9 times.

(b)



This part is used least, 4 times.

Chapter 1 Test (pages 48–49)

4. $65{,}359{,}477{,}124{,}183 \times 68 = 4{,}444{,}444{,}444{,}444{,}444$ **8.** 1, 8, 21, 40, 65, 96, 133, 176; The pattern is 1, 0, 1, 0, 1, 0, 1, 0, ... **9.** The first two terms are both 1. Each term after the second is found by adding the two previous terms.

CHAPTER 2 The Basic Concepts of Set Theory

2.1 Exercises (pages 56–58)

24. {William Clinton, George H.W. Bush, Ronald Reagan, Jimmy Carter, Gerald Ford, Richard Nixon} **92.** This is impossible. If they are equal, they have the same number of elements and must be equivalent.

2.2 Exercises (pages 63–65)

55. {Higher cost, Lower cost, Educational, More time to see the sights, Less time to see the sights, Cannot visit relatives along the way, Can visit relatives along the way} **56.** {Lower cost, Less time to see the sights, Can visit relatives along the way} **57.** {Higher cost, More time to see the sights, Cannot visit relatives along the way} **62.** {A, B, C, D}, {A, B, C, E}, {A, B, D, E}, {A, C, D, E}, {B, C, D, E} **63.** {A, B, C}, {A, B, D}, {A, B, E}, {A, C, D}, {A, C, E}, {A, D, E}, {B, C, D}, {B, C, E}, {B, D, E}, {C, D, E} **64.** {A, B}, {A, C}, {A, D}, {A, E}, {B, C}, {B, D}, {B, E}, {C, D}, {C, E}, {D, E} **68.** They are the same: $32 = 2^5$. The number of ways that people from a group of five can gather is the same as the number of subsets there are of a set of five elements. **71.** (d) Adding one more element will always double the number of subsets, so the expression 2^n is true in general.