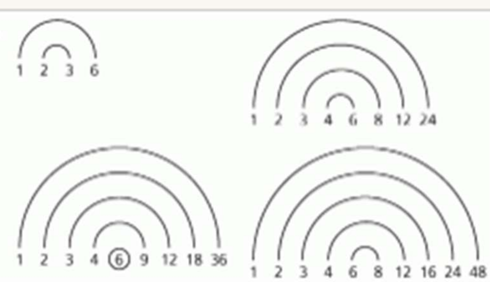
Chapter 1: Sections 1.4, 1.5, and 1.6 Answer Key

Section 1.4

1. The prime factorization of a composite number is the number written as a product of its prime factors.
2. First, find a factor pair and draw "branches." Next, circle the prime factors as you find them. Then, find factors until each branch ends at a prime factor.
3. 6, 9 does not belong because it is a factor pair of 54 and the others are factor pairs of 56.
4. 2, 3, 6, 9
5. 3, 5, 9
6. 2, 3, 5, 6, 9, 10
7. None, 1709 is a prime number.
8. 1, 15; 3, 5
9. 1, 22; 2, 11
10. 1, 34; 2, 17
11. 1, 39; 3, 13
12. 1, 45; 3, 15; 5, 9
13. 1, 54; 2, 27; 3, 18; 6, 9
14. 1, 59
15. 1, 61
16. $2 \cdot 2 \cdot 2 \cdot 2$ or 2^4
17. $5 \cdot 5$ or 5^2
18. $2 \cdot 3 \cdot 5$
19. $2 \cdot 13$
20. $2 \cdot 2 \cdot 3 \cdot 7$ or $2^2 \cdot 3 \cdot 7$
21. $2 \cdot 3 \cdot 3 \cdot 3$ or $2 \cdot 3^3$
22. $5 \cdot 13$
23. $7 \cdot 11$
24. 9 is not prime, it is equal to $3 \cdot 3$.
    $72 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 = 2^3 \cdot 3^2$
25.



26. 180

27. 1575

28. 12,584

29. 4

30. 25

31. 36

32. 1

33. yes; 2 is a prime number because it only has 1 and itself as factors. The rest of the even whole numbers have 2 as a factor.

34. composite; The total number of players on the baseball team is equal to the number in each group times the number of groups, so it must be composite.

35. See *Taking Math Deeper.*

36. 6

37. cupcake table; Because 60 has more factors than 75, there are more rectangular arrangements.

38. 26 yd

35.

$36 = 1 \bullet 36$	There can't be 1 group of 36 students.
$36 = 2 \bullet 18$	There can't be 2 groups of 18 students.
$36 = 3 \bullet 12$	There can't be 3 groups of 12 students.
$36 = 4 \bullet 9$	There can't be 4 groups of 9 students.
$36 = 6 \bullet 6$	There can be 6 groups of 6 students.
$36 = 9 \bullet 4$	There can be 9 groups of 4 students.

There are 2 possible group sizes: 6 groups of 6 students and 9 groups of 4 students.

36. 6

37. cupcake table; Because 60 has more factors than 75, there are more rectangular arrangements.

38. 26 yd

39. 6 prisms; There are 6 unique arrangements of length, width, and height using the factors of 40. (Note that $1 \times 1 \times 40$ names the same prism as $40 \times 1 \times 1$.); $1 \times 1 \times 40$, $1 \times 2 \times 20$, $1 \times 4 \times 10$, $1 \times 5 \times 8$, $2 \times 2 \times 10$, $2 \times 4 \times 5$

40. 145

41. 357

42. 2395

43. 1248

44. B

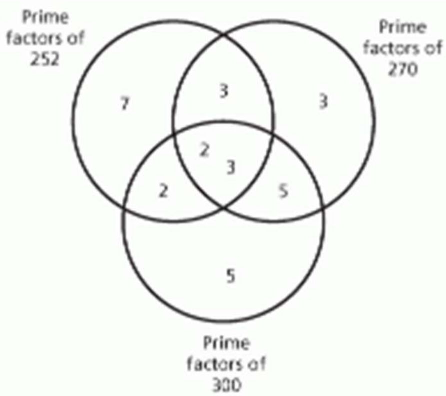
Section 1.5

1. The GCF is the greatest factor that is shared by the two numbers.
2. First, find the prime factorization of both numbers. Next, identify common prime factors. Then, find the product of the common prime factors.
3. What is the greatest prime factor of 24 and 32?; 2; 8
4. 6
5. 2
6. 12
7. 3
8. 14
9. 1
10. 13
11. 17
12. 1
13. 15
14. 9
15. 9
16. 12
17. 1
18. 1
19. 7 is the greatest common *prime* factor. The GCF is $2 \cdot 7 = 14$.
20. Not all of the common prime factors are included. The GCF is $2^2 \cdot 3 = 12$.
21. 23 packets
22. 8 arrangements
23. 7
24. 6
25. 14
26. *Sample answer:* 16, 32, and 48; Multiply 16 by 1, 2, and 3.
27. *Sample answer:* Prime factorization because it is tedious to find all the factors of large numbers.
28. sometimes
29. always

30. never

31. 12; 6 red, 5 pink, and 4 yellow

32. **a.**



b. 6

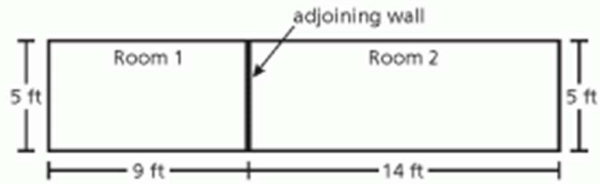
c. 18; 12; The GCF of two numbers is the product of the prime factors in the overlap of the circles representing the numbers in the Venn diagram.

33. **a.** Because 73 is a prime number and the GCF of the three numbers is 1.

b. 18; The GCF of 54 and 36 is 18. 18 divides evenly into 72 leaving one banana left over.

34. *Sample answer*: The answer (in feet) is the GCF of the number of tiles (area) in Room 1 and the number of tiles (area) in Room 2. The rooms have dimensions, length × width, where the units are 1 foot by 1 foot tiles. The greatest length of the adjoining wall is the GCF of the areas of the rooms.

In the example below, Room 1's area is $5 \bullet 9 = 45$ square feet (45 tiles) and Room 2's area is $5 \bullet 14 = 70$ square feet (70 tiles). The GCF of the numbers representing the two areas is 5. So, the greatest possible length of the adjoining wall is 5 feet.



35. Commutative Property of Addition

36. Associative Property of Addition

37. Commutative Property of Multiplication

38. Associative Property of Multiplication

39. B

Section 1.6

1. The LCM of two numbers is the least of the multiples shared by the two numbers.

2. First, find the prime factorization of both numbers. Next, circle each different factor where it appears the greatest number of times. Then, find the product of the circled factors.

3. 21

4. 24

5. 60

6. 18

7. 12

8. 72

9. 40

10. 60

11. 36

12. 63

13. 108

14. 90

15. 66

16. 180

17. 350

18. The product of two numbers is not necessarily the LCM. Use prime factorization to see that the LCM is $2 \cdot 3 \cdot 3 = 18$.

19. 15 days

20. 4 packs of hot dogs and 5 packs of buns

21. D; This model represents multiples of 4 and 6 which have an LCM of 12. The other models represent multiples of 3 and 8, 8 and 12, and 6 and 8, which have an LCM of 24.

22. 42

23. 165

24. 36

25. 120

26. 126

27. 1260

28. *Sample answer:* Prime factorization because it is tedious to list all of the multiples of two numbers that do not have any common factors.

29. always

30. sometimes

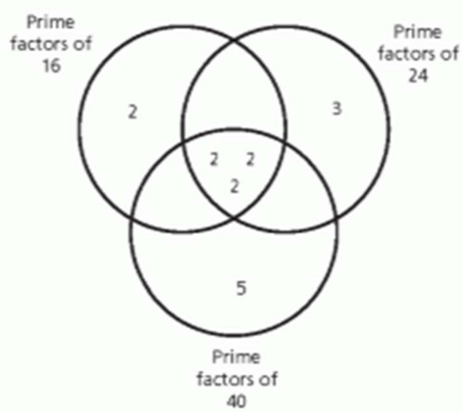
31. never

32. See *Taking Math Deeper.*

33. 300th caller

34. you: 7 mi; your friend: 6 mi

35. a.



b. The LCM of 16, 24, and 40 is $2 \bullet 2 \bullet 2 \bullet 2 \bullet 3 \bullet 5 = 240$.

c. The LCM of 16 and 40 is $2 \bullet 2 \bullet 2 \bullet 2 \bullet 5 = 80$.

The LCM of 24 and 40 is $2 \bullet 2 \bullet 2 \bullet 3 \bullet 5 = 120$.

36. The LCM of the two numbers is equal to their product when the two numbers have no common prime factors.

37. 3^2

38. 5^4

39. 17^5

40. B