Chapter 8 Exercises

Solve each problem.

1. The student government body consists of 16 females and 12 males. What is the greatest number of subgroups that can be made if each group must have the same number of males and females?

2. As part of a service project, Brooke, Madison, and Collin have collected school supplies (pens, pencils, glue, and notebooks) along with toothbrushes and toothpaste to send to school kids in Haiti. They collected the following.

   60 glue sticks 122 pencils 180 pens 90 notebooks
   70 toothbrushes 40 tubes of toothpaste

   a. If they want to make identical care packages using the supplies they collected, what is the maximum number of care packages they can make?

   b. How many of each item will be in each package?

3. What is the largest number that divides both 691 and 861 leaving a remainder of 11 each for each number.

4. The Food Mission is a local nonprofit organization that teaches high school students how to grow a sustainable garden. They donate all the food grown to local hunger organizations. The land they have must be divided into two pieces so that they can rotate through spring and summer crops. The first garden needs to cover 400 square feet, and the second garden needs to be 340 square feet. In order to stretch donated supplies, the shared boundary between the two gardens needs to be maximized.

   a. What is the maximum boundary the gardens can share?

   b. What will the dimensions of each garden be if the shared boundary is maximized?

5. Find the GCD of the numbers 1785 and 546. Are the numbers relatively prime?

Determine the missing digit for each 10-digit ISBN.

6. 0–337–25**?**16–9

7. 1–00–**?**82634–1

8. 0–07–7734**?**1–1

9. **?**–271–53981–1

Decide whether each barcode is valid. If it is not, state what the correct checksum number should be.

Each of the following bar codes consists of 12 digits. To find the checksum digit, the first 11 digits are multiplied by 3 and 1, alternatively. These multiples are summed with the last digit so that the result is 0 (mod 10).

10.

11.

12.

Find the missing digit for each credit card number.

13. 4485 4217 6305 8**?**81

14. 6011 5341 1874 008**?**

15. **?**465 9337 2511 334

Encode each number using the given public key.

16. Encode the number $K = 21$ using the public key $n = 77$ and $e = 13$.

17. Encode the number $T = 28{,}462$ using the public key $n = 5{,}298{,}463$ and $e = 99$.

Decode each number using the given private key.

18. Decode the number 5,031,323 using the private key $d = 105{,}019$ and $n = 5{,}298{,}463$.

19. Decode the number 51,189,234 using the private key $d = 27{,}743$ and $n = 152{,}472{,}479$.