

8.1 Exercises

✓ CONCEPT CHECK

1. If a number is divisible by 2 and 3, then it is also divisible by ____.
2. If a number is even, then it is divisible by ____.
3. True or False: 1 is a prime number.
4. True or False: A composite number is a positive integer with two or more divisors.

💡 PRACTICE

Determine whether each of the numbers is prime or composite.

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| 5. 245 | 6. 939 |
| 7. 149 | 8. 4372 |
| 9. 68,045,800 | 10. 113 |
| 11. 51 | 12. 79 |
| 13. 91 | 14. 147 |

Determine the prime factorization of each number.

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| 15. 16 | 16. 124 |
| 17. 162 | 18. 630 |
| 19. 625 | 20. 72 |
| 21. 105 | 22. 81 |

Use a factor tree to determine the greatest common divisor of each pair of numbers.

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| 23. 35 and 14 | 24. 28 and 42 |
| 25. 90 and 225 | 26. 350 and 217 |
| 27. 36 and 72 | 28. 36 and 54 |
| 29. 175 and 245 | 30. 360 and 216 |

Use Euclid's Algorithm to find the greatest common divisor of each pair of numbers.

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| 31. 357 and 217 | 32. 350 and 140 |
| 33. 1235 and 5687 | 34. 1556 and 236 |
| 35. 2216 and 1008 | 36. 288 and 672 |
| 37. 894 and 204 | 38. 225 and 121 |

Use Euclid's Algorithm to determine whether each pair of numbers is relatively prime.

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| 39. 67 and 17 | 40. 1231 and 5673 |
| 41. 351 and 141 | 42. 289 and 169 |
| 43. 39 and 51 | 44. 133 and 153 |
| 45. 428 and 1284 | 46. 1084 and 1444 |

APPLICATIONS

47. There are 16 cellists, 32 violinists, 24 flautists, and 16 violists at a summer classical music camp.
- What is the largest number of identical groups that can be made from all of the musicians?
 - How many violinists will be in each group?
 - How many campers will be left without a group?
48. Berrylin was asked to make flower arrangements for the tables at a sports banquet. She was given 36 tulips, 27 daisies, and 18 carnations.
- What is the largest number of identical arrangements that Berrylin can make from all of the flowers?
 - How many of each flower will be put into each arrangement?
49. Phillip's Bakery gives away any remaining items at the end of the day to local hunger organizations. Today they had 39 loaves of bread and 86 cookies left. Bill is allowed to take some of the food home himself because he volunteers to box the goods each day. If he plans to take 3 loaves of bread and 10 cookies home, how many boxes will Bill fill given that each box must contain the same number of loaves of bread and cookies?

50. The library received 117 used books for their summer used book drive this year. There were 45 hardbacks and 72 paperbacks. The library delivers the books in bundles to local shelters.
- How many bundles can the library make if each bundle must have the same number of hardback and paperback books?
 - How many paperback books will be in each bundle?
51. Two girl scout troops are planting gardens side-by-side on donated land. Based on the number of girls, Troop A is planning a garden that will cover 180 square feet, and Troop B's garden will be 204 square feet. The gardens must have a fence completely surrounding each one. The fencing is only sold in whole foot sections. In order to save money, the troops decide to maximize the shared amount of fence between the gardens.
- What is the greatest amount of fence the troops can share?
 - What will the dimensions of each garden be if the shared fencing is maximized?

 **WRITING & THINKING**

52. Which possible divisors must be checked to see if 283 is prime?
53. Which possible divisors must be checked to see if 1291 is prime?
54. Suppose you are choosing the size of an elementary school class. It must be between 15 and 20 students. Knowing that teachers regularly break the class into smaller groups for projects and activities, answer the following questions.
- List the advantages and disadvantages for each of the possible class sizes between 15 and 20.
 - Which size would you say is best?

8.1 PROJECT**PRIME FACTORIZATION AND THE NUMBER OF FACTORS**

In Section 8.1, you learned about prime and composite numbers. In this project, you will explore a way to determine the number of factors a number has by using its prime factorization.

- Find the prime factorization of 18. How many times does each prime factor appear in the prime factorization? Find all possible factors of 18. How many total factors are there?
- Find the prime factorization of 100, and then find all factors of 100. How many times does each prime factor appear in the prime factorization? How many total factors are there?