3 Develop the Concept

Problem Solving

Exercise	Content
21	Prime Factorization; Composite Numbers (2 × 3 × 5)
22	Multiple Step ((6 + 2) × 2 × 4)
23	Prime Factorization
24	Prime Factorization (75 ÷ 25)
25	Estimating Products (400 × 8)
26	Prime Factorization
27	Estimation; Compatible Numbers
28	Prime Numbers

Students use underlying processes and mathematical tools for Exercises 21–28. Remind students to check for reasonableness when solving each problem.

Exercise 21

Problem-Solving Strategy: Use Logical Reasoning ***What could you multiply first to get one number?*** [2 × 3 × 5 = 30] ***If the other number is double the first number, what would you have to do?*** [Multiply by 2.]

Exercise 22

Test-Taking Tip: Gather Information Remind students to gather the information they need from the text. ***If Jay walks 6 blocks and then 2 more, what operation do you need to perform?*** [Addition] ***If Jay does the trip there and back, what do you need to calculate the two-way total?*** [Multiply the total by 2.] ***What operation do you need to find the 4-week total?*** [Multiply by 4.]

Problem Solving

21. Two composite numbers have 2, 3, and 5 in their prime factorizations. One of the numbers is twice as large as the other. What could the two composite numbers be?
See margin.

22. **Think About the Process** Every Sunday Jay walks 6 blocks one way to his grandmother's house for lunch. After lunch, he walks 2 blocks farther to the park. He then walks home on the same exact route. Which shows how to find the number of blocks Jay walks in 4 weeks?

A (6 + 2) × (4 + 6) **C** 6 × 2 × 2
B 6 × (2 × 4) **D** (6 + 2) × 2 × 4

23. Which numbers between 40 and 49 have both 2 and 3 in their prime factorizations?
42, 48

24. The prime factorization of 25 is 5 × 5. Using mental math, what is the prime factorization of 75?
3 × 5 × 5

25. **Reasonableness** Shirley multiplied 379 × 8 and got 3,032. Use estimation to check the reasonableness of her answer.
See margin.

26. Roadrunners live year-round throughout the southwestern part of the U.S., and can get to a top speed of 15 miles per hour. What is the prime factorization of 15?

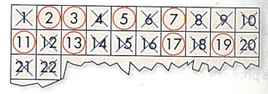
A 3 × 15 **C** 1 × 2 × 3 × 5
B 2 × 3 × 5 **D** 3 × 5

27. Which pair of compatible numbers would be best to estimate the sum of 249 and 752?

A 200 and 700 **C** 300 and 800
B 250 and 750 **D** 400 and 700

28. Eratosthenes was born in Cyrene (now Libya) about 230 B.C. He developed a method for deciding if a number is prime. It is called the Sieve of Eratosthenes because it "strains out" prime numbers from other numbers. Use a hundred chart to find all the prime numbers between 1 and 100.

a Cross out 1. It is neither prime nor composite.
b Circle 2, the least prime number. Cross out every second number after 2.
c Circle 3, the next prime number. Cross out every third number after 3 (even if it has already been crossed out.)
d Circle 5, and repeat the process.
e Circle 7, and repeat the process.
f Circle all the remaining numbers that have not been crossed out. The numbers that are circled are the prime numbers less than 100. There should be 25.
2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97



21. Sample answer: 30 and 60.
25. Sample answer: 400 × 8 = 3,200, so 3,032 is a reasonable answer.