



SKILL 3: Prime Factorization

If a number is prime, then the only way it can be factored is “1 times itself.” If a number is composite, it can be expressed as a product of prime factors. This is called its **prime factorization**.

Example 1

Find the prime factorization of 6.

The prime factorization of 6 is 2×3 , because 2 and 3 are prime and $2 \times 3 = 6$.

Example 2

Find the prime factorization of 50.

You can use *factor trees* to find prime factors of 50.

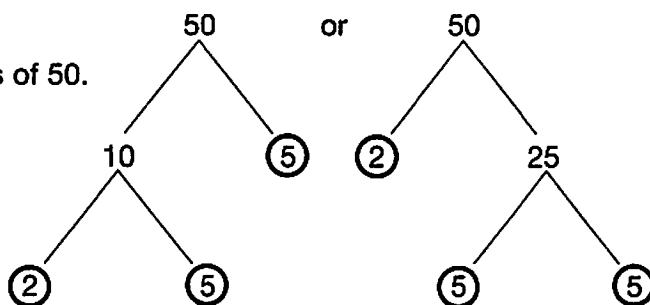
Write 50 as the product of two factors.

Is each factor prime or composite?

Circle each prime factor.

Write each composite factor as the product of two factors.

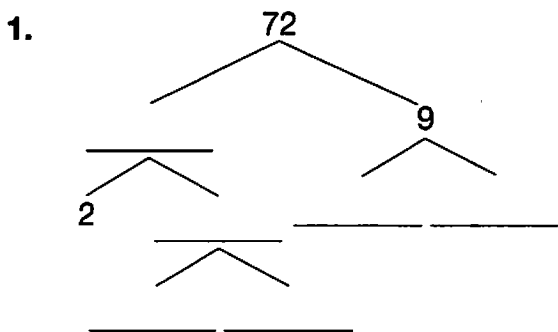
Continue until all the numbers are prime.



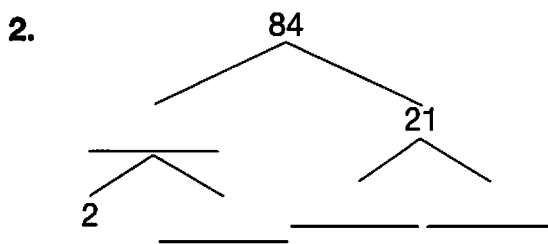
Both factor trees show that $2 \times 5 \times 5$ is the prime factorization of 50.

Guided Practice

Find the prime factorization of each number by writing the appropriate numbers in each blank.



Prime factorization of 72: _____



Prime factorization of 84: _____

3. Is $2 \times 6 \times 5$ the prime factorization of 60? _____

4. Write the prime factorization of 60. _____

5. Is 7×12 the prime factorization of 84? _____

SKILL 3: Practice

Find the prime factorization.

- | | | |
|------------------|--------------------|------------------|
| 1. 12
_____ | 2. 40
_____ | 3. 64
_____ |
| 4. 36
_____ | 5. 60
_____ | 6. 65
_____ |
| 7. 20
_____ | 8. 30
_____ | 9. 56
_____ |
| 10. 21
_____ | 11. 18
_____ | 12. 16
_____ |
| 13. 630
_____ | 14. 1,001
_____ | 15. 625
_____ |
| 16. 400
_____ | 17. 2,000
_____ | 18. 560
_____ |

19. The prime factorization of a number is
 $2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5$.
 What is the number? _____

20. What number is in the prime factorization of all even numbers? _____

21. Could $2 \times 4 \times 5 \times 9 \times 11$ be the prime factorization of a number? Explain.



22. Which is the prime factorization of 48?

Skill 3

- A $2 \times 2 \times 2 \times 2 \times 3$
- B $2 \times 2 \times 2 \times 6$
- C 4×12
- D 3×16

23. Which number is not composite?

Skill 2

- F 62
- G 77
- H 95
- J 53