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VIRGINIA
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MATHEMATICS

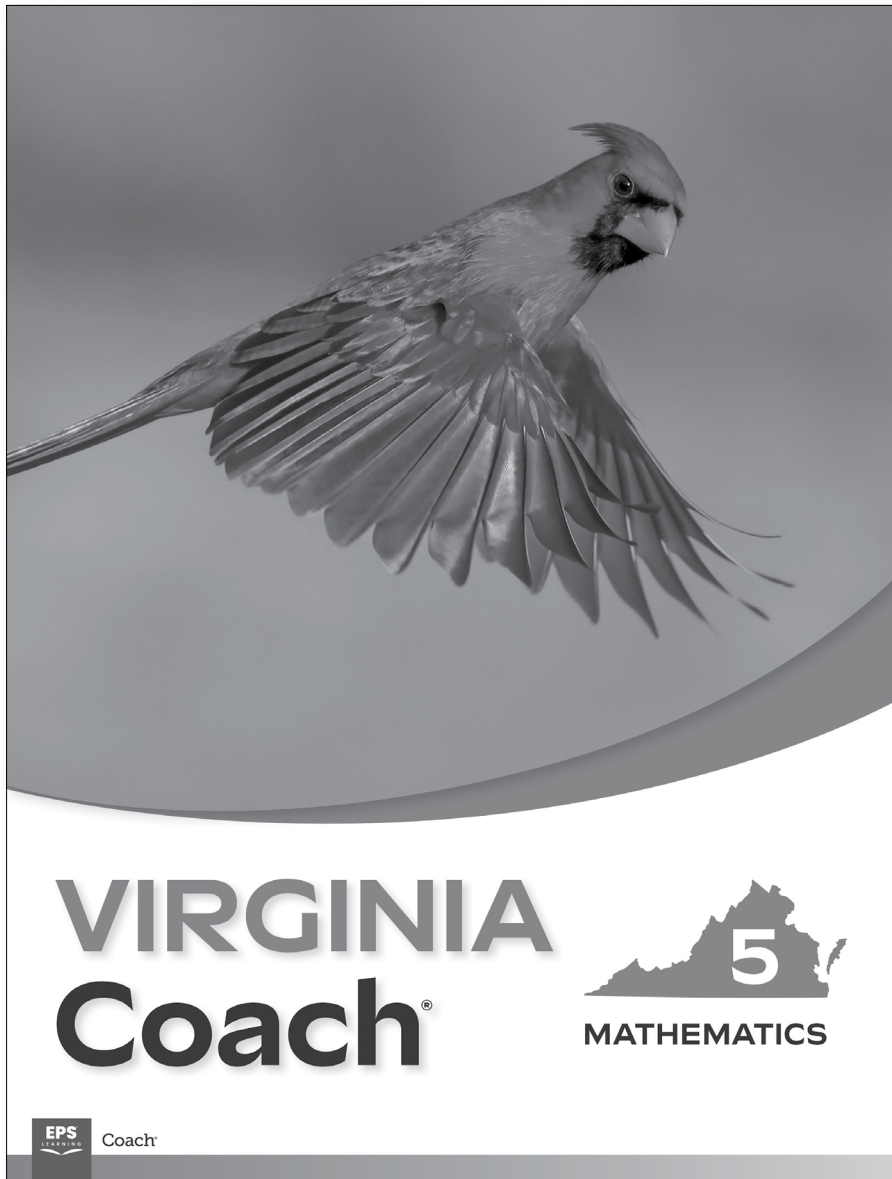


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GRADE 5

LESSON 4 SAMPLE

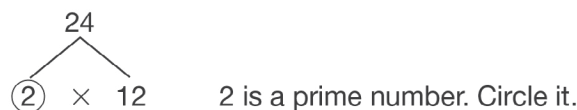
Prime Factorization

Getting the Idea

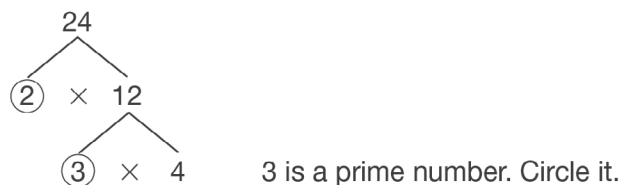
You can write a composite number as a product of prime factors. This is called **prime factorization**. You can use a **factor tree** to find the prime factorization of a composite number.

Use a factor tree to find the prime factorization of 24.

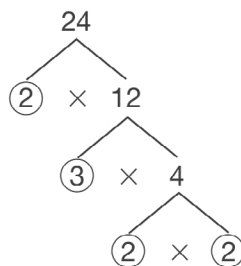
Write a factor pair of 24, such as 2 and 12. 2 and 12 are a factor pair of 24 because $2 \times 12 = 24$.



Write a factor pair of 12, such as 3 and 4.



Write 4 as a product of two prime numbers.



Write all the circled prime numbers in order from least to greatest.

$$24 = 2 \times 2 \times 2 \times 3$$

The prime factorization of 24 is $2 \times 2 \times 2 \times 3$.

Example 1

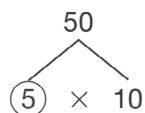
Find the prime factorization of 50.

Strategy Find a factor pair of 50. Then make a factor tree.

Step 1 Write a factor pair of 50.

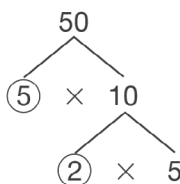
A factor pair of 50 is 5×10 because $5 \times 10 = 50$.

Step 2 Make a factor tree with 50 at the top. Fill in the first factor pair and circle the prime number.



5 is a prime number, so it is circled.

Step 3 Write 10 as a product of two prime numbers.



2 and 5 are a factor pair of 10. They are both prime numbers.

Step 4 Write the prime numbers shown in the factor tree in order from least to greatest.

$$50 = 2 \times 5 \times 5$$

Solution The prime factorization of 50 is $2 \times 5 \times 5$.

Example 2

Find the prime factorization of 72.

Strategy Find a factor pair of 72. Then make a factor tree.

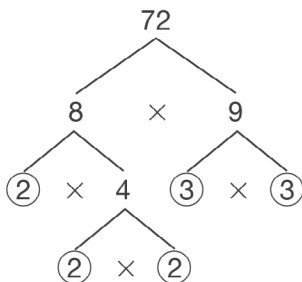
Step 1 Write a factor pair of 72.

A factor pair of 72 is 8×9 .

Step 2

Make a factor tree with 72 at the top.

Create factor pairs for the composite numbers until all prime factors are circled.

**Step 3**

Write the prime numbers shown in the factor tree in order from least to greatest.

$$72 = 2 \times 2 \times 2 \times 3 \times 3$$

Solution The prime factorization of 72 is $2 \times 2 \times 2 \times 3 \times 3$.

Coached Example

Complete the factor tree to find the prime factorization of 48.

The first factor pair shown on the factor tree is $3 \times \square = 48$

$$3 \times \underline{\quad} = 48$$

Circle the prime factor, 3.

The next factor pair is $2 \times \underline{\quad} = \underline{\quad}$.

Circle the prime factor, 2.

The next factor pair is $2 \times \underline{\quad} = \underline{\quad}$.

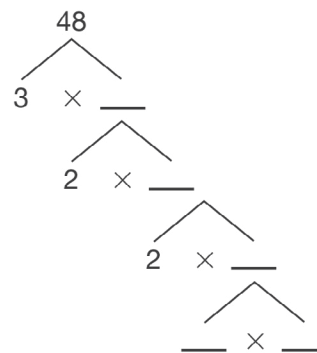
Circle the prime factor, 2.

The final factor pair is $\underline{\quad} \times \underline{\quad} = \underline{\quad}$.

Circle the prime factors.

Order the prime factors from least to greatest: $\underline{\hspace{2cm}}$.

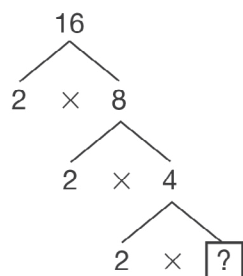
The prime factorization of 48 is $\underline{\hspace{2cm}}$.



Lesson Practice

Choose the correct answer.

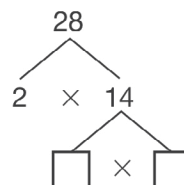
1. Virginia drew this factor tree for 16.



Which missing number belongs in the bottom row?

- A. 2 C. 8
 B. 4 D. 16
2. Which shows the prime factorization of 15?
- A. 1×15
 B. $2 \times 3 \times 5$
 C. 2×5
 D. 3×5
3. Which prime factorization is **not** correct?
- A. $20 = 2 \times 2 \times 5$
 B. $32 = 2 \times 2 \times 2 \times 2 \times 2$
 C. $48 = 2 \times 2 \times 2 \times 3$
 D. $25 = 5 \times 5$

4. Natalie started a factor tree for 28.



Which numbers should Natalie write in the bottom row?

- A. 3, 4
 B. 2, 7
 C. 7, 7
 D. 1, 14
5. Which shows the prime factorization of 54?
- A. 2×3
 B. $2 \times 2 \times 3 \times 3$
 C. $2 \times 3 \times 3 \times 3$
 D. 6×9
6. Which prime factorization is correct?
- A. $42 = 3 \times 7$
 B. $68 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$
 C. $35 = 1 \times 35$
 D. $100 = 2 \times 2 \times 5 \times 5$

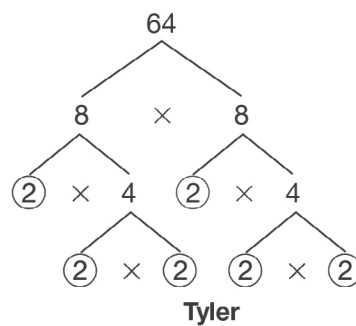
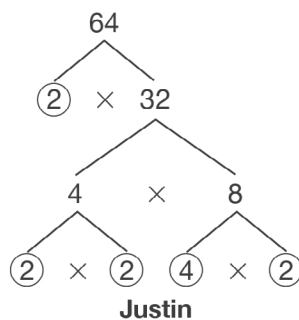
7. Which shows the prime factorization of 77?

- A. 7×11
- B. 1×77
- C. $11 + 7$
- D. $7 \times 7 \times 7$

8. Which shows the prime factorization of 80?

- A. $2 \times 2 \times 2 \times 5$
- B. $2 \times 2 \times 2 \times 2 \times 5$
- C. 8×10
- D. $2 \times 2 \times 2 \times 5 \times 5$

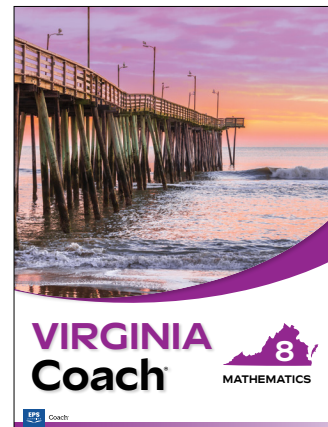
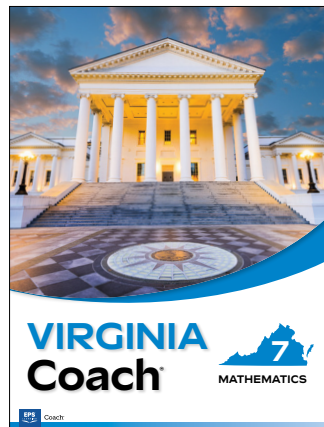
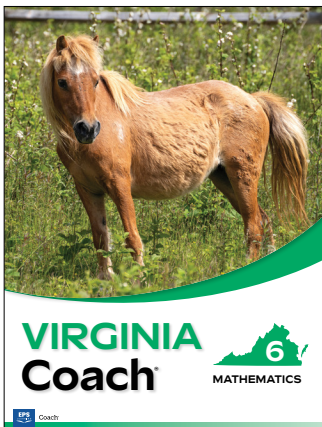
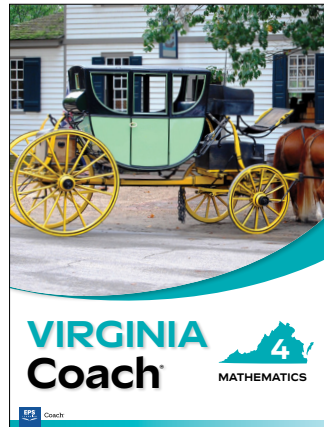
9. Justin and Tyler each made a factor tree for 64.



A. Whose factor tree is correct? Explain how the other factor tree can be corrected.

B. Write the prime factorization of 64.

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