Factor Trees

Essential Question How can you factor numbers using a factor tree?

UNLOCK the Problem · REAL WORLD

Mr. Shu gives this puzzle to his math students.

"Write 24 as a product of factors that are prime. Remember that a prime number must be greater than 1 and can have only 1 and itself as factors."
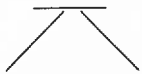
You can use a diagram called a **factor tree** to find the factors of a number.

- Give an example of a number greater than 1 that has only 1 and itself as factors.

  _____

Use a factor tree to find the prime number factors that have a product of 24.
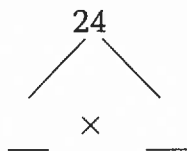
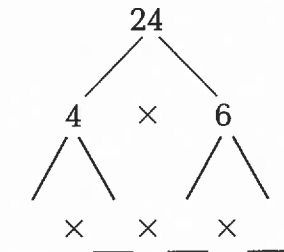| STEP 1	STEP 2	STEP 3	STEP 4
Write the number to be factored at the top of the factor tree.	Write it as a product of any two factors. Think: $4 \times 6 = 24$	Write each factor as the product of two factors. Think: $2 \times 2 = 4$ and $2 \times 3 = 6$	Continue until each factor is a prime number. Think: $2 \times 1 = 2$ and $3 \times 1 = 3$ Write the factors that are prime numbers from least to greatest.

STEP 2:
$$24$$
$$\_\_ \times \_\_$$

STEP 3:
$$24$$
$$4 \times 6$$
$$\_\_ \times \_\_ \ \_\_ \times \_\_$$

STEP 4:
$$\_\_ \times \_\_ \times \_\_ \times \_\_$$

So, 24 = _____ .

Try This! Make a different factor tree for 24.

- Is the product of factors the same as in the Example? **Explain.**

  _____

  _____

  _____

$$24$$
$$\times$$
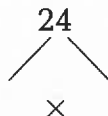
Math Talk **Explain** how you can use factored numbers to find common factors.

Share and Show

1. Use a factor tree to find the prime number factors that have a product of 210.

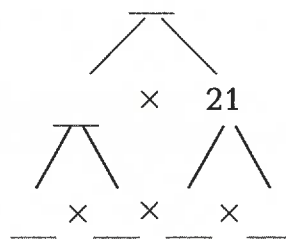   • Write 210 as a product of any two factors.

   _____ = _____ × 21

   • Write each factor as the product of factors.

   10 = _____ × _____   21 = _____ × _____

   Now each factor has only _____ and itself as factors.

   So, 210 = _____ × _____ × _____ × _____.

! **ERROR Alert**

Remember to continue to factor a number if it has factors other than 1 and itself.

Use a factor tree to find the prime number factors.

2. 8

3. 45

4. 350
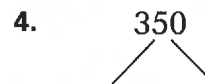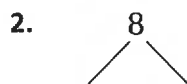
On Your Own

Use a factor tree to find the prime number factors.

5. 36

6. 72

7. 540

Problem Solving REAL WORLD

Mr. Shu gave these problems to his math students. Solve.

8. Write 500 as a product of prime number factors. Each factor must be greater than 1 and can have only 1 and itself as factors.

9. Find a number that has four identical even factors. Each factor must be greater than 1 and can have only 1 and itself as factors.