

Name _____

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.

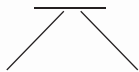
- Give an example of a number greater than 1 that has only 1 and itself as factors.



Use a factor tree to find the prime number factors that have a product of 24.

STEP 1

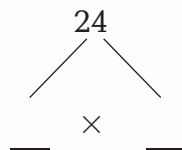
Write the number to be factored at the top of the factor tree.



STEP 2

Write it as a product of any two factors.

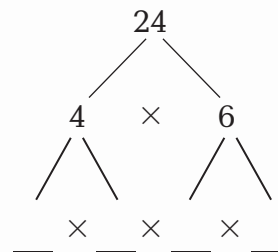
Think: $4 \times 6 = 24$



STEP 3

Write each factor as the product of two factors.

Think: $2 \times 2 = 4$
and $2 \times 3 = 6$



STEP 4

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.

___ \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.**



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.

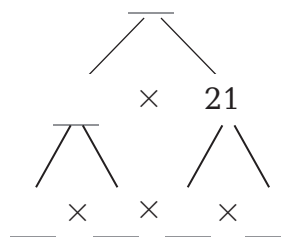
$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}} \times 21$$

- Write each factor as the product of factors.

$$10 = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} \qquad 21 = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}}$$

Now each factor has only and itself as factors.

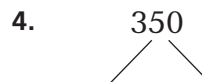
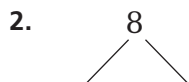
So, $210 = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} \times \underline{\hspace{2cm}} \times \underline{\hspace{2cm}}$.



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.



On Your Own

Use a factor tree to find the prime number factors.



Problem Solving



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.