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.

Possible answers: 2, 3, 5

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

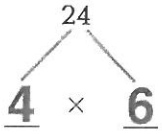
STEP 1

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

STEP 2

Write it as a product of any two factors.

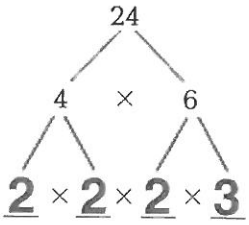
Think: $4 \times 6 = 24$



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.

$2 \times 2 \times 2 \times 3$

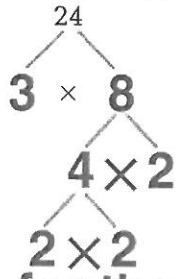
So, $24 = 2 \times 2 \times 2 \times 3$.

Try This! **Make a different factor tree for 24.**

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

See Planning Guide, pg. 81.

Check students' factor trees. Possible answer is given.

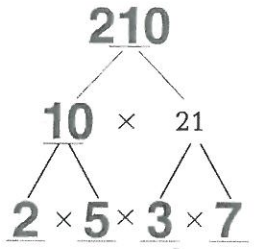


Math Talk **Explain** how you can use factored numbers to find common factors.

Possible explanation: You can see what factors are the same for the two numbers; these would be 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.

210 = 10 × 21

- Write each factor as the product of factors.

10 = 2 × 5 21 = 3 × 7

Now each factor has only 1 and itself as factors.

So, 210 = 2 × 3 × 5 × 7.

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.

Check students' factor trees.

2. 8

2 × 2 × 2

3. 45

3 × 3 × 5

4. 350

2 × 5 × 5 × 7

On Your Own

Use a factor tree to find the prime number factors.

Check students' factor trees.

5. 36

2 × 2 × 3 × 3

6. 72

2 × 2 × 2 × 3 × 3

7. 540

2 × 2 × 3 × 3 × 3 × 5

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.

2 × 2 × 5 × 5 × 5

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.

2 × 2 × 2 × 2 = 16