

Lesson: Exponents and Prime Factorization

Sixth Grade Objective: 1.05 Develop fluency in the use of factors, multiples, exponential notation, and prime factorization

Lesson: Exponents

Examine 4^3 .

The **4** is the **BASE** and the **3** is the **EXPONENT**.

We read 4^3 as “four to the third power” or “four cubed”.

Many students look at 4^3 as $4 \cdot 3 = 12$. This is incorrect.

The correct way to solve 4^3 is $4 \cdot 4 \cdot 4 = 84$.

The exponent tells you how many times to multiply the base.

Try these on your own!

- 1. 2^3
- 2. 6^2
- 3. 5^4

Check your answers

- 1. $2 \cdot 2 \cdot 2 = 8$
- 2. $6 \cdot 6 = 36$
- 3. $5 \cdot 5 \cdot 5 \cdot 5 = 625$

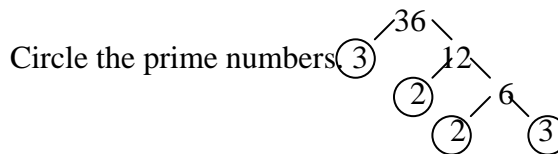
Lesson: Prime Factorization

Prime numbers are numbers that only have itself and one as a factor. Example the number 3 has only itself and one as a factor. The number 4 would not be a prime number because its factors are 1,2 and 4.

Examine the number 36.

Find the prime factorization of 36, which means find the prime numbers that when multiplied together, will equal 36.

- 1. Create a factor tree. Ask yourself what times what equals 36. One answer is $6 \cdot 6$ or you can use $3 \cdot 12$. It doesn't matter what you start with because you will end up with the same prime numbers.



- 2. Write the prime numbers as an expression simply by putting multiplication signs in between the prime numbers and that is it! $2 \cdot 2 \cdot 3 \cdot 3$ or $2^2 \cdot 3^2$

Quiz Yourself

Evaluate.

1. 3^5
2. Write 7^4 in word form.
3. 9^2
4. 10^3
5. Write $8 \cdot 8 \cdot 8 \cdot 8 \cdot 8$ as an exponential expression.

Find the prime factorization.

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Extra Practice! Click on the website to practice your factors!

<http://illuminations.nctm.org/ActivityDetail.aspx?ID=12>

Check Your Answers

1. $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 = 243$
2. Seven to the fourth power
3. $9 \cdot 9 = 81$
4. $10 \cdot 10 \cdot 10 = 1000$
5. 8^5

Find the prime factorization.

