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How are exponents used in real-world situations?

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HOW ARE EXPONENTS USED IN REAL-WORLD SITUATIONS?

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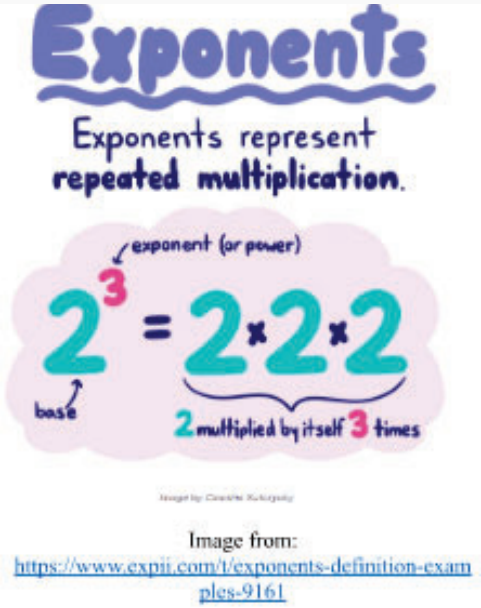

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Exponents are challenging to understand because they require examination of the relationship between symbols, meanings, and exponentiation's algorithmic properties. In this process, knowing how to do the calculations isn't enough to figure out the value of exponential expressions. You also need to understand the logic behind algorithms and the order of the number system. Students typically multiply the base by the exponent, for instance, while computing the numerical value of an exponential equation.

In contrast, exponentiation involves laws regarding base and power. This arrangement is problematic because the children grow confused and forget the rules. Students think of exponents as hard and abstract ideas that have nothing to do with real life (İymen & Duatepe-Paksu, 2015). The concept of an exponent is more than just a piece of knowledge that math students must know in order to pass a test. As you may have seen, exponents are used a lot in many different fields, such as science, math, and the financial industry.

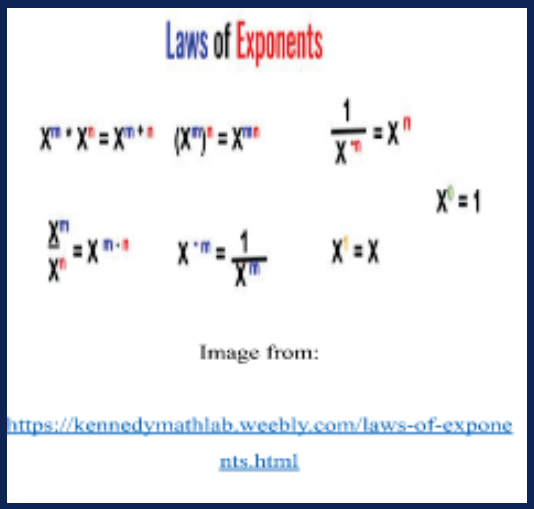

Image from: https://kennedymathlab.weebly.com/laws-of-exponents.html

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Scientific Scale

When a scale is used in science, like the pH scale or the Richter scale, you can be sure that there will be exponents. This is because the pH scale and the Richter scale are both logarithmic, which means that each whole number is ten times bigger than the one before it. Not only that, but exponents are also used a lot in chemistry to figure out the mass of protons, electrons, etc. For example, chemists know that a substance with a pH of 7 is equal to 107 and that a substance with a pH of 8 is equal to 108. This means that the pH-8 substance is 10 times more acidic than the pH-7 substance.

Taking Measurements

- Exponents are used to measure and calculate multidimensional values. Because area is a two-dimensional measure (length x width), it is commonly measured in square feet or meters. Volume is a three-dimensional measure of space (length x width x height); hence, it's measured in cubic units like cubic feet or cubic meters. If you wanted to calculate the greenhouse's volume in cubic feet, you'd use an exponent.
- Additional units are needed in biology and physics due to the limited distances involved. A micrometer is 1×10^{-6} of a meter. It is frequently used in biology to quantify microorganisms and the wavelengths of infrared radiation. It is also referred to as a micron and is represented by the symbol. There are also nanometers (1×10^{-9} of a meter), picometers (1×10^{-12} of a meter), femtometers (1×10^{-15} of a meter), and attometers (1×10^{-18} of a meter).

Earth Quake Intensity

For many years, the Richter scale was used to measure how strong an earthquake was. The most common way to measure the same thing right now is with the Moment Magnitude Scale, which is based on the same math. Add 3 to the exponent, x, to get the amplitude of the vibration in millimeters as ten raised to an exponent. If the amplitude is 100 mm, for example, write it as 10^2 mm.

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Finance: Compound Interest

Compounded interest is calculated using exponential functions. A fixed amount is added to the account balance whenever funds are invested. Interest is the amount that is applied to the principal balance. The amount will continue to accrue interest following the addition of interest throughout the future compounding period.

Computer

Computers also employ exponents. Computer memory has many significant digits. Exponents help characterize computer memory. Data entry, programming, calculation applications, and more employ exponents. Imagine coding without exponents. In computing, an exponent is defined as $1GB=10^9$ bytes.

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