The Algebra Tutor

Lesson #5
Exponents & Properties of Exponents

Learn about powers, exponential notation, comparison of numbers versus quantities to squares and cubes. Numbers with exponents of one and zero are also covered.

QUESTIONS FOR THOUGHT AND FURTHER STUDY
1. Why do we use exponents?
2. What is exponential notation?
3. Compare 3(X2) and 3X2.
4. Any non zero number (X) to the
zero power equals?
5. Why is it important to follow the
order of operation?

ANSWERS
1. It is a shorter and condensed way of writing products.
2. A term for a power using exponents.
3 Following the order of operations, the X2 IN 3(X2) is performed first and in 3X2, 3 times X is performed first and then that number is squared.
4. 1
5. The solution to the problem will not be correct if the problem is not solved with the proper order of operations.

STUDENT VOCABULARY
Exponent: A number that indicates the operation of repeated multiplication.

Power: The number that represents the operation of repeated multiplication.
Example: The third power of 4 equals 43 equals 4 times 4 times 4.

Exponential Notation: An expression of a power using exponents.

Expression: A term used for a mathematical symboI.

Order of Operations: The proper sequence used to solve expressions.
Example: In the equation 2(X+3) the first operation is to perform the X+3 then multipIy by 2.

Positive Exponents: Exponents with values greater than 0.

Negative Exponents: Exponents with values less than 0.

PRACTICE PROBLEMS

I. 5 times 5 in exponential notation.

2. Write A times A times A times A in exponential notation.

3. Evaluate 8 to the third power or 8 cubed.

4. Evalute 1.2 to the second power, or 1.2 squared.

5. Evaluate X to the fifth power, when X equals 3.

6. Evalute 4 times X squared and 4X quantity squared, when X equals 3.

7. Evaluate A equal pi times R squared when R equals 4. Use 3.14 for pi.

8. Evaluate 3A quantity cubed when A equals negative 3.

9. Evaluate negative 5 to the first power and to the zero power.

10. Evaluate 0 to the first power and to the zero power.

11. Express 5 to the negative 2 power with positive exponents and then simplify.

12. Express 3 times X to the negative 4 power with positive exponents.

13. Express 1 over 2Y quantity to the negative 3 power with positive exponents.

14. Express T to the seventh power with negative exponents.

ANSWERS:

1. 52
2. A4
3. 512
4. 1.44
5. 243
6. 36, 144 Expressions not equal
7. 50.24
8. -729
9. -5, 1
10. 0 Undefined
11. 1/25
12. 3/X4
13. 2Y3

14. 1/T-7

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The Addition & Multiplication Property of Equality

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Volume 5
Exponents & Properties of Exponents