

DEFINITION OF A NATURAL NUMBER EXPONENT

If b is a real number and n is a natural number,

_____ is read "the _____ of _____" or "_____ to the _____ power. The expression _____ is called an _____."

Example 1: Evaluate.

1. $(-5)^3$

2. $(-12)^2$

ORDER OF OPERATIONS

1. Perform all _____ within _____ symbols
2. Evaluate all _____ expressions.
3. Do all _____ and _____ in the order in which they occur, working from _____ to _____.
4. Finally, do all _____ and _____ using one of the following procedures:
 - π Work from _____ to _____ and do additions and subtractions in the _____ in which they occur.

or
 π Rewrite subtractions as _____ of _____.

Combine _____ and _____ numbers
separately, and then _____ these results.

Example 2: Simplify.

1. $40 \div 4 \cdot 2$

3. $(3 \cdot 5)^2 - 3 \cdot 5^2$

2.
$$\frac{-5(7-2) - 3(4-7)}{-13 - (-5)}$$

4.
$$\left[-\frac{4}{7} - \left(-\frac{2}{5} \right) \right] \left[-\frac{3}{8} + \left(-\frac{1}{9} \right) \right]$$

Example 3: Simplify each algebraic expression.

1. $-6x^2 + 18x^2$

2. $4(7x^3 - 5) - [2(8x^3 - 1) + 1]$

3. $6 - 5[8 - (2y - 4)]$

APPLICATIONS

In Palo Alto, CA, a government agency ordered computer-related companies to contribute to a pool of money to clean up underground water supplies. (The companies had stored toxic chemicals in leaking underground containers). The mathematical model $C = \frac{200x}{100-x}$ describes the cost, C , in tens of thousands of dollars, for removing x percent of the contaminants.

1. Find the cost, in tens of thousands of dollars, for removing 50% of the contaminants.
2. Find the cost, in tens of thousands of dollars, for removing 60% of the contaminants.
3. Describe what is happening to the cost of the cleanup as the percentage of contaminant removed increases.