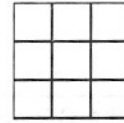


Part 4 Exponents, Roots, Algebra, and Geometry

Unit 25 Exponents and Roots

1. Square is the term used to describe multiplying a number by itself.

A. Examples: $1 \times 1 = 1$ $2 \times 2 = 4$ $3 \times 3 = 9$



B. The symbol for square is 2 .

$$1^2 = 1 \times 1 = 1$$

$$2^2 = 2 \times 2 = 4$$

$$3^2 = 3 \times 3 = 9$$

C. The square of a number less than one is smaller than the original number.

$$\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$$

$$\frac{1}{10} \times \frac{1}{10} = \frac{1}{100}$$

$$.1 \times .1 = .01$$

2. The square root of a given number is that number which, if multiplied by itself, results in the given number.

A. The symbol for square root is $\sqrt{\quad}$.

B. Examples:

$$\sqrt{1} = 1$$

$$\sqrt{4} = 2$$

$$\sqrt{9} = 3$$

C. The square root of a number less than one is larger than the original number.

$$\sqrt{.64} = .8$$

$$\sqrt{.04} = .2$$

$$\sqrt{\frac{1}{4}} = \frac{1}{2}$$

3. Exponents

A. An exponent describes how many times a number (the base) is multiplied by itself. The answer is called the power. 2 raised to the third power is 8.

$$2^3 = (2)(2)(2) = 8$$

Labels: Base (under 2), Exponent (above 3), Power (under 8)

B. Examples:

$$4^3 = (4)(4)(4) = 64$$

$$(.5)^3 = (.5)(.5)(.5) = .125$$

$$\left(\frac{1}{5}\right)^2 = \left(\frac{1}{5}\right)\left(\frac{1}{5}\right) = \frac{1}{25}$$

$$2^5 = (2)(2)(2)(2)(2) = 32$$



C. Special exponents

1. Negative exponents indicate fractions.

$$3^{-1} = \frac{1}{3} \quad \text{and} \quad 3^{-2} = \frac{1}{(3)(3)} = \frac{1}{9}$$

2. Any number raised to the 0 power is 1.

$$3^0 = 1$$

3. Any number raised to the first power is the number itself.

$$3^1 = 3$$