

POWERS AND SQUARE ROOT



UNIT 3

POWERS

A **power** is a product of two or more equal factors.

The number that you repeat is called the **base**.

The number of times that you repeat the base is called the **index**.

Example: $2 \times 2 \times 2 \times 2 = 2^4$

2^4

2 is called base

4 is called exponent

Multiplying a number by itself is called **squaring**. The numbers 1, 4 and 9 are **square** numbers.

7 squared is $7 \times 7 = 49$

7^2 means square 7. So $7^2 = 49$

Squaring is **not** the same as multiplying the number by 2.

7^2 does not mean 7×2 .

The **cube** of a number is given by three of the numbers multiplied together.

Cubing is raising a number to the power of 3.

2 cubed means $2 \times 2 \times 2 = 8$

2^3 means 2 cubed

2^3 means $2 \times 2 \times 2$

2^3 does **not** mean 2×3

How do we read the powers?

7^2 = Seven squared, seven to the power of two, or the square of 7.

7^3 = The cube of seven or seven to the power of three, or seven cubed.

7^4 = Seven to the power of four.



Powers of 10

10^2 , 10^3 , 10^4 , etc. = are powers of 10.

$10^2 = 10 \times 10 = 100$, so you can write 100 as 10^2 .

$10^3 = 10 \times 10 \times 10 = 1\,000$, so you can write 1 000 as 10^3 .

$10^4 = 10 \times 10 \times 10 \times 10 = 10\,000$, so you can write 10 000 as 10^4 .

The **index** tells you how many zeros the number has.

For example, the number 100 000 000 has 8 zeros, so you can write it as 10^8 for short.

It is often quicker to write large numbers using **powers of 10**.

$500 = 5 \times 100 = 5 \times 10^2$.

$3000 = 3 \times 1000 = 3 \times 10^3$

$4000\,000\,000 = 4 \times 1000\,000\,000 = 4 \times 10^9$

Writing numbers using a number between 1 and 10 multiplied by a power of 10 is called **standard form**.

ROOTS

The reverse or inverse of squaring a number is finding the **square root** of a number.

The square root is the number which, when multiplied by itself, gives the original number.

The symbol for this is $\sqrt{\quad}$

For example, the square root of 49 is seven, which is written as $\sqrt{49} = 7$.

Since $7 \times 7 = 49$

3. THE ORDER OF OPERATIONS

The order of operations is :



REMEMBER

- To **square** a number, multiply the number by itself.
- The **cube** of a number is given by multiplying this number by itself three times
- In a **power of ten**, the index shows the number of zeros.
- Large numbers can be written using **standard form**.
- Finding the **square root** is the opposite of squaring.

USEFUL WEBSITES

www.funbrain.com/kidscenter.html

<http://www.quia.com/jg/65631.html>



ACTIVITIES

1. Complete this table of squares and cubes.

	1	2	3	4	5	6	7	8	9	10
Squared				16						
Cubed		8								

2. Write these numbers as a power of 10.

- | | |
|----------------------|------------------------------|
| a) One hundred..... | e) One hundred million..... |
| b) Ten thousand..... | f) One thousand..... |
| c) One million..... | g) Ten million..... |
| d) One billion..... | h) One hundred thousand..... |

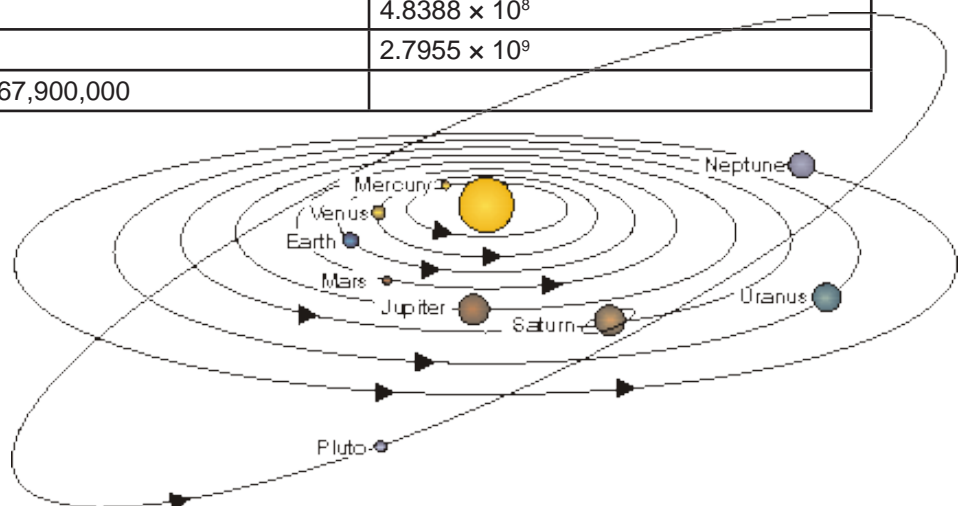
3. Complete and write the answer like a power.

X	2^2	2^3	2^4	2^5
2				
2^2				
2^3				
2^4				

X	5^2	5^6	5^7	5^3
5^5				
5				
5^4				
5^2				

4. Complete the following table in your books.

Planet	Distance from Sun (Ordinary Miles)	Distance from Sun (Standard form Miles)
Mercury	35,990,000	
Venus		6.724×10^7
Earth	93,000,000	
Jupiter		4.8388×10^8
Neptune		2.7955×10^9
Pluto	3,667,900,000	



IT WILL HELP YOU DEVELOP YOUR COMPETENCIES

FIND OUT!

DID YOU KNOW.....?

“A **symbol** represents something. Typically, a symbol is a way to quickly represent an object, an idea, or a concept. The first mathematical symbols were the numbers, which were a simple way to represent how many of any object there might be.

Here is a table of some of the most frequently used math symbols. Please feel free to send me any additions you would like to see added.

Symbol	What Is It?
+	Adding Sign.Often referred to as the 'plus' sign.
-	Subtracting Sign.Often referred to as the 'minus' sign.
x	Multiplication Sign.Often referred to as the 'times' sign.
÷	Division Sign.
=	Equal Sign.
	Absolute Value
()	Parenthesis.
[]	Square Brackets.
%	Percent Sign - Out of 100.
√	Square Root Sign.
<	Inequality sign. Less Than.
>	Inequality sign. Greater Than.
π	Pi
∞	Infinity

