Speed Maths

Cubes & Cube roots

CUBES

Cubes of 2 digit numbers

To calculate the cube value of a 2 digit number.

Step 1: Put down the cube of the ten's digit in a row of 4 figures. Find the ratio between the digits of the given number. So, the other 3 digits in the row are in the geometrical ratio in the exact proportion.

Step 2: Put down under the second and third digits, 2 times of the second and the third digit. Then add up the 2 rows.

1. Calculate 12^3.

Solution:

The ten's digit of the number is 1

So we write the first digit as $1^3 = 1$

The ratio between the digits is 1:2, the next digits will be double the previous one.

So the first row is 1 2 4 8

The second ad the third digits are 2 and 4.

So write down 4 and 8 below 2 and 4 and then add.

$$\begin{array}{r} 1\ 2\ 4\ 8 \\ \quad 4\ 8 \\ \hline 1\ 7\ 2\ 8 \end{array}$$

$\therefore 12^3 = 1728$

2. Calculate 21^3.

Solution:

$$\begin{array}{cccc} 8 & 4 & 2 & 1 \\ & 8 & 4 & \\ \hline 9 & 2 & 6 & 1 \end{array} \qquad \left[8 = 2^3, 8 \div 4 = 2,\ 4 \div 2 = 1,\ 2 \div 1 = 2\right]$$

$\therefore 21^3 = 9261 \qquad \left[4 \times 2 = 8,\ 2 \times 2 = 4\right]$

3. Calculate 34^3.

Solution:

27	36	48	64
	72	96	
39	$_{12}3$	$_{15}0$	$_{6}4$

$\therefore 34^3 = 39304$

4. Calculate 93^3.

Solution:

729	243	81	27
	486	162	
804	$_{75}3$	$_{24}5$	$_{2}7$

$\left[9^3 = 729, 9:3 = 3:1 \right.$
$\left. \therefore \text{Each term is obtained by dividing by } 3 \right]$

$\therefore 93^3 = 804357$

5. Calculate 77^3.

Solution:

343	343	343	343
+	686	686	
456	$_{113}5$	$_{106}3$	$_{34}3$

$\left[7^3 = 343, \text{ratio } 1:1\right]$

$\therefore 77^3 = 456533$

Cube roots

If $y = x^3$, then x is called the cube root of y and is written as $x = \sqrt[3]{y}$

1. Find the cube root of 2744.

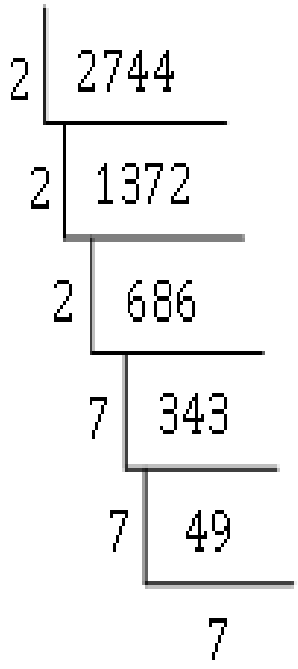
Solution:

$2744 = 2 \times 2 \times 2 \times 7 \times 7 \times 7$

$= 2^3 \times 7^3$

$\therefore \sqrt[3]{2744} = 2 \times 7$

$= 14$



2. Find the cube root of 0.000512.

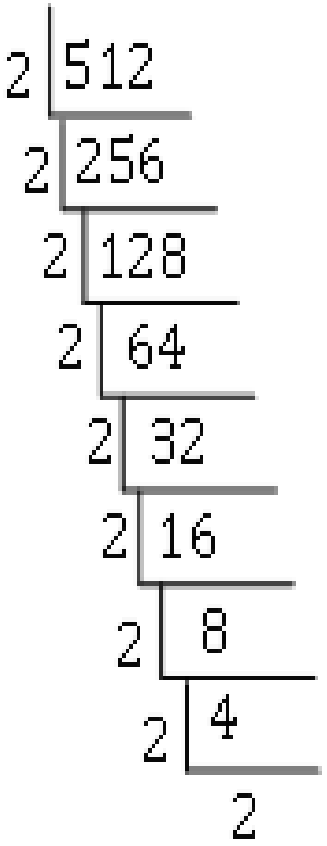
Solution:

$$\sqrt[3]{0.000512} = \sqrt[3]{\frac{512}{1000000}} = \frac{\sqrt[3]{512}}{100}$$

$$\sqrt[3]{512} = \sqrt{2^9}$$

$$\therefore \sqrt{512} = 2^3 = 8$$

$$\therefore \sqrt[3]{0.000512} = \frac{8}{100} = 0.08$$



3. Evaluate $\sqrt[3]{4\frac{12}{125}}$.

Solution:

$$\sqrt[3]{4\frac{12}{125}} = \sqrt[3]{\frac{512}{125}} = \frac{\sqrt[3]{512}}{\sqrt[3]{125}} = \frac{8}{5} = 1\frac{3}{5^2}$$

4. Find the smallest number by which 3600 be divided to make it a perfect cube.

Solution:

$$3600 = 2\times2\times2\times2\times3\times3\times5\times5$$

$$= 2^4 \times 3^2 \times 5^2$$

$\therefore$ 3600 should be divided by $2\times3^2\times5^2$ to make it a perfect cube 8.

$\therefore$ The required number is $2\times9\times25 = 450$

2	3600
2	1800
2	900
2	450
5	225
3	45
3	15
	5

CUBES OF 2 DIGIT NUMBERS

Exercise:

1. Calculate 23^3.

2. Calculate 97^3.

3. Calculate 103^3.

4. Calculate 111^3.

CUBE ROOTS

Exercise:

3. Find the cube root of 5832.

4. Find the cube root of 0.000216.

5. Find the smallest number by which 33275 be divided to make it a perfect square.