Alternate academic calendar for the month of November

Class: 8th **Subject:** Mathematics **Year:** 2021-22

Cubes and cuberoots

Suggestive activities that can be carried out on Cubes and cube roots

Sl. no	Month/ Week	Important learning objectives	Learning activities	Evaluation
1	November 2st week	Concept of cube numbers.	Developing the concept of cube numbers in students. Let us make children to list out cube numbers and do chart.	Give them activity sheet no.1 and verify.
		Testing cube numbers. The minimum number to be multiplied to make perfect cube number.	1) Verifying whether the given numbers are perfect cube numbers with help of examples. 2)With the help of vedio, make children to understand the minimum number to be multiply or divide to make perfect cube number. https://www.youtube.com/watch?v=e5MzwBfO0Q4	Give them activity sheet no.2 and verify.
2	November 3rd week.	Concept of cube roots.	Developing the concept of cube roots in students. Completing the list of cube roots.	Give them work sheet no.3 and verify.
		Finds out cube root by prime factorisation method.	Explain the method to find out cube root of numbers by prime factorisation method and instruct to solve same type of problems. https://www.youtube.com/watch?v=yEiYtWiz_iw	Give activity sheet no.4 and verify.

Exponents and exponential powers

Suggestive activities on exponents and exponential powers

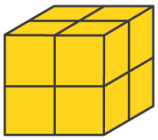
Sl. no.	Month/ Week	Important learning objectives	Learning activities	Evaluation
3	November 3rd week	Negative exponential powers of exponents.	By recalling negative exponential powers finds out expanded form of exponents.	Give them work sheet no.5 and verify.
		Laws of exponents.	Simplifies different types of problems by using laws of exponents.	Give them activity sheets 5,6,7 and to verify.
4	November 4th week.	Expressing big and small numbers in common form by using exponents.	Students understands big and small numbers in common form by using exponents with examples.	Give them activity sheet no.8 andSS verify.
		Comparing bigger and smaller numbers.	By solving different problems of bigger and smaller numbers, students understands comparing numbers. https://www.youtube.com/watch?v=tmviROv-b1A&feature=youtu.be	Give them activity sheet no.9 and verify.

Activity sheet - 1 ***Cubes and cube roots***

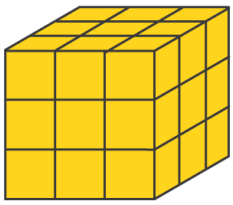
Cubes:

Multiply a number by itself three times, then the number obtained is called cube number.

$1 \times 1 \times 1 = 1$

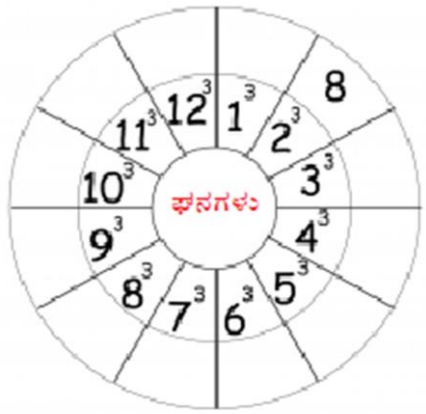


$2 \times 2 \times 2 = 8$



$3 \times 3 \times 3 = 27$

1. **Fill in the blank with cube numbers of the following.**



2. **Complete the following table.**

Number	Cubes	Cube roots	Cube
1	$1 \times 1 \times 1 = 1^3 = 1$	11	
2	$2 \times 2 \times 2 = 2^3 = 8$	12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

Activity sheet - 2 ***Cube and cube roots***

1. Check whether the following numbers are perfect cube numbers.

Exemplar problem:

1) Whether 243 is perfect cube number?

243 = 3 x 3 x 3 x 3 x 3

In the above factors make 3's group of three numbers.Then 3× 3 is left with no group of 3. Hence 24: is not a perfect cube number.

3	243
3	81
3	27
3	9
3	3
	1

2) Whether 729 is perfect cube?

729 = 3 x 3 x 3 x 3 x 3 x 3

In the above factors, two groups of 3's are there. Hence 729 is perfect cube.

3	729
3	243
3	81
3	27
3	9
3	3
	1

3) 1000

4) 128

2. Find out the least number to be multiplied to make following numbers as perfect cube number.

Example problem:

1) 81

81 = 3 x 3 x 3 x 3

To make 81 as perfect cube number, multiply it by 3 x 3

3	81
3	27
3	9
3	3
	1

2) 135

3) 192

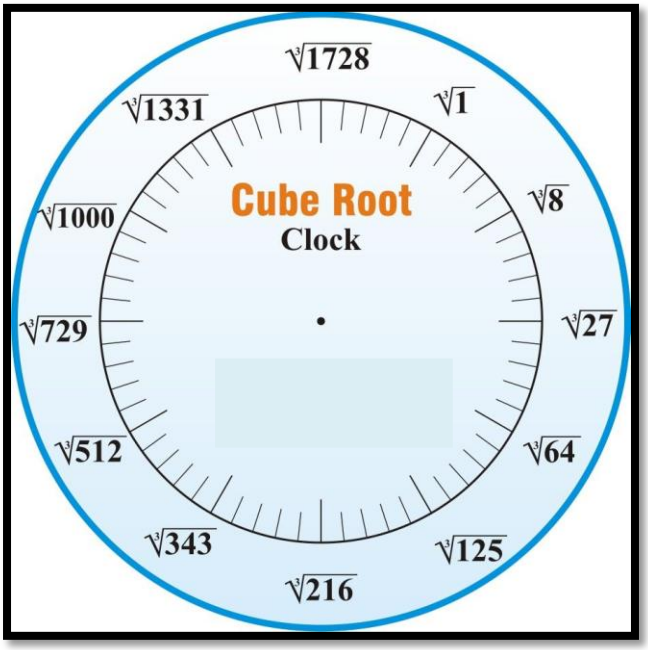
4) 704

Cube roots:

1. Complete the following table.

Number	Cube root	Number	Cube root
1	$\sqrt[3]{1} = 1$		$\sqrt[3]{\quad} = 11$
8	$\sqrt[3]{8} = 2$		$\sqrt[3]{\quad} = 12$
27	$\sqrt[3]{27} = 3$		$\sqrt[3]{\quad} = 13$
64	$\sqrt[3]{64} =$		$\sqrt[3]{\quad} = 14$
125	$\sqrt[3]{125} =$		$\sqrt[3]{\quad} = 15$
216	$\sqrt[3]{216} =$		$\sqrt[3]{\quad} = 16$
343	$\sqrt[3]{343} =$		$\sqrt[3]{\quad} = 17$
512	$\sqrt[3]{512} =$		$\sqrt[3]{\quad} = 18$
729	$\sqrt[3]{729} =$		$\sqrt[3]{\quad} = 19$
1000	$\sqrt[3]{1000} =$		$\sqrt[3]{\quad} = 20$

2. Find out cube root of numbers given in the first clock and fill it up in the second clock.



Finds cube root of numbers by prime factorisation method:

1. Find out cube root by prime factorisation method of the following numbers:

1. 3375

3375 = 3 x 3 x 3 x 5 x 5 x 5

$3375 = 3^3 \times 5^3$

$3375 = (3 \times 5)^3$

$\sqrt[3]{3375} = 3 \times 5$

$\sqrt[3]{3375} = 15$

3	3375
3	1125
3	375
5	125
5	25
5	5
	1

2. 512

$512 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$512 = 2^3 \times 2^3 \times 2^3$

$512 = (2 \times 2 \times 2)^3$

$\sqrt[3]{512} = 2 \times 2 \times 2$

$\sqrt[3]{512} = 8$

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

3. 27000

4. 15625

2. State whether the following statements are true or false.

i) **Cube of a odd number is even number.** ☐

ii) **There is no perfect cube number which ends with 8.** ☐

iii) **Cube of single digit number may be single digit.** ☐

iv) **A perfect cube number will not end with two zeros.** ☐

v) **68600 is perfect cube number.** ☐

Activity sheet - 5 **Exponents and exponential powers**

Negative exponential powers of exponents(Inverse multiplication):

Example: 1) $10^{-2} = \frac{1}{10^2}$ **2)** $3^6 = \frac{1}{3^{-6}}$

1. Write inverse multiplication of the following:

1) 2^{-10}	
2) 19^2	
3) 200^{-10}	
4) 7^{-8}	
5) 5^4	

Write expanded form of the following numbers by using exponents.

Example : Write expanded form of 2457.36

Solution : $2457.36 = 2\times1000 + 4\times100 + 5\times10 + 7\times 1 + 3\times \frac{1}{10} + 6\times \frac{1}{100}$

$= 2\times10^3 + 4\times10^2 + 5\times10^1 + 7\times1 + 3\times10^{-1} + 6\times10^{-2}$

2.Expand the following numbers by using exponents :-

1. 2463.79

2. 14037.659

Activity sheet - 6 **Exponents and exponential powers**

Laws of exponents:

Match the following :-

	A	B	Answers
1)	$a^m \times a^n$	a^{m-n}	_____
2)	$a^m \div a^n$	1	_____
3)	$[a^m]^n$	a^{m+n}	_____
4)	$[a \times b]^m$	$a^m \div b^m$	_____
5)	$[a \div b]^m$	$a^m \times b^m$	_____
6)	a^0	a^{mn}	_____

1) Law of expoment: $a^m \times a^n = a^{m+n}$

Example: 1) $5^{10} \times 5^{20} = 5^{10+20} = 5^{30}$

2) $(-3)^{-2} \times (-3)^{-9} = \frac{1}{(-3)^2} \times \frac{1}{(-3)^9} = \frac{1}{(-3)^{11}} = (-3)^{-11}$

Simplify :-

1) $7^{20} \times 7^{40}$	2) $(-6)^{-5} \times (-6)^{-20}$
3) $9^2 \times 9^{15}$	4) $6^3 \times 6^4$

2) Law of exponent: $\frac{a^m}{a^n} = a^{m-n}$

Example :1) Find out the value of $\frac{2^6}{2^2}$

Solution : $\frac{2^6}{2^2} = 2^6\ 2^{-2} = 2^{6-2} = 2^4 = 2\times2\times2\times2 = 16$

Simplify :-

2) $\frac{4^8}{4^2}$	3) $\frac{3^{-7}}{3^{-8}}$

3) Law of exponent: $[a^m]^n = a^{mn}$

Example : Simplify $(7^2)^3$

Solution : $(7^2)^3 = 7^{2x3} = 7^6$

Simplify the following as given in the above exemplar problem.

1) $(4^2)^3$	2) $(-5^4)^2$

4) Law of exponent: $[a\times b]^m = a^m\times b^m$

Example : Simplify $(5\times2)^3$

Solution : $(5\times2)^3 = 5^3 \times 2^3 = 5\times5\times5\times2\times2\times2 = 125 \times 8 = 1000$

Simplify the following as given in the above exemplar problem.

1) $(4\times2)^3$	2) $(-5\times4)^2$

5) Law of Exponent: $[a \div b]^m = \frac{a^m}{b^m}$

Example: 1) $(5 \div 8)^{-2}$

Solution : $(5 \div 8)^{-2} = \left\{\frac{5}{8}\right\}^{-2} = \frac{5^{-2}}{8^{-2}} = \frac{8^2}{5^2} = \frac{8 \times 8}{5 \times 5} = \frac{64}{25}$

Simplify the following as given in the above exemplar problem.

1) $(2 \div 3)^{-3}$	**2) $(3 \div 5)^{-2}$**

Using exponents, express the bigger and smaller numbers in common form.

Example : 1) Distance between the earth and moon is 38,44,67,000m. Express this measurement in common form.

Solution : 38,44,67,000 m = 3.84×10^8 m (Approximation)

Example : 2) The diameter of a computer chip wire is 0.000003 m. Exress this in common form.

Solution : 0.000003 m = 3×10^{-6} m.

Write the following numbers in common form as given in the exemplar problem.

1) The size of biological cell is 0.00000025m.

2)The size of an object is 25,00,00,00,000m

Comparision of bigger and smaller numbers:

1) **The diameter of an object 'A' is 2×10^4 m and 'B' object is 2×10^2 m. Compare the size of these two objects and express which object is having more size.**

Solution:

$$\frac{\text{Diameter of object 'A'}}{\text{Diameter of object 'B'}} = \frac{2\times 10^4\ \text{m}}{2\times 10^2\ \text{m}} = 10^{4-2} = 10^2\ m = 100\ m$$

∴ **The diameter of 'A' is 100 times more than the diameter of 'B'.**

Compare and express the smaller and bigger number as given in the above problem.

1) **The radius of an object 'x' is 40×10^{10}m and radius of an object 'y'is 20×10^6 m. Then compare and find out how much the radius of object 'X' is more than the object 'Y'.**

2) **The mass of an earth is 5.97×10^{24} Kg and mass of the moon is 7.35×10^{22} Kg. Then compare and express how much the mass of earth is more than the mass of moon?**