

## LESSON PLAN 1

NAME OF THE TEACHER :

NAME OF THE UNIT	SUB-TOPICS	NO OF PERIODS REQUIRED			Time line for teaching	
		Teaching	Practice	TOTAL	From	To
<b>NUMBER SYSTEMS</b>	<b>1.1 INTRODUCTION</b>	<b>2</b>	<b>2</b>	<b>4</b>		
	<b>1.2 IRRATIONAL NUMBERS</b>	<b>2</b>	<b>3</b>	<b>5</b>		
	<b>1.3 REAL NUMBERS AND THEIR DECIMAL EXPANSIONS</b>	<b>2</b>	<b>3</b>	<b>5</b>		
	<b>1.4 OPERATIONS ON REAL NUMBERS</b>	<b>2</b>	<b>3</b>	<b>5</b>		
	<b>1.5 LAWS OF EXPONENTS FOR REAL NUMBERS</b>	<b>1</b>	<b>2</b>	<b>3</b>		
	<b>TOTAL</b>	<b>9</b>	<b>13</b>	<b>22</b>		
<b>PRE-REQUISITES &amp; SKILLS</b>	Every Pupil is expected to have basic knowledge and skills in # Different Number systems in Natural Numbers, Whole Numbers, Integers and Rational Numbers # four basic operations like +,-,x and ÷ # Basic Knowledge on Squares, Square roots, Cubes and Cuberoots # Basic info on Laws of exponents and algebraic identities and expressions # Preliminary knowing about Pythagoras Theorem (in class 8th Squares & Square roots)					

## Learning Outcomes

After Completion of this lesson every student will be able to

- # acquire knowledge on rational and irrational numbers, their existence and operations on those numbers
- # can place any number of rationals & irrationals between any two rationals and irrationals
- # can convert decimals into p/q and vice versa.
- # can rationalize the given irrational using rationalizing factor
- # utilize the laws of exponents and Number Systems in real life situations effectively.

## Teaching Learning Process

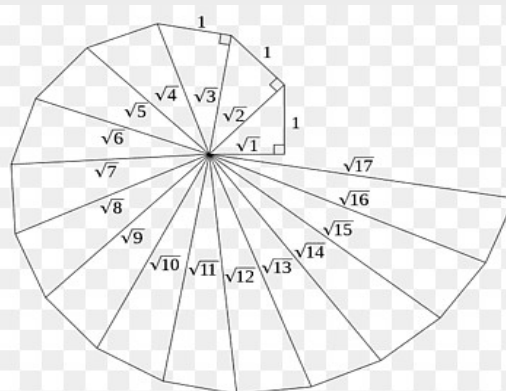
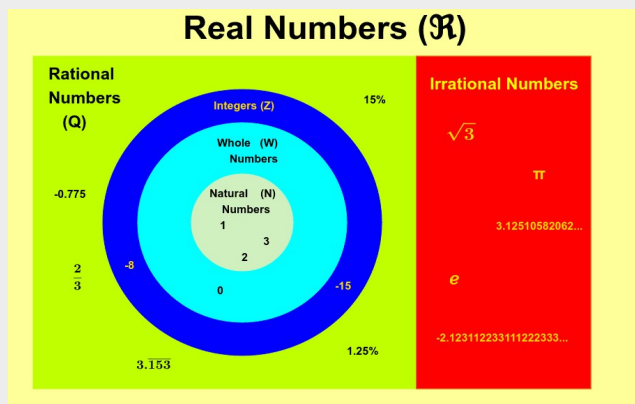
### INTRODUCTION /INDUCTION

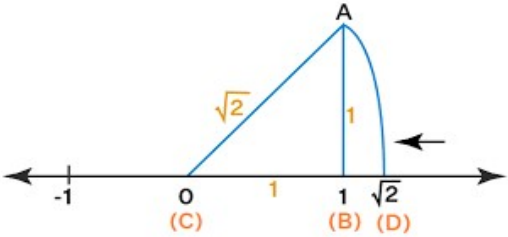
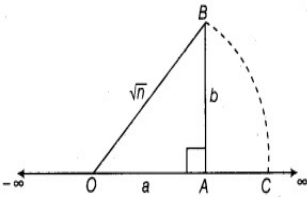
Teacher introduces the chapter of number systems by quoting some real life examples like distributing say some 8 chocolates among some children with a condition that each child should get the same number of chocolates equal to the number of children .Here the student needs to find the square root of 8 which results in an irrational. With this the teacher explains the necessity of different number systems in real life situations and proceeds into the chapter

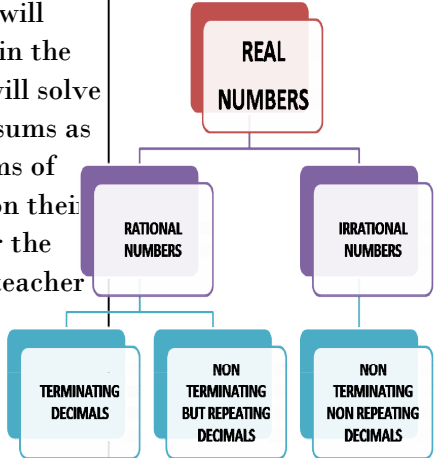
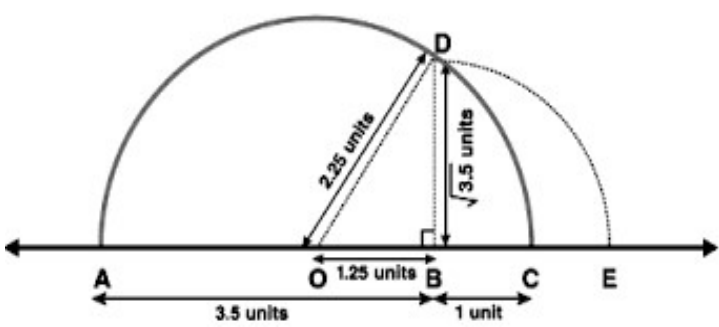
### Experience & Reflection

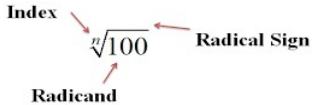
# Pupils will recollect their knowledge on Rationals and their usage that they were acquainted with in their previous class and will reflect the knowledge here in exploring Some more number systems like Irrational Numbers and Real Numbers

# Students will experience the usage of Irrationals, Rationals and Real numbers in real life situations.



EXPLICIT TEACHING/TEACHER MODELLING (I DO)	GROUP WORK (WE DO)	INDEPENDENT WORK (YOU DO)	NOTES
<p><b>1.1. INTRODUCTION</b></p> <p>Teacher recalls the pupils' knowledge on different number systems and introduces the concept of irrational numbers using real life examples</p>	<p>Heterogeneous groups will be formed and each group will be provided with two rational numbers and will be asked to put 5 more rationals between them. In this process the two methods of placing rationals between any two rationals 1) through finding mean 2) by converting into like fractions will be once again recalled by the pupils</p>	<p>Students will solve the example sums and exercise 1.1 on their own by recalling their previous knowledge under the guidance of teacher</p>	<p><b>Denseness Property of Rational Numbers:</b></p> <p>There exist infinitely many rationals between any two rationals.</p>
<p><b>1.2. IRRATIONAL NUMBERS</b></p> <p>Teacher introduces the concept of irrational numbers by an activity</p> <p>Later demonstrates how to represent <math>\sqrt{2}</math> on number line and guides children in representing some more irrationals on number line</p>	<p>Heterogeneous groups will be formed and each group will be provided with a non perfect square integer and will be asked to distribute that integer into some pupils with a condition that number received by each pupil must be equal to total no of pupils who were distributed. With this activity pupils will know the concept of irrationals</p> 	<p>Students will solve example sums and sums of exercise 1.2 on their own under the guidance of teacher</p>	<p>step wise procedure of representing irrational numbers on number line</p>  <p>Fig. 2.1</p>

EXPLICIT TEACHING/TEACHER MODELLING (I DO)	GROUP WORK (WE DO)	INDEPENDENT WORK (YOU DO)	NOTES
<p><b>1.3 REAL NUMBERS AND THEIR DECIMAL EXPANSIONS</b></p> <p>Teacher demonstrates the procedure of converting rational numbers into decimal form and explores the types of decimals through an activity of division. Finally concludes the concept.</p>	<p>Children are divided into groups and each group will be given different fractions and are asked to convert them into decimals and observe the quotient in each case. As they end at either terminating or non terminating but repeating decimals they are made familiar with the concept that those decimals which are terminating or non terminating but repeating are rationals. And those decimals which are either non terminating or non repeating will come under irrationals.</p> <p>By the way pupils are also engaged in an activity involving conversion of decimals into fraction(p/q) form</p>	<p>Students will participate in the activity and will solve the example sums as well as sums of exercise 1.3 on their own under the guidance of teacher</p>	
<p><b>1.4 OPERATIONS ON REAL NUMBERS</b></p> <p>Teacher recalls various properties of Rational numbers like closure, commutativity, associativity etc that pupils are acquainted with in their previous classes and utilizing them he demonstrates the concept of representing any real number on the number line.</p>	<p>Students will be divided into heterogeneous groups and will be directed to draw and represent any real number say <math>\sqrt{3.5}</math> on number line under the guidance of teacher</p> 	<p>Students will participate in the activity and will solve the example sums as well as sums of exercise 1.4 on their own under the guidance of teacher</p>	<p>Step wise procedure of representing any real number on number line</p>

EXPLICIT TEACHING/TEACHER MODELLING (I DO)	GROUP WORK (WE DO)	INDEPENDENT WORK (YOU DO)	NOTES
<p>1.5 LAWS OF EXPONENTS FOR REAL NUMBERS</p> <p>Teacher recalls the previous knowledge of laws of exponents on Natural Numbers that they have learnt earlier in class 8th and will extend to Real Numbers and introduces the concept of <math>n^{\text{th}}</math> root of <math>a</math></p> <p><math>\sqrt[n]{\quad}</math> indicates an <math>n^{\text{th}}</math> root.</p> 	<p>Each group will be guided in identifying surds or radicals and will be guided in solving sums involving usage of radicals and laws of exponents</p> <ul style="list-style-type: none"> <li>• <math>(\sqrt{a})^2 = a</math></li> <li>• <math>\sqrt{a^2} = a</math></li> <li>• <math>\sqrt{ab} = \sqrt{a} \times \sqrt{b}</math></li> <li>• <math>\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}</math></li> <li>• <math>(\sqrt{a} - \sqrt{b})(\sqrt{a} + \sqrt{b}) = a - b</math></li> <li>• <math>(a - \sqrt{b})(a + \sqrt{b}) = a^2 - b</math></li> <li>• <math>(\sqrt{a} + \sqrt{b})^2 = a + b + 2\sqrt{ab}</math></li> <li>• <math>(\sqrt{a} + \sqrt{b})(\sqrt{c} + \sqrt{d}) = \sqrt{ac} + \sqrt{ad} + \sqrt{bc} + \sqrt{bd}</math></li> </ul>	<p>Students will participate in the activity and will solve the example sums as well as sums of exercise 1.5 on their own under the guidance of teacher</p>	<p>Laws of Exponents on real numbers and some identities in irrational numbers</p>
<b>CHECK FOR UNDERSTANDING QUESTIONS</b>			
1. Factual	1) How many irrationals exist between any two rationals 2) represent $\sqrt{9.5}$ on number line		
2. Open Ended/Critical Thinking	1) Put any five rationals between $\frac{3}{5}$ and $\frac{1}{8}$ 2. Write the rationalizing factor of $\sqrt{3} - \sqrt{5}$ 3. Since $\sqrt[3]{8}$ is in the form of a radical can we say that it is an irrational		
3. Student Practice questions & Activities	1) Rationalize the denominator $\left[ \frac{(\sqrt{3}-\sqrt{2})}{(\sqrt{3}+\sqrt{2})} \right]$ 2) Convert 23.4538 into p/q form 3) Prepare a Square root spiral.		
4. Assessment	1) Worksheet on laws of real numbers 2) Quiz to be conducted on Real numbers		