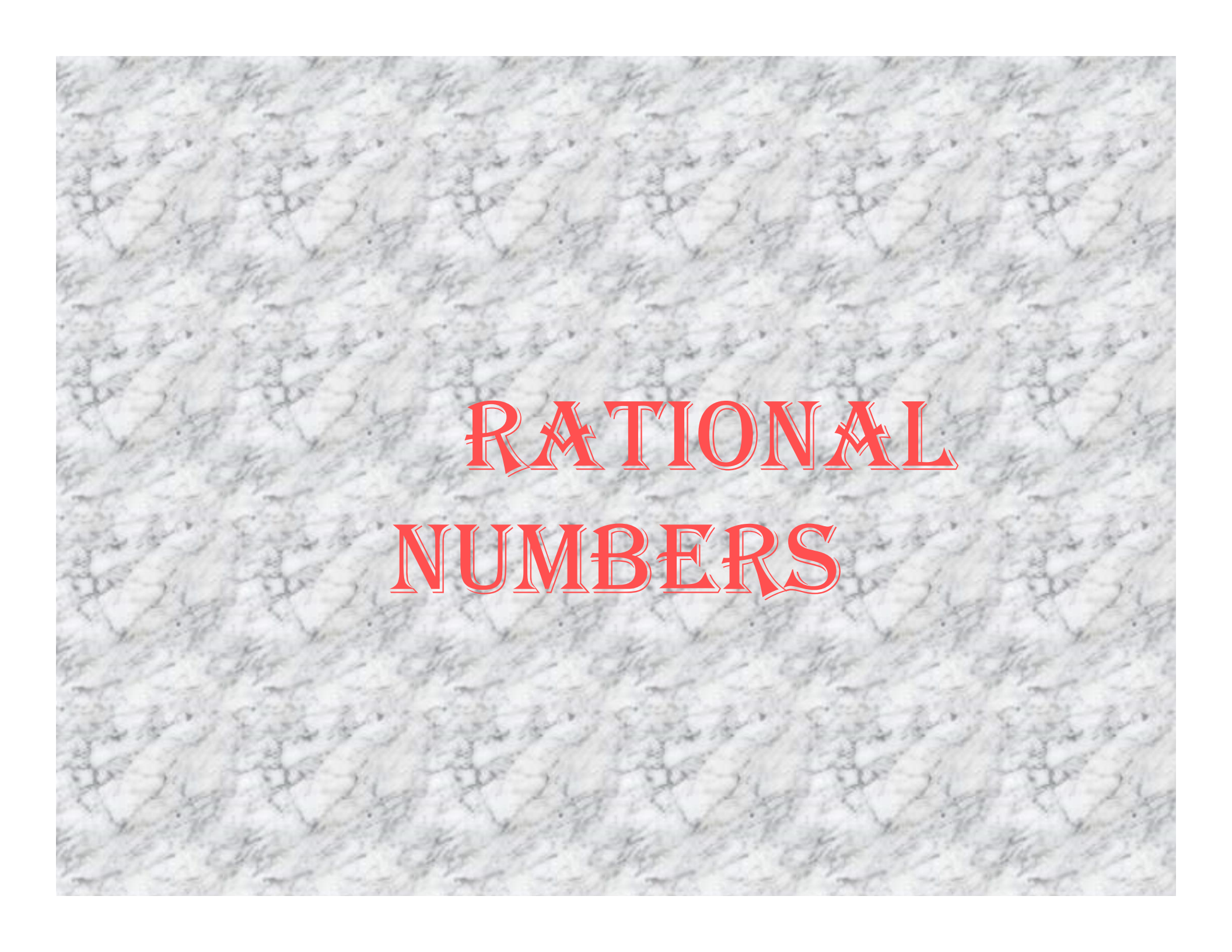


The background of the slide is a classic marbled paper pattern, featuring a dense, irregular network of grey, black, and white veins on a light cream-colored base.

RATIONAL NUMBERS

RATIONAL NUMBERS

A number of the form P/Q or a number which can be expressed in the form P/Q , where P and Q are integers and $Q \neq 0$, is called a RATIONAL NUMBERS.

EXAMPLE – Each of the numbers $2/3$, $-5/7$, $-11/-5$, $7/-9$ is a RATIONAL number.

But $2/0$, $-5/0$ are not RATIONAL numbers.

MORE ABOUT RATIONAL NUMBERS

PROPERTY NO- 1

Every natural number is a rational number but a rational number need not be a natural number.

PROOF – We know that $1=1/1$, $2=2/1$, $3=3/1$ and so on.

Thus ,every natural number is a RATIONAL numbers.

Clearly $3/2$, $2/5$ etc. are rational numbers but they are not natural numbers.

PROPERTY- NO. 2

Zero is a RATIONAL NUMBER.

PROOF-We know that the integer 0 can be written in any of the of the following forms :-

0/1, 0/-1, 0/2, 0/-2, 0/3, 0/-3, and so on.

In other words , $0 = 0/q$, where q is non-zero integer.

Thus 0 can be written as p/q ,where $p=0$ and q is any non-zero integer. Hence , 0 is a rational number.

PROPERTY NO. 3

Every integer is a rational number but a rational number need not be an integer.

PROOF:- We can write $1 = 1/1, 2 = 2/1, 3 = 3/1$ and so on also $-1 = -1/1, -2 = -2/1, -3 = -3/1$ and so on.

Thus any integer p can be written as $p = p/1$, which is a rational number. So, integer is a rational number. Clearly $3/2, -5/3$ etc. are rational numbers but they are not integers.

PROPERTY NO- 4

Every fraction is a RATIONAL NUMBER but a rational number need not be a fraction .

PROOF- Let p/q be any fraction. Then, p and q are natural numbers . Since every natural number is an integer. Therefore , p and q are integers . Thus , the fraction p/q is the quotient of two integers such that q is not equal to 0. Hence, p/q is a rational number.

We know that $3/-5$ is a rational number but it is not a fraction because its denominator is not a natural number .

Hence every fraction is also a rational number.

PROPERTY NO 5

POSITIVE RATIONAL NUMBER

A rational number is said to be positive if its numerator and denominator are either both positive integers or both negative integer e.g. $\frac{2}{3}$, $\frac{-7}{-12}$.

PROPERTY NO 6

NEGATIVE RATIONAL NUMBER

A rational number is said to be negative if its numerator and denominator are such that one of them is positive integer and another one is a negative integer e.g. $-\frac{2}{3}$, $\frac{7}{-5}$

PROPERTY NO 7

A rational number remains unchanged if we multiply its numerator and denominator by the same non-zero integer

e.g. $-3 \times 2 / 4 \times 2 = -6 / 8 = -3 / 4$

PROPERTY NO 8

If there are two rational numbers with common denominator, then one with the larger numerator is larger than the other

e.g. $7/8$, $11/8$, here $11/8$ is greater than $7/8$.

PROPERTY NO 9

Every positive rational number is greater than zero.

PROPERTY NO 10

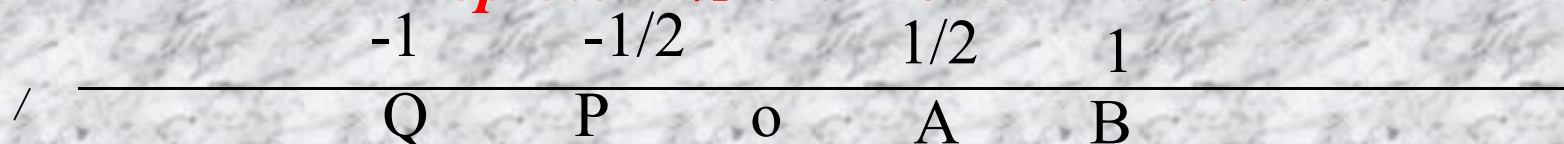
Every negative rational is less than zero.

PROPERTY NO 11

The rational numbers can be represented on the number line.

REPRESENTATION OF RATIONAL NUMBERS ON NUMBER LINE

EXAMPLE- Represent $\frac{1}{2}$ and $-\frac{1}{2}$ on number line.



Method- Draw a line. Take a point o. Let it represent 0. Set off unit lengths OB and OQ to the right as well as to the left of o .

Then clearly B represents the integer 1 and Q represents the integer -1. Now divide OB into two equal parts. Let OA be the first 1 part out of these two parts. Then, the point A represents the rational number $\frac{1}{2}$. Again, divide OQ into two equal parts. Let OP be the first one part out of these two parts. Then, the point P represents the rational number $-\frac{1}{2}$.