NORTH EX PUBLIC SCHOOL
(Senior Secondary,Affiliated to CBSE)
(School block, Jain Nagar Sector-38, Rohini, Delhi-81)

CLASS-IX
SUBJECT-MATHS
CHAPTER-1 NUMBER SYSTEM

TOPICS/ INTRODUCTION:

1. Natural Numbers: Numbers from 0 (zero) onward are known as Natural numbers, denoted by 'N'.
N = {1, 2, 3, 4,.....}

2. Whole Numbers: Numbers from 0 (zero) onward are known as Whole numbers, denoted by 'W'.
W = {0, 1, 2, 3, 4, ...}

3. Integers: The collection of all whole numbers and negative of natural numbers are called Integers, denoted by 'Z' or 'I'.
Z or I = {..... −3, −2, −1,0,1,2,3 .....}

4. Rational Number: A number which can be expressed as $\frac{p}{q}$ where q ≠ 0 and q, q εZ is know as rational number, denoted by 'Q'.

5. Irrational Number: A number which can't be expressed in the form of p/q and its decimal representation is non-terminating and non-repeating is known as irrational number.
e.g., $\sqrt{2}$, $\sqrt{3}$, π,... 1.732105, etc.

6. The sum of a rational number and an irrational number is always an irrational number.

7. The product of a non-zero rational number and an irrational number is always an irrational number.
e.g., $\frac{2}{3}\sqrt{5}$ is an irrational number.

8. The sum of two irrational numbers is not always an irrational number.
$(2+\sqrt{2})+(2-\sqrt{2})=4$ (a rational number)

9. The product of two irrational numbers is not always an irrational number.
e.g., $(\sqrt{3-1}).(\sqrt{3}+1)=3-1=2$

Rational numbers

(A) Terminating rational numbers: Remainder becomes 0 after some steps of division in decimal form. For ex- =0.25

(B)Non terminating recurring(repeating) numbers: Remainder never becomes 0 after division in decimal form . for ex: = 0.333….

Irrational number: Non terminating non recurring.for ex: , ,

Note that square root numbers which are not perfect squares are irrational.

is a perfect sq. of 8, so this is rational.

Some related sums are as follows:

1. Write the following in decimal form and say what kind of decimal expansion each has:

(a) (b)

(a) We have $\frac{36}{100}=0.36$

⇒ The decimal expansion of $\frac{36}{100}$ is terminating

$$
\begin{array}{r}
0.1818 \\
11\overline{)\ 2.0000} \\
-11 \\
\hline
90 \\
-88 \\
\hline
20 \\
-11 \\
\hline
90 \\
-80 \\
\hline
2
\end{array}
$$

(b)Dividing 2 by 11, we have

Here, the repeating block of digits is 18.

$\Rightarrow \frac{2}{11} = 0.1818\ldots = 0.0.\overline{18}$

Thus, the decimal expansion of $\frac{2}{11}$ is "non-terminating repeating

2. Find six rational numbers between 3 and 4.

Ans. We know that there are an infinite number of rational numbers between two rational numbers.

Therefore, six rational numbers between 3 and 4 can be:

Multiply the numbers by

3x = < , , , , , > 4x =

WORKSHEET-2,2020-21

1. **Find six rational numbers between 4 and 5.**
2. **Write the following in decimal form and say what kind of decimal expansion each has:**
   (a) (b)
3. **Find two rational numbers between and**
4. **Classify the following numbers as rational or irrational:**
   (i) $\sqrt{23}$ (ii) $\sqrt{225}$
   (iii) 0.3796 (iv) 7.478478
   (v) 1.101001000100001. . .
5. **Classify the following numbers as rational or irrational:**
   (i) $2-\sqrt{5}$ (ii) $(3+\sqrt{23})+\sqrt{23}$
   (iii) $\frac{2\sqrt{7}}{7\sqrt{7}}$ (iv) $\frac{1}{\sqrt{2}}$
   (v) 2π
6. **Simplify each of the following expressions:**
   (i) $(3+\sqrt{3})(2+\sqrt{2})$ (ii) $(3+\sqrt{3})(3-\sqrt{3})$
   (iii) $(\sqrt{5}+\sqrt{2})^2$
   (iv) $(\sqrt{5}-\sqrt{2})(\sqrt{5}+\sqrt{2})$