LECTURE_01

MODULE_01

NUMBERS

Include negative of natural numbers

NATURAL NUMBERS :	1, 2, 3, 4, 5, …
WHOLE NUMBERS :	0, 1, 2, 3, 4, 5, …
INTEGERS :	… , -3, -2, -1, 0, 1, 2, 3, …

NUMBERS

INTEGERS : … , -3, -2, -1, 0, 1, 2, 3, …

RATIONAL NUMBERS : If p is any integer and q any non-zero integer, then $\frac{p}{q}$ is a rational number.

$\frac{5}{9}$ $\frac{-3}{1}$? $\frac{4}{3}$ $\frac{1}{5}$

Ratio of integers

Numerator → Integer

Denominator → Non-zero Integer

RATIONAL NUMBERS

If p is any integer and q any non-zero integer, then $\frac{p}{q}$ is a rational number.

Decimal form of rational number is terminating or non-terminating & recurring.

$\frac{9}{4} = 2.25 \rightarrow$ Terminating

$\frac{11}{3} = 3.666\ldots \Rightarrow 3.\overline{6}$ Non-terminating and recurring

$4.914914\ldots = 4.\overline{914}$

Identify Rational Numbers

$0.048\overline{}$ → Rational number

$4.9\overline{14}$ → Rational number

2.066 → Rational number

0.0122547825... → Not a Rational number

3.1415926538... → Not a Rational number

2.61353029864... → Not a Rational number

1.90357415569... → Not a Rational number

$270.\overline{253}$ → Rational number

IRRATIONAL NUMBERS

Numbers whose decimal form is non-terminating and non-recurring are called Irrational numbers.

These decimal numbers are non-terminating and non-recurring

0.0122547825...

3.1415926538...

2.61353029864...

1.90357415569...

?

IRRATIONAL NUMBERS

Numbers whose decimal form is non-terminating and non-recurring are called Irrational numbers.

The Square roots of numbers that are not perfect squares are Irrational numbers.

These decimal numbers are non-terminating and non-recurring

$\sqrt{2}$ = 1.414213562373...

$\sqrt{3}$ = 1.732050807568...

$\sqrt{5}$ = 2.236067977499...

$\sqrt{6}$ = 2.449489742783...

REAL NUMBERS

RATIONAL NUMBERS

$\frac{\text{Integer}}{\text{Non-zero integer}}$

Terminating or
Non-terminating
recurring

IRRATIONAL NUMBERS

Non-terminating
Non-recurring

INTEGERS : ..., -2, -1, 0, 1, 2, ...

WHOLE NUMBERS : 0, 1, 2, 3, ...

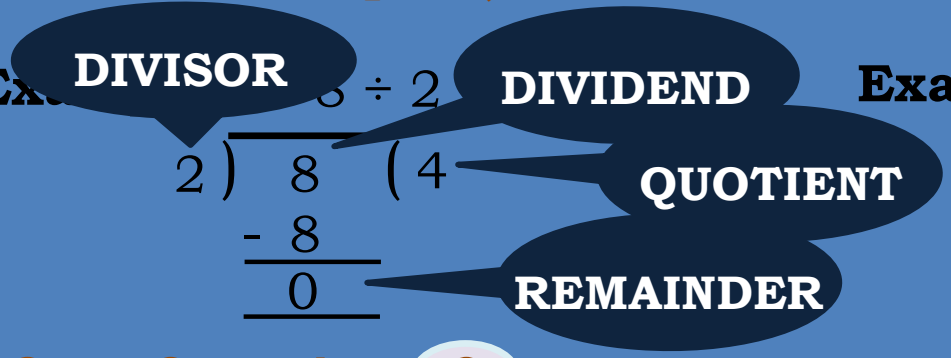
NATURAL NUMBERS : 1, 2, 3, 4, ...

EUCLID'S DIVISION ALGORITHM

DIVIDEND = DIVISOR × QUOTIENT + REMAINDER

For two given positive integers a and b there exist unique integers q and r satisfying $a = bq + r$; $0 \leq r < b$

Example 1 : 8 ÷ 2



$8 = 2 \times 4 + 0$

$a = b \times q + r$

Example 2 : 15 ÷ 2

$$\begin{array}{r} 2\overline{)\,15\,(\,7} \\ -\,14 \\ \hline 1 \end{array}$$

$15 = 2 \times 7 + 1$

$a = b \times q + r$

MODULE_02

Exercise 1.1

Q.1 Use Euclid's division algorithm to find the HCF of :
(i) 135 and 225

Sol.

Applying Euclid's Division Algorithm,

$225 = 135 \times 1 + 90$

applying Euclid's Division Algorithm,

Dividend = Divisor × Question + Reminder

$135 = 90 \times 1 + 45$

applying Euclid's Division Algorithm,

$90 = 45 \times 2 + 0$

Now, the divisor in this division is required HCF of 225 & 135

$$\begin{array}{r} 1 \\ 135\overline{)\ 225} \\ -\ 135 \\ \hline 90\overline{)135}\ (1 \\ -\ 90 \\ \hline 45\overline{)\ 90}\ (2 \\ -\ 90 \\ \hline 0 \end{array}$$

$\therefore$ **HCF (135, 225) = 45**

Exercise 1.1

Q.1 **Use Euclid's division algorithm to find the HCF of :**
(iii) 867 and 255

Sol.

Divide, 867 by 255

Applying Euclid's Division Algorithm,

Dividend = Divisor × Question + Reminder

$867 = 255 \times 3 + 102$

applying Euclid's Division Algorithm,

$255 = 102 \times 2 + 51$

applying Euclid's Division Algorithm,

$102 = 51 \times 2 + 0$

Now, the divisor in this division is required HCF of 867 & 255

$\therefore$ **HCF (867, 255) = 51**

```
        3
   ┌─────
255 ) 867
    - 765
    ─────
      102 ) 255 ( 2
          - 204
          ─────
            51 ) 102 ( 2
                - 102
                ─────
                  0
```