Ch-1 → Real Numbers

→ Notes:

- Euclid Division Lemma:

» given 2 positive integers 'a' & 'b' their exists an unique integers 'q' & 'r' such that $a = bq + r$, ~~0 <~~ $0 \leq r < b$

- Euclid Division Algorithm:

» It is used for finding 'HCF' of 2 given positive integers

→ Exercise 1.1:

(1) Euclid divison algorithm:

(i) 135 and 225

→ $a = bq + r$

so $225 = 135 \times 1 + 90$

$= 135 = 90q + r$

$= 135 = 90 \times 1 + 45$

$= 90 = 45q + r$

$= 90 = 45 \times 2 + 0$

↳ HCF

so $HCF(135, 225) = 45$

$$\begin{array}{r} 2 \\ 45\overline{)90} \\ -90 \\ \hline 0 \end{array} \qquad \begin{array}{r} 1 \\ 135\overline{)225} \\ 135 \\ \hline 090 \end{array} \qquad \begin{array}{r} 1 \\ 90\overline{)135} \\ 90 \\ \hline 45 \end{array}$$

(ii) 196 and 38220

= $a = bq + r$

= $38220 = 196 \times q + r$

= $38220 = 196 \times 193 + 0$

so HCF (196, 38220) = 196

$$\begin{array}{r|l} & 193 \\ \hline 196 & 38220 \\ & 196 \\ \hline & 1862 \\ & 1764 \\ \hline & 980 \\ & -980 \\ \hline & 000 \end{array}$$

(iii) 867 and 225

= $a = bq + r$

= $867 = 225 \times q + r$

= $867 = 225 \times 3 + 192$

$$\begin{array}{r|l} & 3 \\ \hline 225 & 867 \\ & -675 \\ \hline & 192 \end{array}$$

= $225 = 192 \times 1 + 33$

= $33 = 17 \times 1 + 16$

= $16 = 1 \times 16 + 0$

$\therefore$ HCF (867, 225) = 1

(2) Let a, b, c

= Set $6q + 1 = bq + r$

$\therefore$ $b = 6$

= By Euclid division Lemma

= $a = 6q + r$ — (1)

∴ values of r are : 0, 1, 2, 3, 4, 5

= $a = 6q \rightarrow 9_6$ $r = 0 \rightarrow$ even
= $a = 6q+1 \rightarrow$ Odd
= $a = 6q+2 \rightarrow$ Even
= $a = 6q+3 \Rightarrow$ Odd
= $a = 6q+4 \rightarrow$ Even
= $a = 6q+5 \rightarrow$ odd

∴ so, any positive odd integer is of the form $6q+1$ or $6q+3$ or $6q+5$

(3) Members in the first group = 616
Members in the second group = 32

» we have to find out the HCF between the 2 groups

= By Euclid algorithm
$a = 6q + r$

= $616 = 32 \times 19 + 8$
$32 = 8 \times 4 + 0$

= HCF = 8

∴ The maximum number of columns is 8