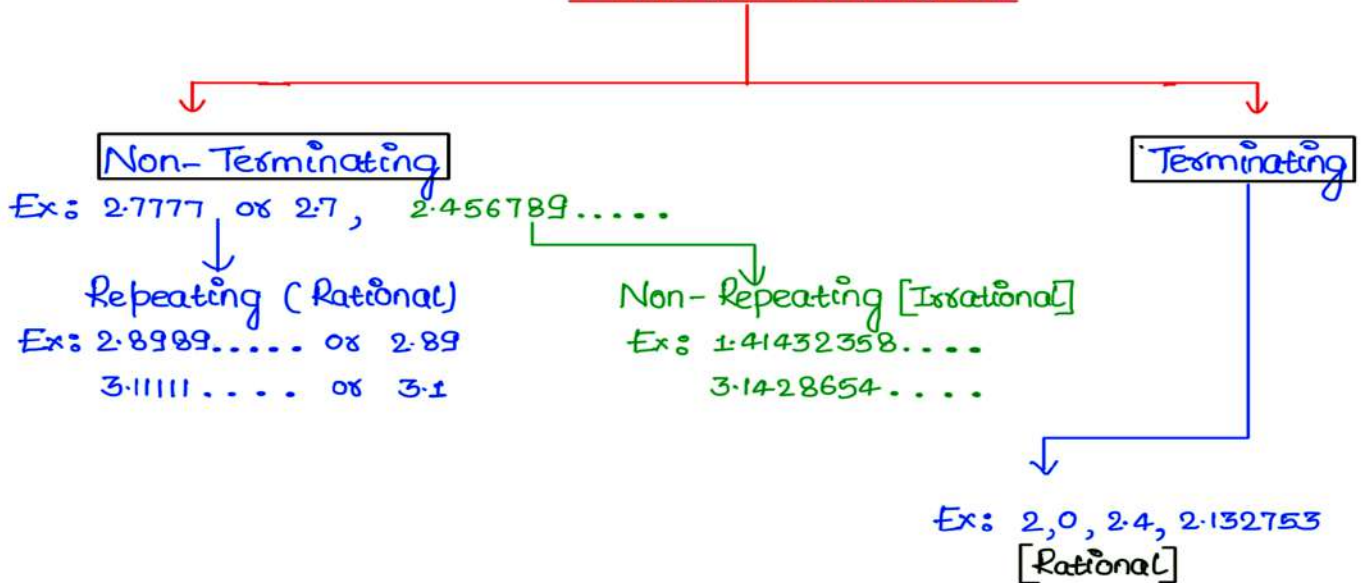




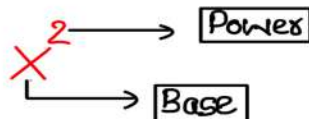
NUMBER SYSTEM

DECIMAL EXPANSION



NOTE

- * Decimal expansion of a rational number is either terminating or Non-Terminating recurring.
- * Decimal expansion of an irrational number is Non-terminating Non-recurring.



LAWS OF EXPONENT

Let $a > 0$ be a real number.

Let m & n be integers such that m and n have no common factors other than 1, and $n > 0$.

Then, $a^{m/n} = (\sqrt[n]{a})^m$

$$\begin{aligned} a^p \cdot a^q &= a^{p+q} \\ [a^p]^q &= a^{p \cdot q} \\ a^{p/q} &= [a^p]^{1/q} \\ a^p \cdot b^p &= [ab]^p \end{aligned}$$

$$\begin{aligned} a^0 &= 1 \\ a^{-b} &= \frac{1}{a^b} \\ \left[\frac{a}{b}\right]^p &= \frac{a^p}{b^p} \end{aligned}$$

NOTE: If the denominator of a fraction, contains two terms along with the surd, then we need to multiply both numerator & denominator by the conjugate of the denominator.



To rationalize the denominator of $\frac{1}{\sqrt{a}+\sqrt{b}}$, we multiply this by $\frac{\sqrt{a}-\sqrt{b}}{\sqrt{a}-\sqrt{b}}$.

For positive real numbers a & b , the following identities hold :

$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$$

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

$$(\sqrt{a}+\sqrt{b})(\sqrt{a}-\sqrt{b}) = a-b$$

$$[\sqrt{a}+\sqrt{b}]^2 = a+b+2\sqrt{ab}$$