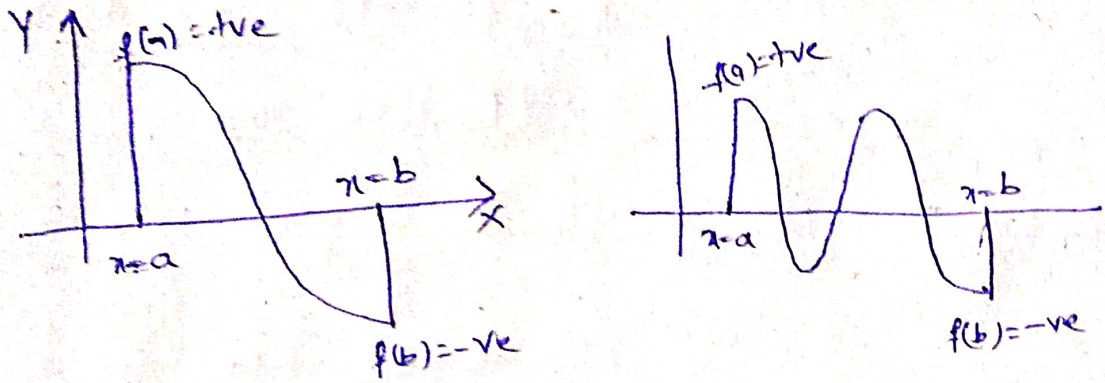
Important formulae & concepts

→ An eqn of degree 'n' has 'n' roots, real or imaginary.

→ Roots $\alpha, \beta = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

→ If f(a) & f(b) are of opposite signs then atleast one or in general odd no. of roots of eqn f(x)=0 lie btw a & b.



→ The quadratic function $f(x) = ax^2+2hxy+by^2+2gx+2fy+c$ is always resolvable into linear factor, iff

$$abc+2fgh-af^2-bg^2-ch^2=0$$

$$\begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix} = 0.$$

→ If roots of the eqn $a_1x^2+b_1x+c_1=0$, $a_2x^2+b_2x+c_2=0$ are in the ratio $\frac{\alpha_1}{\beta_1} = \frac{\alpha_2}{\beta_2}$, then $\frac{b_1^2}{b_2^2} = \frac{a_1c_1}{a_2c_2}$.

→ If one root is 'k' times the other root, then

$$(k+1)^2/k = \frac{b^2}{ac}.$$