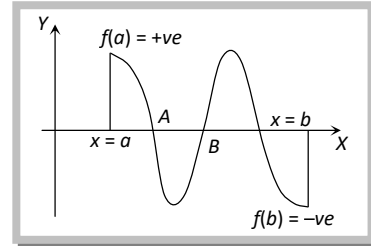
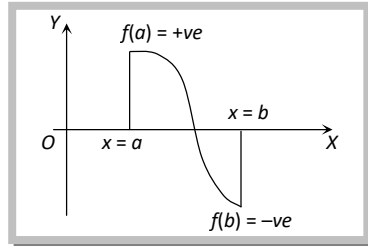
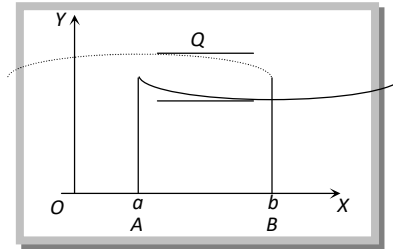


Properties of Quadratic Equation.

(1) If $f(a)$ and $f(b)$ are of opposite signs then at least one or in general odd number of roots of the equation $f(x) = 0$ lie between a and b .



(2) If $f(a) = f(b)$ then there exists a point c between a and b such that $f'(c) = 0$, $a < c < b$.



As is clear from the figure, in either case there is a point P or Q at $x = c$ where tangent is parallel to x -axis

i.e. $f'(x) = 0$ at $x = c$.

(3) If α is a root of the equation $f(x) = 0$ then the polynomial $f(x)$ is exactly divisible by $(x - \alpha)$ or $(x - \alpha)$ is factor of $f(x)$.

(4) If the roots of the quadratic equations $ax^2 + bx + c = 0$, $a_2x^2 + b_2x + c_2 = 0$ are in the same ratio $\left(\text{i.e. } \frac{\alpha_1}{\beta_1} = \frac{\alpha_2}{\beta_2} \right)$ then $b_1^2 / b_2^2 = a_1c_1 / a_2c_2$.

(5) If one root is k times the other root of the quadratic equation $ax^2 + bx + c = 0$ then

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