Figure 1 At least one root exists between the two points if the function is real, continuous, and changes sign.
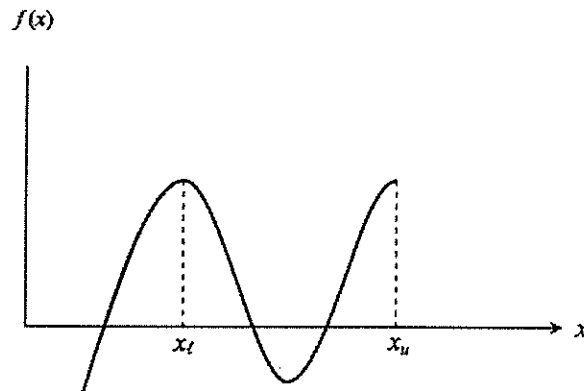

Figure 2 If the function $f(x)$ does not change sign between the two points, roots of the equation $f(x) = 0$ may still exist between the two points.

Source: unknown