Explanation of problem 5

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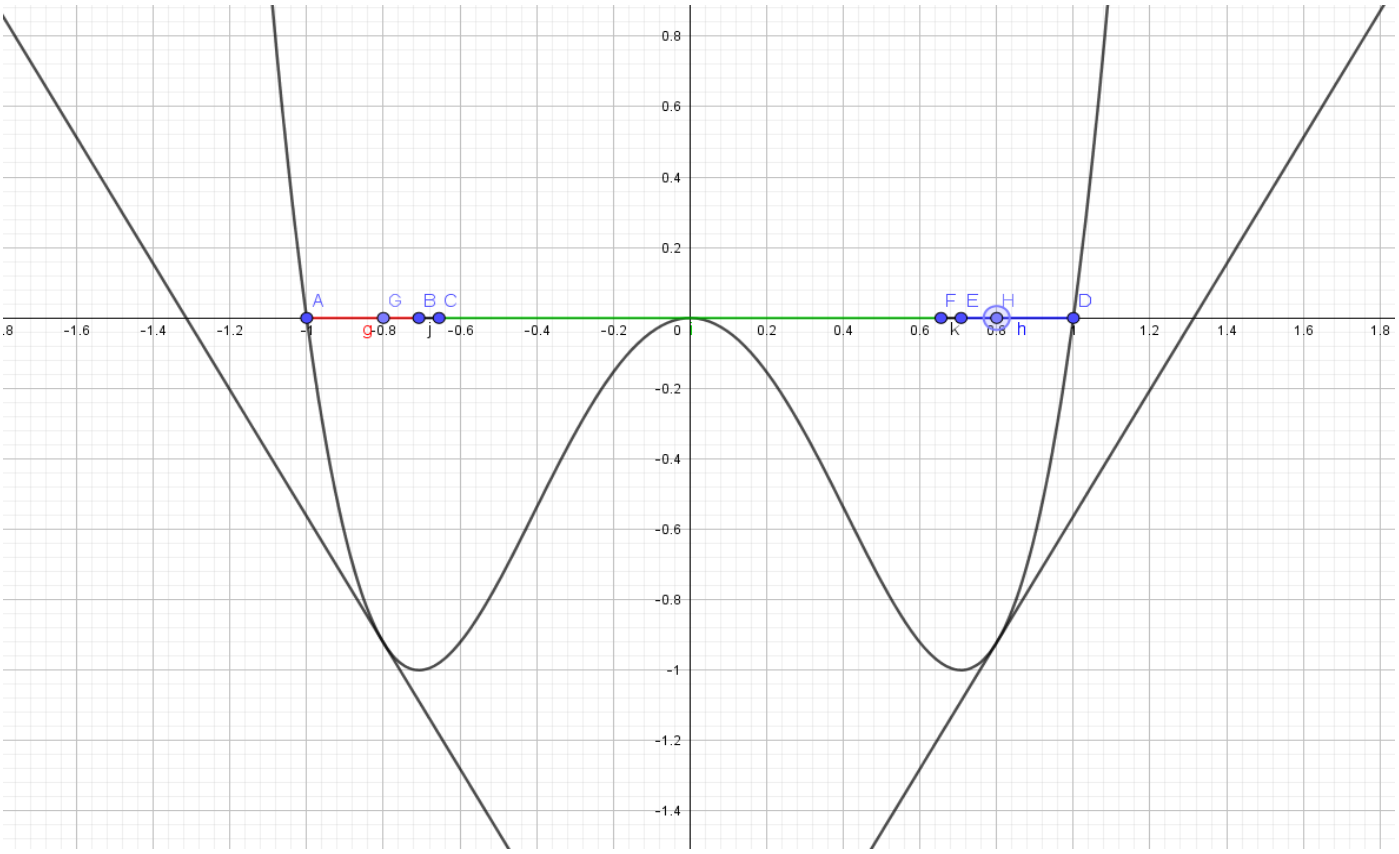
The given function is-

f(x) = $\mathbf{4x^4 - 4x^2}$

The roots of the function are -1, 0, +1.

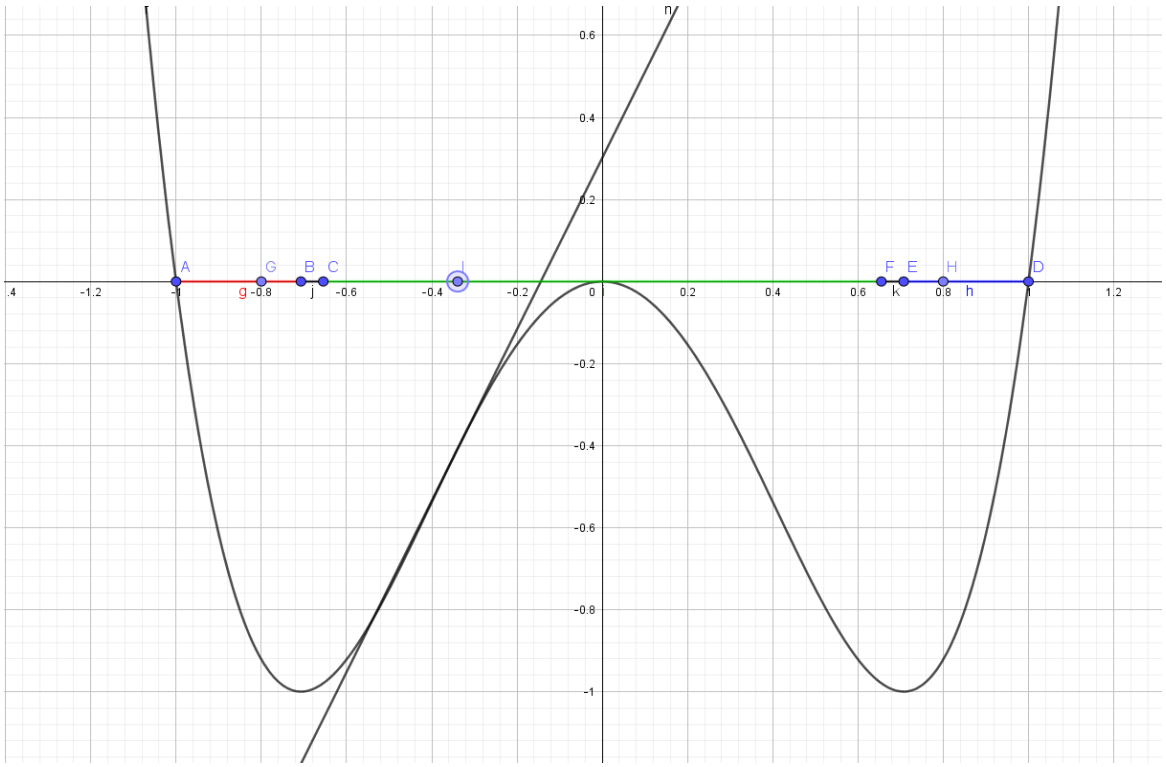
Solving the given equation by NR method by taking differentinitial guesses.

(1) If we take the initial guess between point -1 to - $\frac{\sqrt{2}}{2}$ **and +** $\frac{\sqrt{2}}{2}$ **to +1 .**



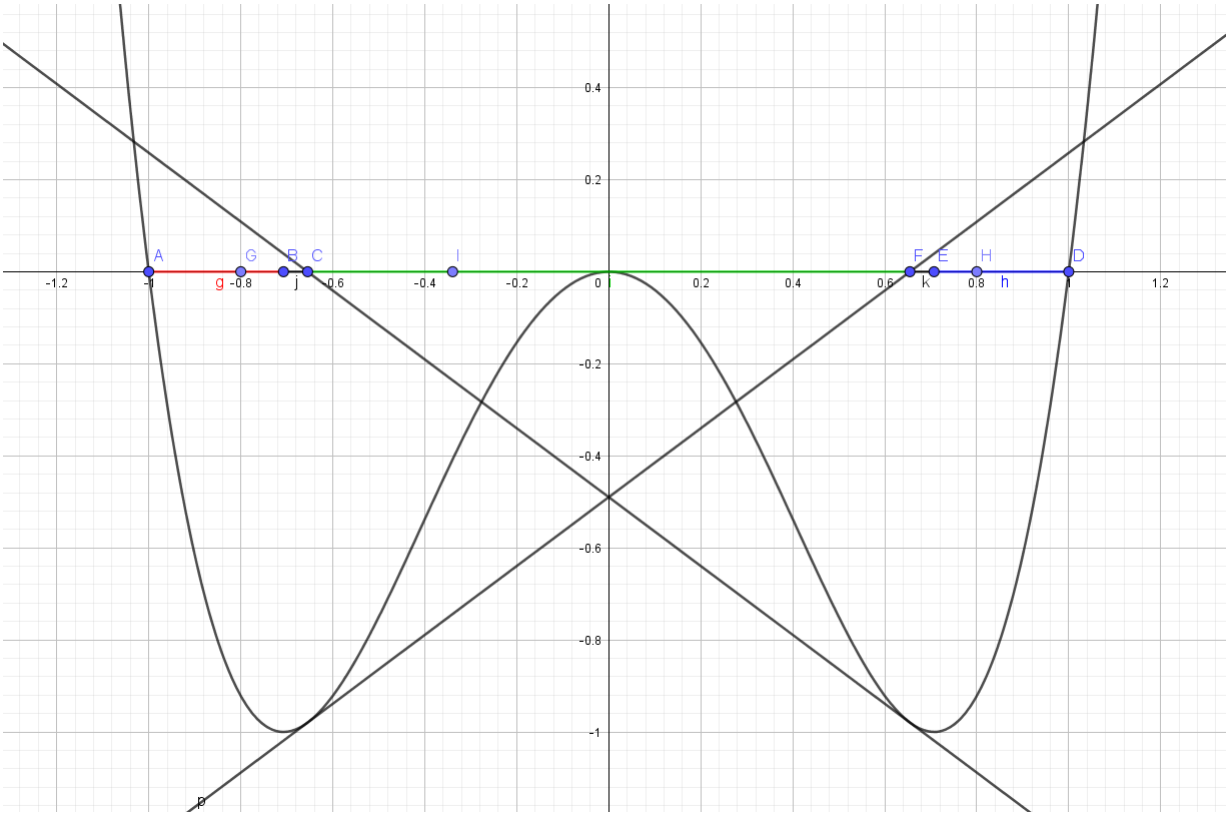
Point G is in between points A and B i.e. -1 and - $\frac{\sqrt{2}}{2}$,the tangent corresponding to this point is in such a way that it will lead to the convergence to -1. Similarly point H is in between points E and D i.e. + $\frac{\sqrt{2}}{2}$ and +1, the tangent corresponding to this point is in such a way that it will lead to the convergence to +1.

(2) If we take initial guess between - $\frac{\sqrt{21}}{7}$ to + $\frac{\sqrt{21}}{7}$.



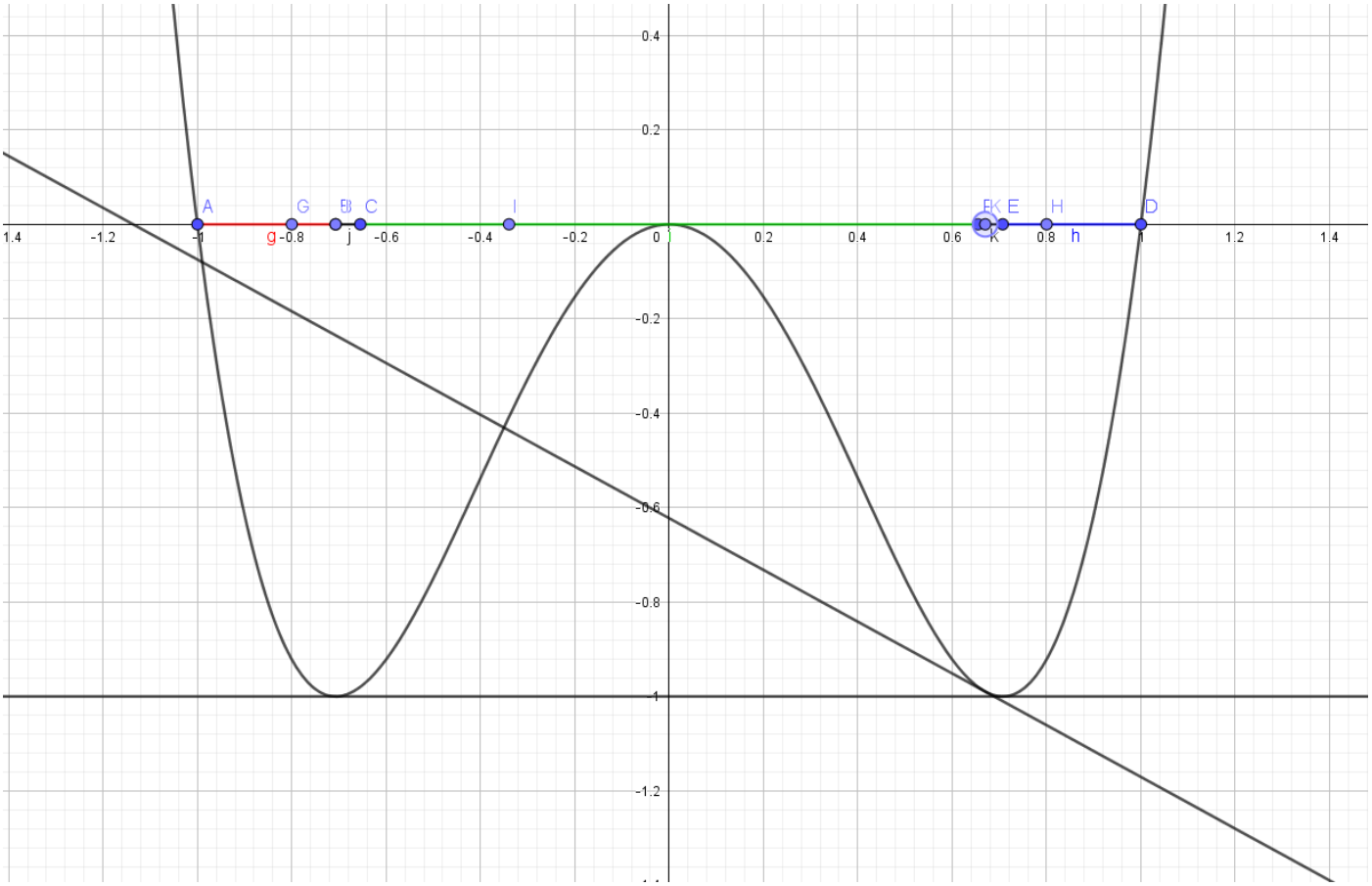
Point "I" is in between points C and F i.e. - $\frac{\sqrt{21}}{7}$ and + $\frac{\sqrt{21}}{7}$,the tangent corresponding to the point "I" is in such a way that it will lead to the convergence to Zero .

(3) If we take the initial guess as $\pm\frac{\sqrt{21}}{7}$.



In above figure, point C and point F represent the - $\frac{\sqrt{21}}{7}$ and + $\frac{\sqrt{21}}{7}$ respectively. If we take initial guess as - $\frac{\sqrt{21}}{7}$ it will iterate the solution to + $\frac{\sqrt{21}}{7}$ that will again iterate to the solution to - $\frac{\sqrt{21}}{7}$ and process will keep on repeating or it will oscillate between these two values hence it will not converge to correct solution.

(4) If we take initial guess between $\frac{\sqrt{21}}{7}$ and $\frac{\sqrt{2}}{2}$.



In the above figure, the points F and E represents the $\frac{\sqrt{21}}{7}$ and $\frac{\sqrt{2}}{2}$ respectively. If we take initial guess as point K which is between these two points then there are infinitely many open intervals of points attracted to -1.