Higher order test of maxima & minima

(*) How to test maxima & minima using higher order derivative

(i) find $f'(x)$

equate $f'(x) = 0$ $\quad x = p, q, r$.

(ii) find $f''(x)$

at $x = p, q, r$ If $f''(x) < 0$ (point of maxima)

$f''(x) > 0$ (point of minima)

$f''(x) = 0$ find $f'''(x)$.

(iii) If $f'''(x) \neq 0$ it is point of inflexion

If $f'''(x) = 0$ find $f^{iv}(x)$.

(iv) If $f^{iv}(x) < 0$ (point of maxima)

$f^{iv}(x) > 0$ point of minima

$f^{v}(x) = 0$ find $f^{v}(x)$

and so on.....

OR

If the even order derivate is $-ve$

it is maxima if it is $+ve$ it is minima

provided the odd order before

the even order should be zero