First part of the proof aims to prove that the nth derivative of any polynomial has all the same factor as the original function but one less power.

Second part of the proof revolves around determining whether ai is an extremum or not, which we can verify with the following rules:

1. If point ai on f(x) is an extremum it satisfies

2. If point ai on f(x) is not an extremum it satisfies

Another version could be

1.

2.

Note: The second version did not include but the statement already implies it.

If we treat this as a recursive call, it is going to look continue searching down to the next derivative taking away one power each time (as we proved earlier) until it hits 0th power, because before then it either satisfies or it dissatisfies . We know when it terminates at ki-1 th derivative everything preceding it would return the same thing. We know that it will terminate at question 1 if ki is odd (assuming we asked question 1 first) and question 2 if it’s even. This means if it was odd the point would not be an extremum and if it was even, it would be an extremum.