

Answer on Question #57268 – Math – Algebra

Question

Use Descartes' rule of signs to describe the roots of $h(x) = 4x^4 - 5x^3 + 2x^2 - x + 5$ show work.

Solution

The polynomial $h(x) = 4x^4 - 5x^3 + 2x^2 - x + 5$ has four sign change: 1) between the first and second terms, 2) between the second and third terms, 3) between the third and fourth terms, 4) between the fourth and fifth terms. The sequence of signs is $+ - + - +$.

Therefore it has exactly four or, counting down in pairs, two or zero positive roots.

To find the number of negative roots, change the signs of the coefficients of the terms with odd exponents, i.e., apply Descartes' rule of signs to the polynomial $h(-x)$, to obtain a second polynomial $h(-x) = 4x^4 + 5x^3 + 2x^2 + x + 5$. There are no sign changes, so there are no negative roots.

Answer:

there are
four, two, or zero positive roots,
and zero negative roots.