2.2 Polynomial Functions

Definition:

$$f(x) = a_n x^n + a_{n-1}x^{n-1} + a_{n-2}x^{n-2} + \dots + a_2 x^2 + a_1 x + a_0$$

Ex: $8x^5 + 3x^4 - 2x^3 + \frac{1}{2}x^2 - 7x + 10$

Leading Term $a_n x^n$ $(8x^5)$

n is the largest exponent

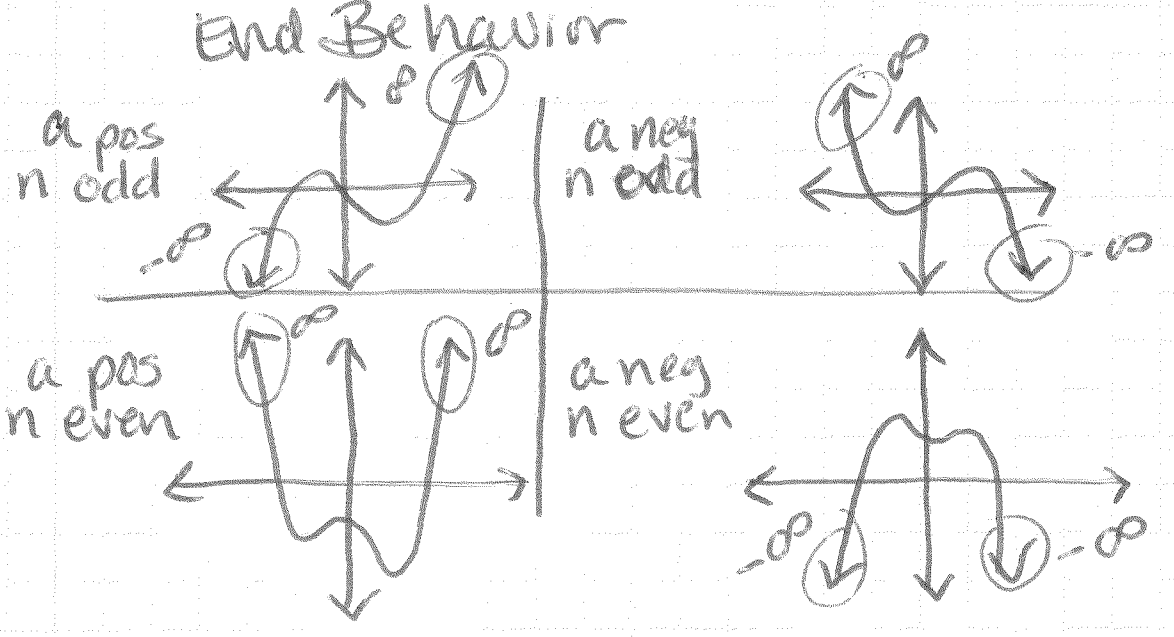
$n > 1$ (no square roots, no fractions)

- Continuous -

n is the degree of the function

Leading Term Test

End Behavior

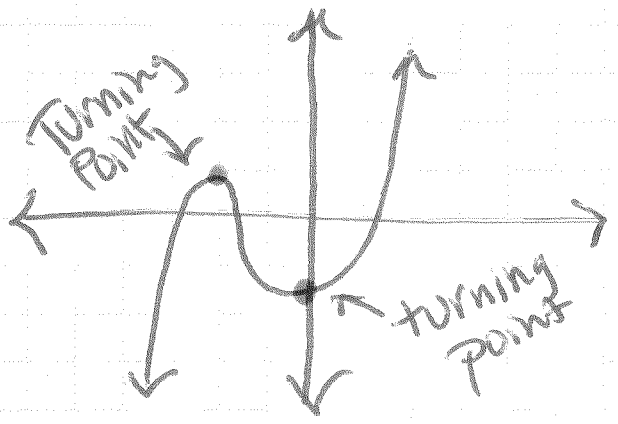


What is the end Behavior? USE LIMITS

$g(x) = 4x^5 - 8x^3 + 20$ $\quad h(x) = 11x^4 - 2x^6 + 2x$

Turning Points and Real Zeros

Turning points are all Relative maximums & minimums. where the graph changes from increasing to decreasing and dec. to inc.



Leading term $a_n x^n$

→ a function has at most n real zeros

→ at most $n-1$ turning points

Ex State zeros & turning points
(max)

$f(x) = x^3 - 6x^2 - 27$ — $n=3$ up to 3 roots; $n-1$ up to 2 tp.

$f(x) = x^4 - 8x^2 + 15$ — up to 4 zeros; up to 3 tp

$f(x) = x^3 - 5x^2 + 6x$ — up to 3 roots; up to 2 tp.

Quartic Equation (basic)

$ax^4 + bx^2 + c$ ← quadratic behavior

$a(x^2)^2 + b(x^2) + c$

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