Polynomial Theorems and Graphing

Fundamental theorem of algebra: Degree is number of zeros

Example: $f(x) = 3x^8 + 7x^5 - 2x^4 + 3x - 5$ there are 8 zeros.

Definition of zero: The solution or value of x

How to find a zero: (1) graph (2) quadratic form. (3) factor (4) Synthetic ÷ (5) inverse

$f(x) = x^3 + 3x^2 - 2x - 8$ - S.f.

$f(x) = (x+1)(x-2)(x+4)$ - f.f

$x = -1, x = 2, x = -4$ - zeros

Standard form: Write expression from highest to lowest

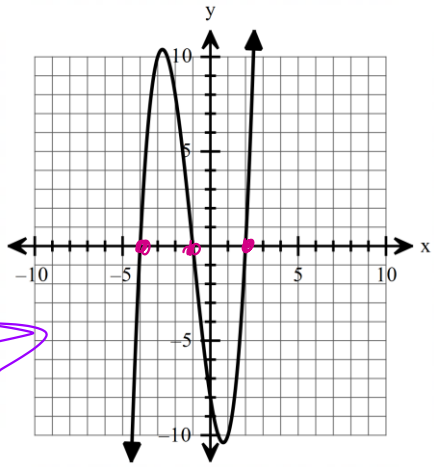
Factored form: Binomials in lowest terms

Zeros: Solutions of x

End behavior: Number ends of graph are approaching

Limit notation:

$\lim_{x \to -\infty} f(x) = -\infty$ $\lim_{x \to \infty} f(x) = \infty$



Polynomial Theorems and Graphing

Fundamental theorem of algebra:

Example:

Definition of zero:

How to find a zero:

$f(x) = x^3 + 3x^2 - 2x - 8$

$f(x) = (x+1)(x-2)(x+4)$

$x = -1, x = 2, x = -4$

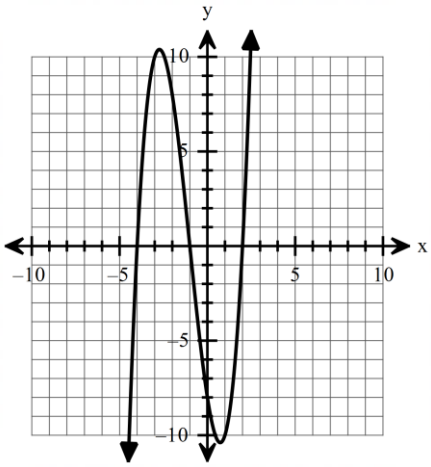
Standard form:

Factored form:

Zeros:

End behavior:

Limit notation:



Remainder Theorem: Sub possible solution into equ. Evaluate. If it is anything but zero it doesn't work and the last number is the remainder.

Example: $f(x) = 3x^4 - 2x^3 + x^2 - 5x + 6, \quad x+2$

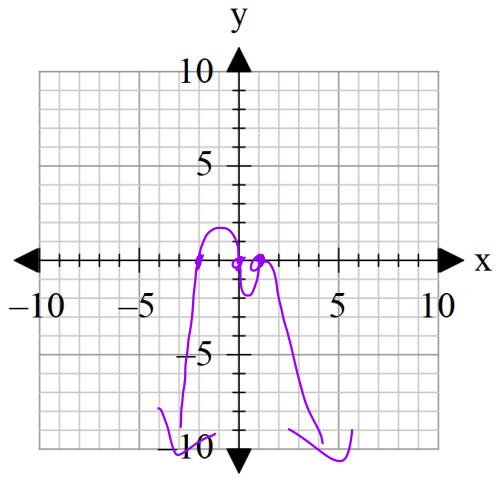
$3(-2)^4 - 2(-2)^3 + (-2)^2 - 5(-2) + 6 = 84$ not factor

Multiplicity: Exponent of the zero as a factor
Even=touch
Odd=cross

$f(x) = -x^3(x+2)(x-1)^2$ degree = 6

Zeros	Multiplicity	Touch/Cross
-2	1	C
0	3	C
1	2	T

$\lim_{x\to-\infty} f(x) = -\infty$ $\lim_{x\to\infty} f(x) = -\infty$



Remainder Theorem:

Example:

Multiplicity:

$f(x) = -x^3(x+2)(x-1)^2$

Zeros	Multiplicity	Touch/Cross

$\lim_{x\to-\infty} f(x) =$ $\lim_{x\to\infty} f(x) =$