7-3 Graphing Polynomial Functions from Standard Form

Recall: Finding the Zeros of a Polynomial

-Factoring: Find GCF first, then may use special factoring, factoring by grouping, or quadratic factoring

-Factor Theorem

-Remainder Theorem

Use to test a factor from rational roots theorem

-Rational Roots Theorem: Helps determine possible rational roots using $x = \pm \frac{\text{factors of constant}}{\text{factors of leading coefficient}}$

End Behavior (polynomial)

End Behavior is determined by the degree of the polynomial and the coefficient of the leading term. The mathematical notation is written using limits.

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

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

Odd Degree: the left & right ends go in opp. directions

(+) coeff.

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

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

(-) coeff.

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

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

Even Degree: both ends go in the same direction

(+) coeff. both up

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

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

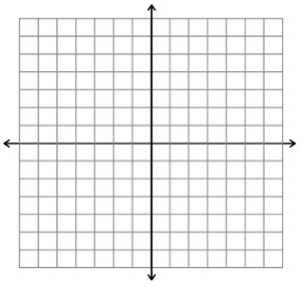
(-) coeff. both down

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

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

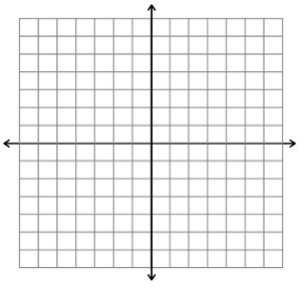
Ex. Find the zeros of the polynomial, then graph by hand

$$f(x)=-x^5-7x^4-12x^3$$



Ex. Find the zeros of the polynomial, then graph by hand

$$f(x)=x^4+4x^3+x^2-6x$$



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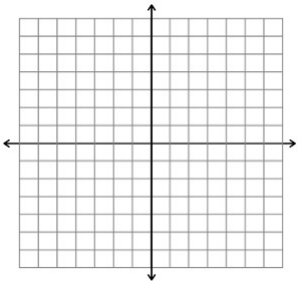
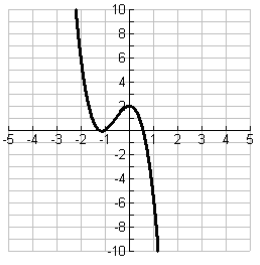
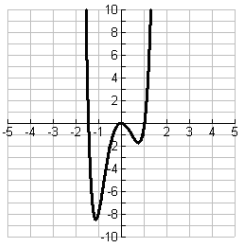
Find the zeros of the polynomial, then graph by hand

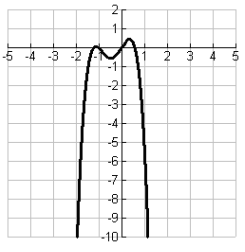
$$f(x) = x^3 - x^2 - 5x - 3$$



Name the degree & the sign of the coefficient of the leading term based on the end behavior:

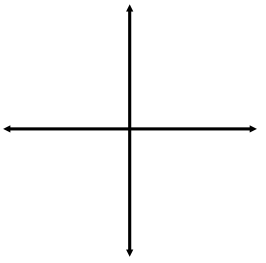






Find the zeros, graph and analyze including end behavior using limits:

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



Domain:

Increasing:

Range:

Decreasing:

Symmetry:

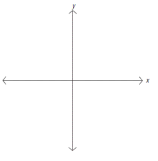
Maximum:

End behavior:

Minimum:

Graph and analyze the following graphs

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



Domain:

Increasing:

Range:

Decreasing:

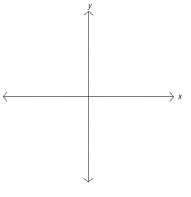
Symmetry:

Maximum:

End behavior:

Minimum:

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



Domain:

Increasing:

Range:

Decreasing:

Symmetry:

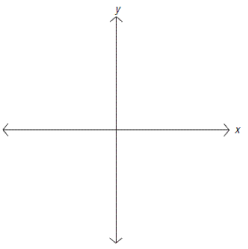
Maximum:

End behavior:

Minimum:

Graph and analyze the following graphs

$f(x) = x^3 - 4x^2 - 11x + 30$



Domain:

Increasing:

Range:

Decreasing:

Symmetry:

Maximum:

End behavior:

Minimum: