Analyzing Graphs of Polynomial Functions

Obj: Graph a rough sketch of a polynomial function by hand given relative max/min points and zeros.
Obj: Graph a rough sketch of a polynomial function using technology to find relative max/min points and zeros.

-Relative Max/Min Points

Hills

Valleys

***relative maximum** - no other nearby points on a graph have a greater *y*-value

***relative minimum** - no other nearby points on a graph have a smaller *y*-value

***relative max/mins** - *turning* points on a graph
-some graphs have more than 1 rel. max/min

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-Steps for Graphing

1) Determine end behavior and basic shape.
(check degree & leading coefficient!)

(0, #) $f(x) = 3x^3 - 5x^2 + 7x$ (0, 9)

2) Determine the y-intercept (constant in the eq!)

3) Find the zeros/x-ints of the function. crosses x-axis

4) Find any relative max/min points.

5) Plot the key points found in steps 2-4.

6) Use the info from step 1 to *draw a continuous, smooth curve.*

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-Examples

1. $f(x) = -x^3 - 4x^2 + 5$

as $x \to -\infty$, $f(x) \to +\infty$

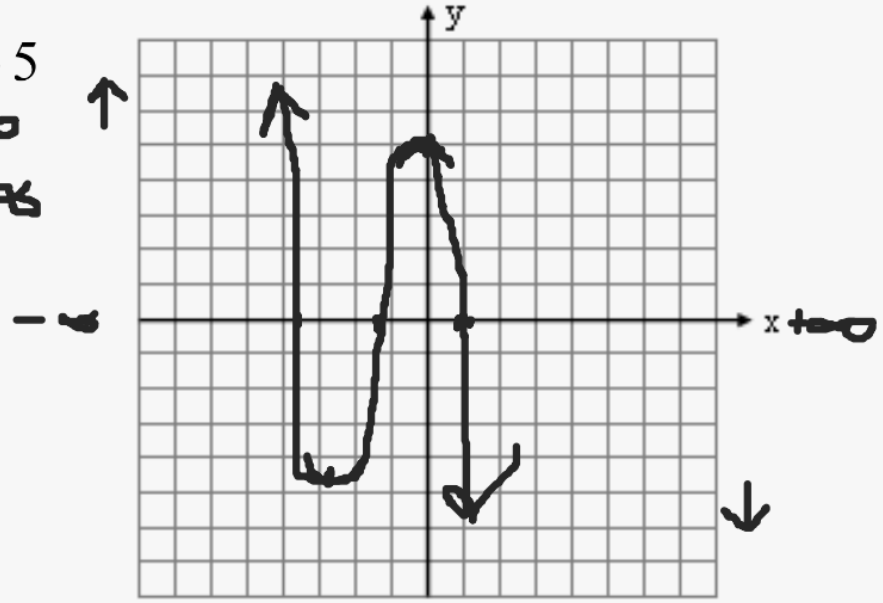
as $x \to +\infty$, $f(x) \to -\infty$

y-int: (0,5)

zeros: (-3.6,0), (-1.4,0), (1.0)

rel max: (0,5)

rel min: (-2.7, -4.5)



deg: 3

LC: −

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-Examples

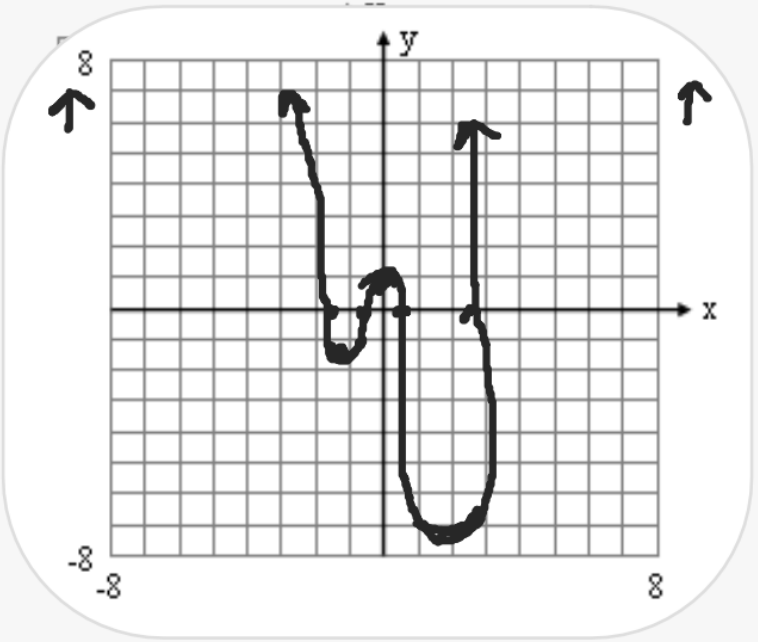
2. $f(x) = x^4 - x^3 - 4x^2 + 1$

y-int: (0,1)

zeros: x = -1.4, -0.6, 0.5, 2.5

rel max: (0,1)

rel min: (-1.1, -1.1)
(1.8, -7.3)



degree: 4 both ends up

LC: |

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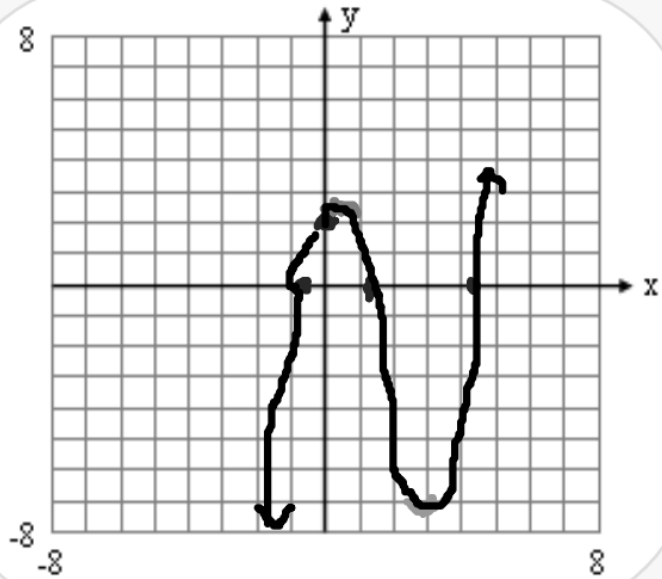
-Examples

Sketch the graph using the given information.

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



y-int: **(0,2)**

zeros: **(-0.4,0) (1.2,0) (4.2,0)**

rel max: **(0.3, 2.5)**

rel min: **(3,-7)**

degree:

LC:

TYPE: X^3 - 5X^2 + 3X + 2

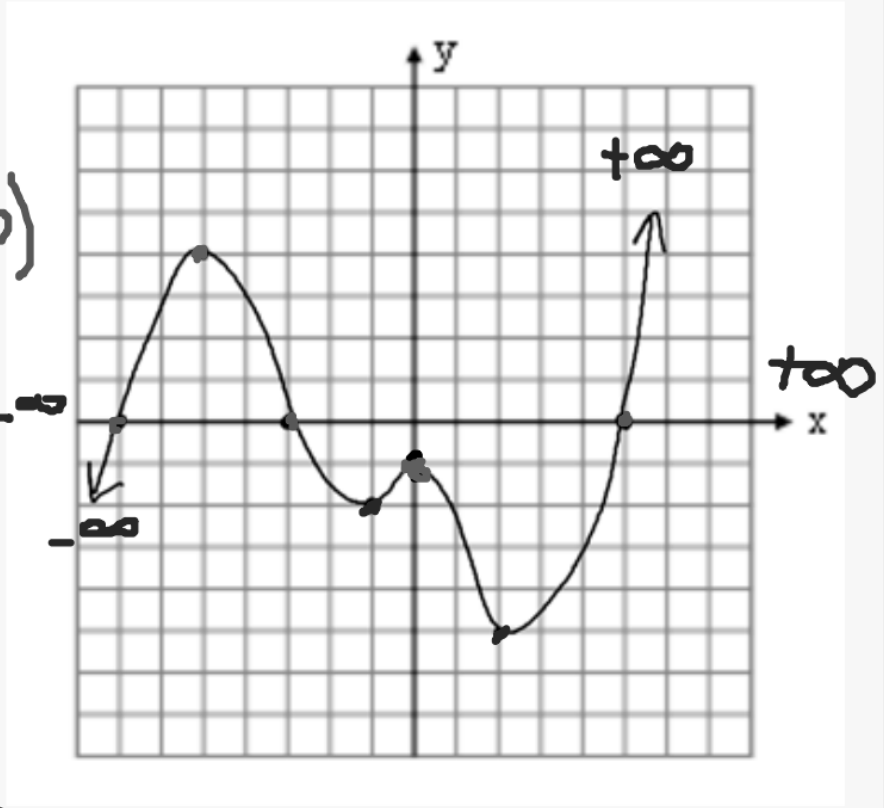
Analyzing Graphs of Polynomial Functions

Obj: Identify parts of the graph of a polynomials function.

-Examples

Identify the y-intercept, real zeros, relative maxima(s), and relative minima(s).

4.



y-int: $(0,-1)$

zeros: $(-7,0),(-3,0),(5,0)$

rel max: $(-5,4),(0,-1)$

rel min: $(-1,-2),(2,-5)$

degree: 5

even or odd:

Positive or Negative LC:

End Behavior As $x \to -\infty, f(x) \to -\infty$

As $x \to +\infty, f(x) \to +\infty$

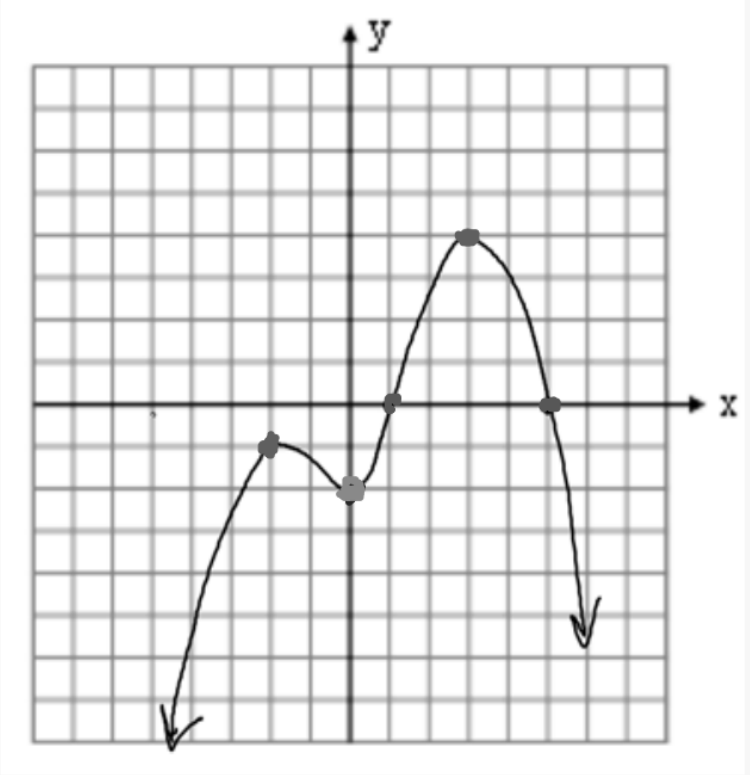
Analyzing Graphs of Polynomial Functions

Obj: Identify parts of the graph of a polynomials function.

-Examples

Identify the y-intercept, real zeros, relative maxima(s), and relative minima(s).

5.



y-int: $(0,-2)$

zeros: $(1,0)$, $(5,0)$

rel max: $(-2,-1)$ $(3,4)$

rel min: $(0,-2)$

degree: 4

even or odd:

Positive or Negative LC:

End Behavior As $x \to -\infty$, $f(x) \to -\infty$

As $x \to +\infty$, $f(x) \to -\infty$