5-4 Graphing Polynomial Functions

Determine as much as possible about the graph from the given function:

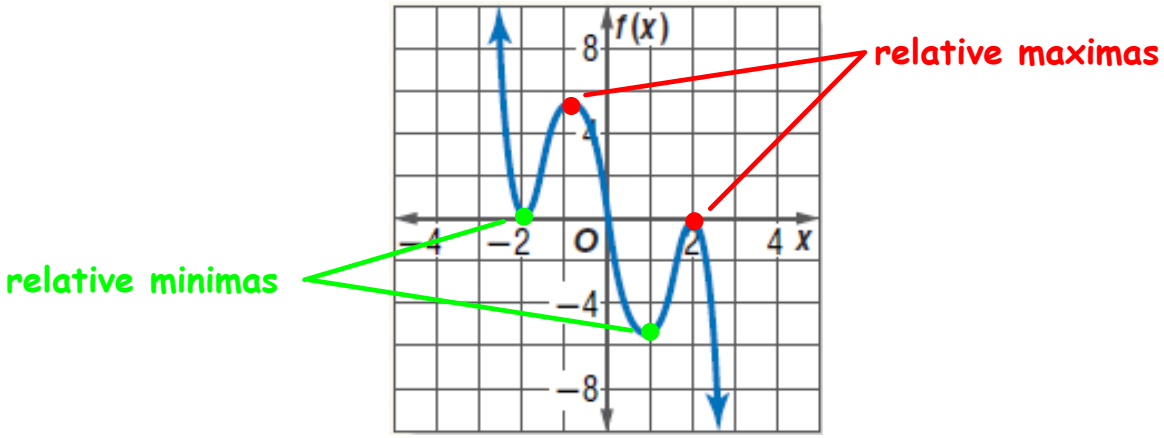
- total # of zeros
- signs and combinations of +, - , *i* zeros
- possible rational zeros
- end behavior

To Graph:

- plot start and end behavior directions.
- plot zeros
- use a t-table of values to determine relative maxima and relative minima points.

relative maxima: points that are the greatest in the given area of a graph.

relative minima: points that are the lowest in a given area of a graph.



Example: ***Graph the following polynomial function. Then give the relative maxima and minima values to the nearest half.***

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

total zeros: 3

y-int (0, 5)

(+) + − + 2 or 0

(−) − − + 1

3 total

+ + −

− i i

0 im. 2 im.

p: ±1, ±5

q: ±1

$\left\{-1, \frac{5 \pm \sqrt{5}}{2}\right\}$

1 | 1 −4 0 5

1 −3

1 −3

−1 | 1 −4 0 5

−1 5 −5

1 −5 5 | 0

$x^2 - 5x + 5 = 0$

$x = \frac{5 \pm \sqrt{(-5)^2 - 4(1)(5)}}{2(1)}$

$x = \frac{5 \pm \sqrt{25 - 20}}{2}$

$x = \frac{5 \pm \sqrt{5}}{2}$ → 3.6, 1.4

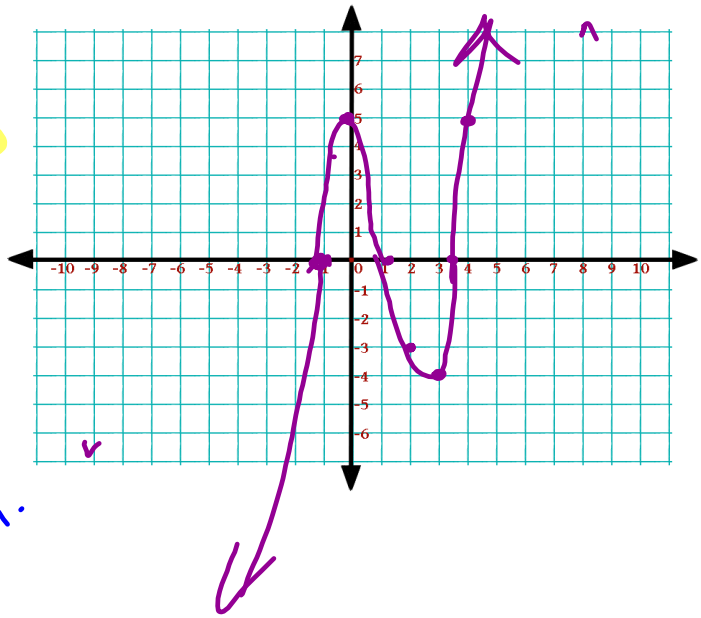
$y = x^3 - 4x^2 + 5$

x	y
-2	-19
-3	-58
0	5
-.5	3.875
.5	4.125
2	-3
3	-4
2.5	-4.375
3.5	-4.125

rel. max

rel. min.

x	y
4	5
5	30



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

2. $h(x) = x^4 - 2x^3 - 7x^2 + 8x + 12$