Review from Sec 2.3 day 1 End Behavior

degree coefficient

even, positive

$y = 3x^4 + \dots$

II ↑ ↗ I

up, up

$x \to \infty \; h(x) \to \infty$

$x \to -\infty \; h(x) \to \infty$

odd, positive

$y = 2x^5 + \dots$

III ↙ ↗ I

down, up

$x \to \infty \; h(x) \to \infty$

$x \to -\infty \; h(x) \to -\infty$

even, negative

$y = -3x^4 + \dots$

III ↘ ↙ IV

down, down

$x \to \infty \; h(x) \to -\infty$

$x \to -\infty \; h(x) \to -\infty$

odd, negative

$y = -2x^5 + \dots$

II ↑ ↓ IV

up, down

$x \to \infty \; h(x) \to -\infty$

$x \to -\infty \; h(x) \to \infty$

Sec 2.3 continued

The degree also tells us two other important graphing items:

$\boxed{y = ax^n + \cdots}$

1) number of roots is n (zeros, intercepts)

Where the graph crosses the x-axis.

2) number of local extrema is n - 1

the max/mins (also turning points)

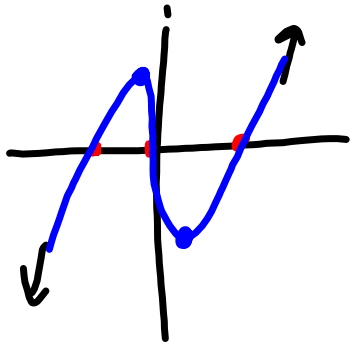
ex. What is the end behavior, # of roots, # of extrema?

$f(x) = 1x^3 + 2x^2 - 11x + 12$

end behavior ↙ ↗

# of roots 3

# of extrema 2

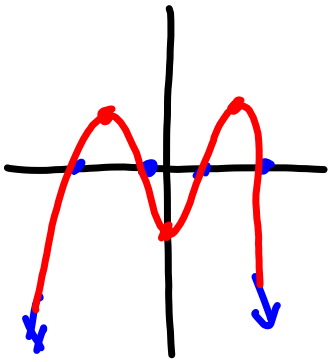


ex. $y = -x^4$

EB ↙ ↘

# of roots 4

# of extrema 3



Sep 30-8:03 AM

$y = -(x + 2)(x - 4)(x + 7)$

$y = -x^3 + \ldots$

$x + 2 = 0$
$-2 \quad -2$
$x = -2$

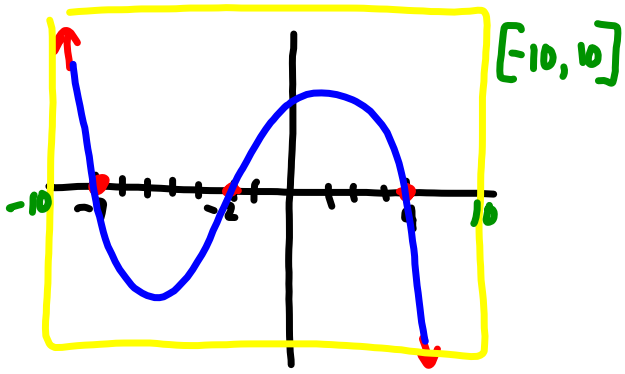
$x = 4$

$x = -7$

EB ↑ ↓

roots 3

extrema 2



Homework. Label 2.3 day 2

In each of the problems below, state the number of zeros and extrema that each polynomial will have.

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

19. $f(x) = -x^3 + 4x^2 + 31x - 70$

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

23. $f(x) = 2x^4 - 5x^3 - 17x^2 + 14x + 41$

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

27. $f(x) = 7x^2 - x^3 + 3x - 4$