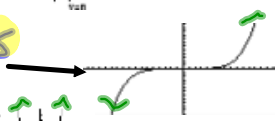
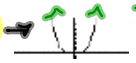
Lesson #13

Aim: How do we recognize the shape and properties of basic polynomial functions?

Do Now: What are the differences between the following graphs?

a) $f_1(x) = 2x^3$ 

b) $f_2(x) = 0.01x^5$ 

c) $f_3(x) = 2x^4$ 

d) $f_4(x) = 6x^6$ → It will look like (c)

ax^n → Exponent (Degree)

a → base

leading coefficient

Note: You may want to adjust the window to view some of them.

Conclusion: If the Degree is

even – the end behavior is (the same) < up +a / Down -a

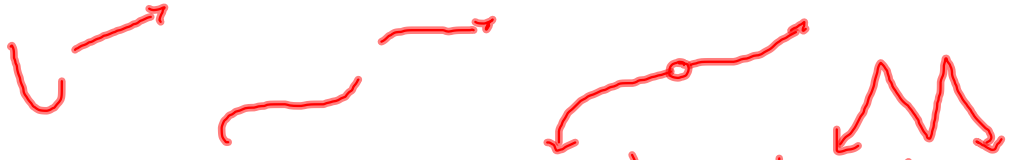
odd – the end behavior is different

+a Down/up

-a up/Down

I- Property: Continuity

1) Every graph of a polynomial function is continuos: (No broken curve, no jumps, no gaps(holes), No sharp corners)

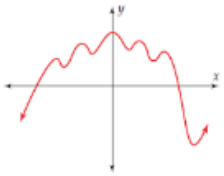


Not acceptable behavior for a polynomial function

2) PAGE 269

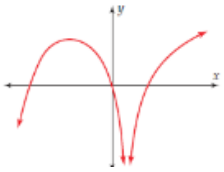
In Exercises 1–6, decide whether the given graph could possibly be the graph of a polynomial function.

1.



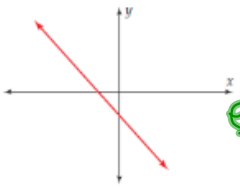
YES

2.



NO

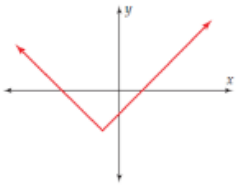
3.



YES

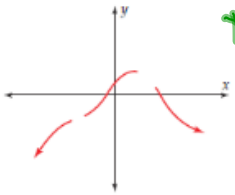
ex) $y = -x - 2$

4.



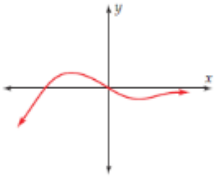
NO

5.



NO

6.



YES

Apr 9-2:32 PM

I End behavior

take a look at each group, what do they have in common?

Group A

$f_1(x) = 2x^4 - 5x^2 + 3$

$f_2(x) = 2x^4$

Group B

$g_1(x) = -3x^6 + 5x^5 + 3$

$g_2(x) = -3x^6$

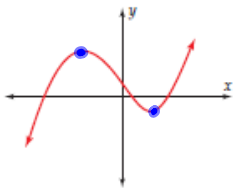
Conclusion: their end behavior are the same as $|x|$ gets bigger it begins to look similar to its higher degree term.

Page 269 →

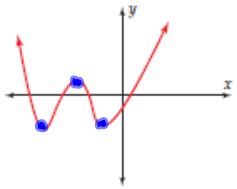
Pg. 269

In Exercises 7–12, determine whether the given graph could possibly be the graph of a polynomial function of degree 3, degree 4, or degree 5.

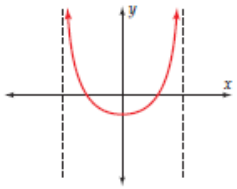
7.



8.



9.



Degree

3 (n-1)
Different end behavior

4 (n-1)
Same end behavior

4

Notes! for Polynomial functions
- only one y intercept
- At most n(Degree) x intercepts

Note ② find all zeros of

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

Zeros	Multiplicity (K)	x-Axis
-1	3	YES (CROSSED)
1	1	CROSSED
3	2	TOUCHED
	6	

IF
- K is even (TOUCHED)
- K is ODD (CROSSED)