7-1 Graphs of Polynomial Functions - Microsoft Word
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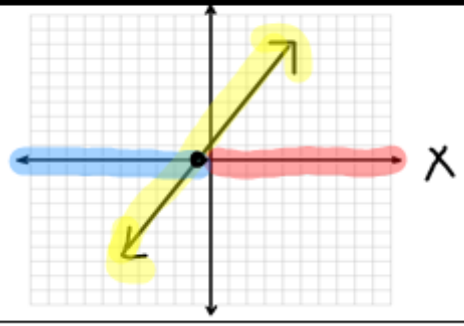
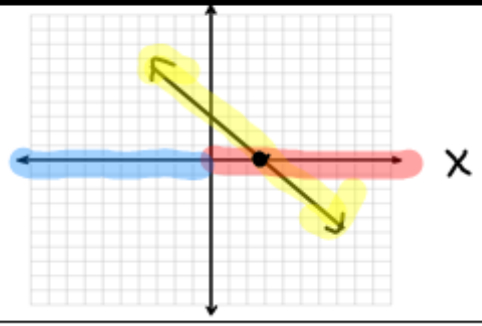
7.1. Advanced Algebra
Graphs of Polynomials

DATE: 2/18

Target 7A. Analyze the graph/equation of a polynomial function by: identify its degree, number and location of its real zeros, determine its end behavior, and determining the maxima and minima

Basic Shapes of the Graph of Polynomial Functions

Odd Degree 1, Leading Coefficient Positive	Odd Degree 1, Leading Coefficient Negative
	
End Behavior: As $x \to -\infty$ (left side), $f(x) \to$ $-\infty$ As $x \to +\infty$ (right side), $f(x) \to$ $+\infty$	End Behavior: As $x \to -\infty$ (left side), $f(x) \to$ $+\infty$ As $x \to +\infty$ (right side), $f(x) \to$ $-\infty$
Maximum number of turns: 0	Maximum number of turns: 0
Maximum number of real zeros: 1	Maximum number of real zeros: 1

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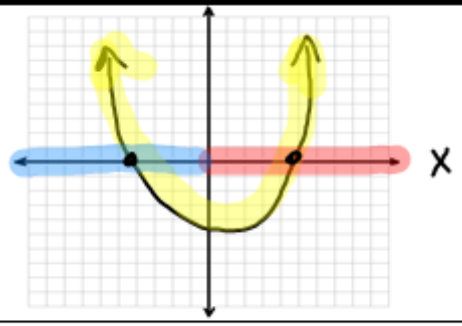
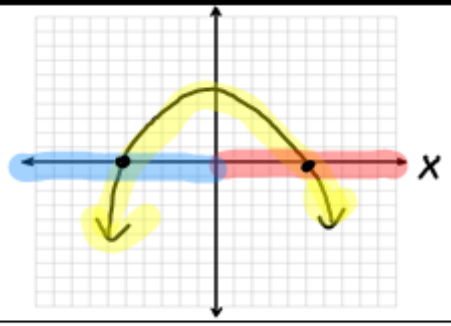
Even Degree 2, Leading Coefficient Positive	Even Degree 2, Leading Coefficient Negative
	
End Behavior: As $x \to -\infty$ (left side), $f(x) \to$ $+\infty$ As $x \to +\infty$ (right side), $f(x) \to$ $+\infty$	End Behavior: As $x \to -\infty$ (left side), $f(x) \to$ $-\infty$ As $x \to +\infty$ (right side), $f(x) \to$ $-\infty$
Maximum number of turns: 1	Maximum number of turns: 1
Maximum number of real zeros: 2	Maximum number of real zeros: 2

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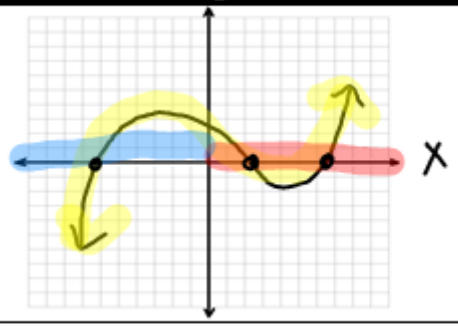
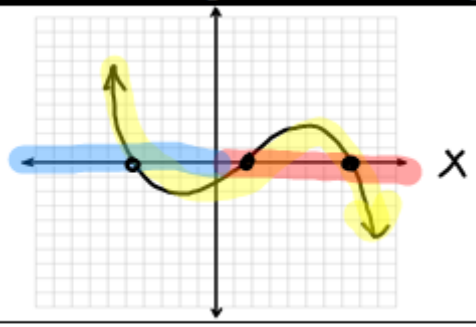
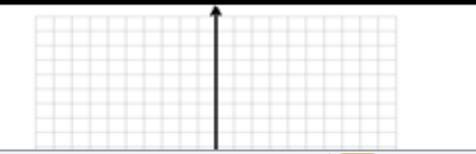
Odd Degree 3, Leading Coefficient Positive	Odd Degree 3, Leading Coefficient Negative
	
End Behavior: As $x \to -\infty$ (left side), $f(x) \to$ $-\infty$ As $x \to +\infty$ (right side), $f(x) \to$ $+\infty$	End Behavior: As $x \to -\infty$ (left side), $f(x) \to$ $+\infty$ As $x \to +\infty$ (right side), $f(x) \to$ $-\infty$
Maximum number of turns: 2	Maximum number of turns: 2
Maximum number of real zeros: 3	Maximum number of real zeros: 3

Even Degree 4, Leading Coefficient Positive	Even Degree 4, Leading Coefficient Negative
	

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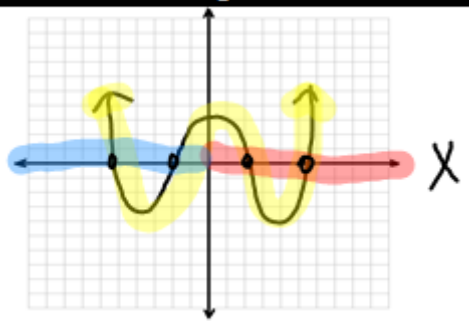
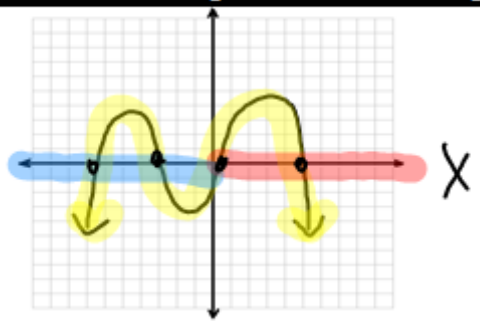
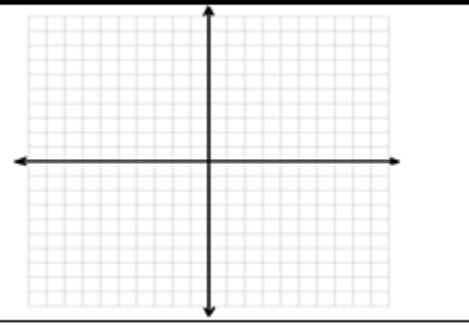
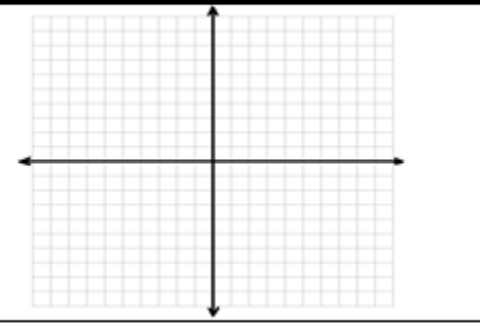
Even Degree 4, Leading Coefficient Positive	Even Degree 4, Leading Coefficient Negative
	
End Behavior: As $x \to -\infty$ (left side), $f(x) \to$ $+\infty$ As $x \to +\infty$ (right side), $f(x) \to$ $+\infty$	End Behavior: As $x \to -\infty$ (left side), $f(x) \to$ $-\infty$ As $x \to +\infty$ (right side), $f(x) \to$ $-\infty$
Maximum number of turns: 3	Maximum number of turns: 3
Maximum number of real zeros: 4	Maximum number of real zeros: 4

Odd Degree 5, Leading Coefficient Positive	Odd Degree 5, Leading Coefficient Negative
	
End Behavior:	End Behavior:

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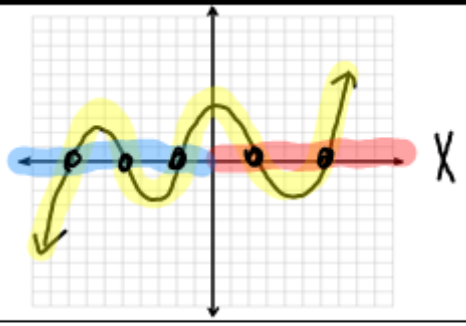
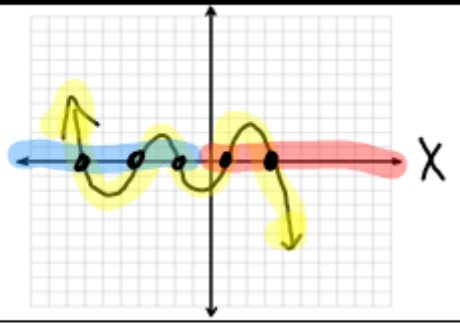
Maximum number of real zeros:	Maximum number of real zeros:

Odd Degree 5, Leading Coefficient Positive	**Odd Degree 5, Leading Coefficient Negative**
	
End Behavior: As $x \to -\infty$ (left side), $f(x) \to$ $-\infty$ As $x \to +\infty$ (right side), $f(x) \to$ $+\infty$	End Behavior: As $x \to -\infty$ (left side), $f(x) \to$ $+\infty$ As $x \to +\infty$ (right side), $f(x) \to$ $-\infty$
Maximum number of turns: 4	Maximum number of turns: 4
Maximum number of real zeros: 5	Maximum number of real zeros: 5

Do each of the following for every given function:

a. Sketch the general shape
b. Describe the end behavior
c. State the maximum number of turns
d. State the maximum number of real zeros

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Do each of the following for every given function:

a. Sketch the general shape
b. Describe the end behavior
c. State the maximum number of turns
d. State the maximum number of real zeros

You try evens!

1. $f(x) = 2x + 7$

a.

b. As $x \to -\infty$ (left side), $f(x) \to$ $-\infty$
As $x \to +\infty$ (right side), $f(x) \to$ $+\infty$

c. 0

d. 1

2. $f(x) = 2x^2 + 7x - 1$

a.

b. As $x \to -\infty$ (left side), $f(x) \to$ _____
As $x \to +\infty$ (right side), $f(x) \to$ _____

c.

d.

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

a.

b. As $x \to -\infty$ (left side), $f(x) \to$ $-\infty$
As $x \to +\infty$ (right side), $f(x) \to$ $+\infty$

c. 2

d. 3

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

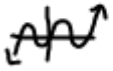
a.

b. As $x \to -\infty$ (left side), $f(x) \to$ _____
As $x \to +\infty$ (right side), $f(x) \to$ _____

c.

d.

5. $f(x) = 2x^5 + 7x^4 - x^3 - 4x^2 + 3x + 6$

a. 

b. As $x \to -\infty$ (left side), $f(x) \to$ $-\infty$
As $x \to +\infty$ (right side), $f(x) \to$ $+\infty$

6. $f(x) = -2x + 7$

a.

b. As $x \to -\infty$ (left side), $f(x) \to$ _____
As $x \to +\infty$ (right side), $f(x) \to$ _____

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5. $f(x) = 2x^5 + 7x^4 - x^3 - 4x^2 + 3x + 6$

a.

b. As $x \to -\infty$ (left side), $f(x) \to$ _____
As $x \to +\infty$ (right side), $f(x) \to$ _____

c. 4

d. 5

6. $f(x) = -2x + 7$

a.

b. As $x \to -\infty$ (left side), $f(x) \to$ _____
As $x \to +\infty$ (right side), $f(x) \to$ _____

c.

d.

You try evens!

7. $f(x) = -2x^2 + 7x - 1$

a.

b. As $x \to -\infty$ (left side), $f(x) \to -\infty$
As $x \to +\infty$ (right side), $f(x) \to -\infty$

c. 1

d. 2

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

a.

b. As $x \to -\infty$ (left side), $f(x) \to +\infty$
As $x \to +\infty$ (right side), $f(x) \to -\infty$

c. 2

d. 3

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

a.

b. As $x \to -\infty$ (left side), $f(x) \to -\infty$
As $x \to +\infty$ (right side), $f(x) \to -\infty$

c. 3

d. 4

10. $f(x) = -2x^5 + 7x^4 - x^3 - 4x^2 + 3x + 6$

a.

b. As $x \to -\infty$ (left side), $f(x) \to$ _____
As $x \to +\infty$ (right side), $f(x) \to$ _____

c.

d.

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