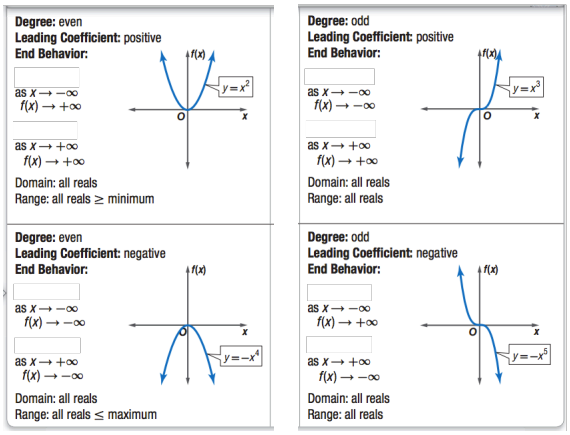
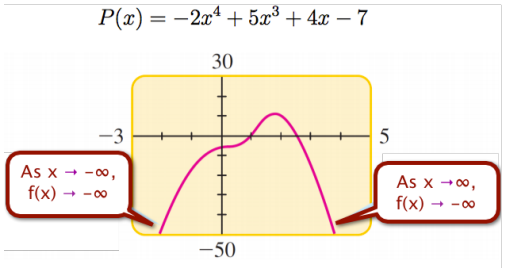
Write your questions and thoughts here!

7.6 –Polynomial Graphs

End Behavior

We can see that the _____ and _____ _____ drive the graph of the polynomial function!





You Try!

What is the end behavior of $f(x) = -3x^2 - x^5$?

Key Terms:

Relative (local) _____

_____

Absolute _____

_____

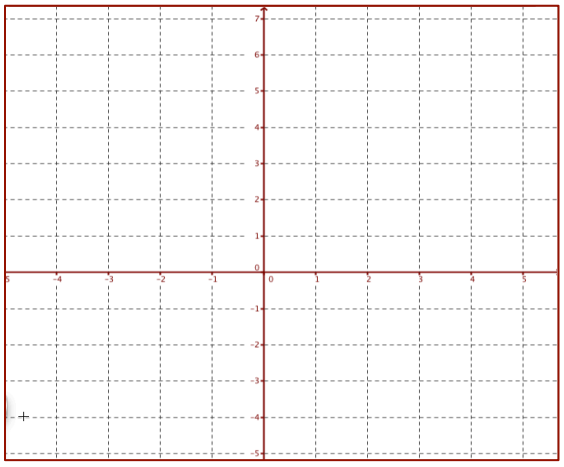
Relative (local) _____

_____

Absolute _____

Lets look at $f(x) = (x+1)(x-2)^2$ or in Standard Form: $f(x) = x^3 - 3x^2 + 4$

Graph the function. Label all extrema, zeros, intercepts and end behavior. Round to the nearest hundredth, if necessary.



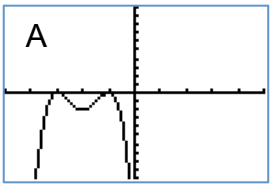
x	f(x)

To find: 2nd TRACE 2 2nd TRACE 3 2nd TRACE 4

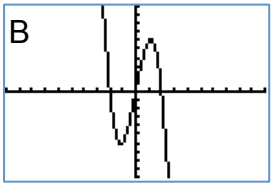
To reset viewing window: ZOOM 6

For each of the following, use the end behavior and x-intercepts to match the equation to its graph.

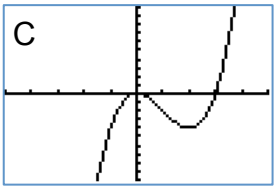
1. $f(x) = x^3 - 3x^2$



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



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



More Graphing….

Graph the function. Label all extrema, zeros, intercepts and end behavior. Round to the nearest hundredth, if necessary.

$f(x) =$

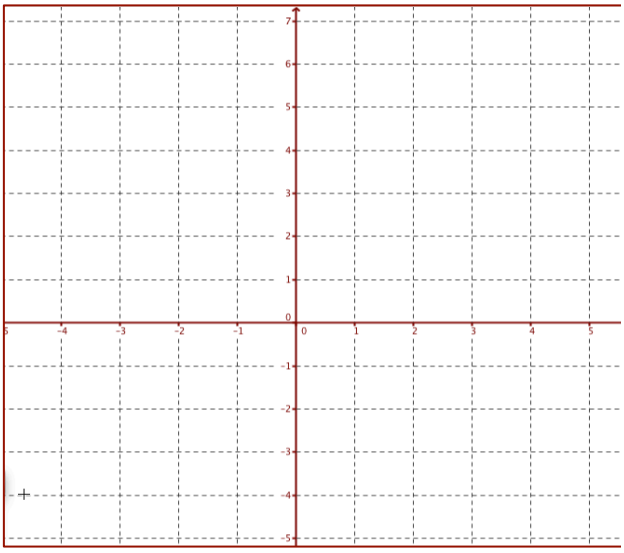
x	f(x)

Zeros:

y-intercept:

Extrema:

End Behavior:



Find all extrema, zeros, intercepts and end behavior. Round to the nearest hundredth, if necessary.

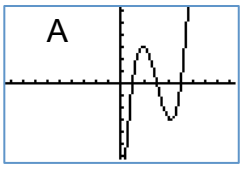
Function	Degree	Leading Coefficient	Zeros	y-Intercept	Extrema	End Behavior
$f(x) = 8x^2 - 5 - x^4$						

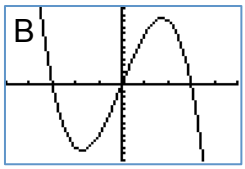
Now summarize what you have learned!

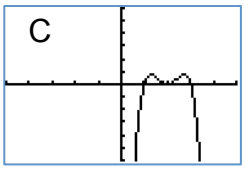
Practice 7.6

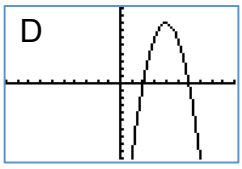
For each of the following, use the end behavior and x-intercepts to match the equation to its graph.

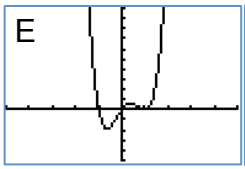
1. $f(x) = x$
2. $f(x) = (x-1)(x-3)(x-5)$
3. $f(x) = -x^3 + 9x$
4. $f(x) = -3(x-1)(x-2)^2(x-3)$
5. $f(x) = -2x^2 + 16x - 24$
6. $f(x) = 3x^4 - 3x^3 - 3x^2 + 3x$

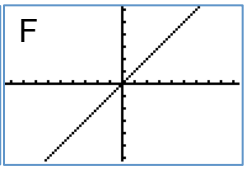




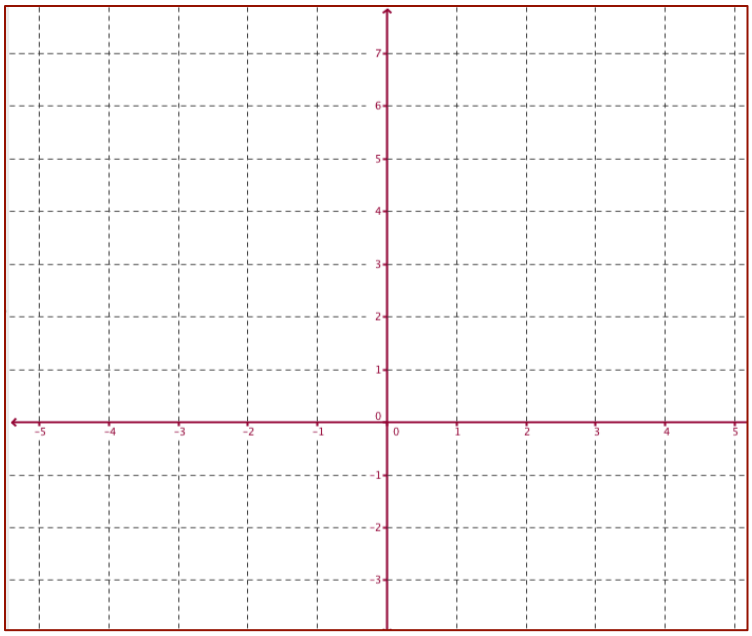








7. Graph the function. Label all extrema, zeros, intercepts and end behavior. Round to the nearest hundredth, if necessary.



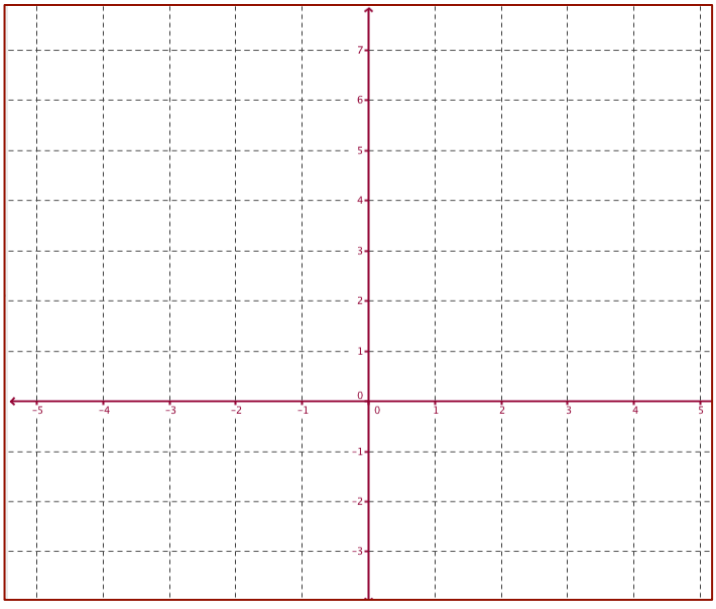
$$f(x) = -x^4 + 5x^2 - x - \frac{1}{2}$$

x	f(x)

8. Graph the function. Label all extrema, zeros, intercepts and end behavior. Round to the nearest hundredth, if necessary.

$$f(x) = \frac{1}{2}x^3 - \frac{1}{2}x^2 - 3x + 2$$

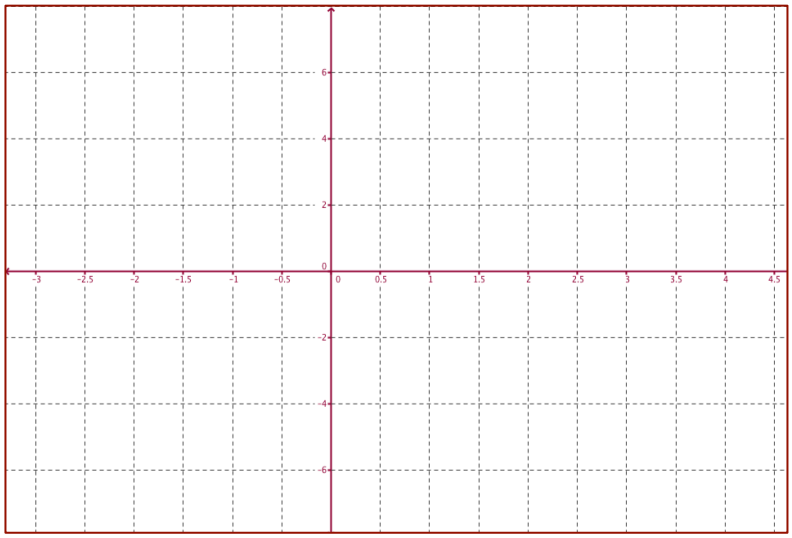
x	f(x)



9. Graph the function. Label all extrema, zeros, intercepts and end behavior. Round to the nearest hundredth, if necessary.

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

x	f(x)



10. Graph the function in your calculator. Label all extrema, zeros, intercepts and end behavior. Round to the nearest hundredth, if necessary.

Function	Degree	Leading Coefficient	Zeros	y-Intercept	Extrema	End Behavior
$f(x) = x^4 - 8x^2 - 12$						
$f(x) = 3x^3 - 2x^2 + 2x$						
$f(x) = x(x-20)(x+15)(x-12)$						
$f(x) = 8 - 2x^3 + 4x^2 - 5x$						
$f(x) = \frac{1}{200}x^4 + 2x - 1$						

Application 7.6

1. Graph the function in your calculator. Label all extrema, zeros, intercepts and end behavior. Round to the nearest hundredth, if necessary.

Function	Degree	Leading Coefficient	Zeros	y-Intercept	Extrema	End Behavior
$f(x) = x^3 + 3x^2 - 6x - 6$						

2. Consider f(x) where: $\boldsymbol{f(x) = x^4 - 8.65x^3 + 27.34x^2 - 37.2285x + 18.27}$

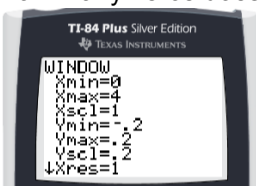
a. What are the degree, leading coefficient and end behavior of the function?

Degree = _____; Leading Coefficient = _____; End Behavior:

x	f(x)
-4	
-3	
-2	
-1	
0	
1	
2	
3	
4	

b. Make a table of values for $-4 \le x \le 4$. How many zeros does the function appear to have from the table?

c. Now change your window to →



d. What conclusions can you make from this new view of the graph?

3. The average annual price of gasoline can be modeled by the cubic function :

$$\boldsymbol{c(t) = 0.0007t^3 - 0.014t^2 + 0.08t + 0.96}$$

where $c(t)$ is the price in dollars and t is the number of years since 1987.

a. Graph the function in your calculator using a domain of $0 \le t \le 30$. Sketch a picture of your graph:

b. Describe any extrema and end behavior.

c. This model was created in 2007. Using the model, predict the price of gasoline in 2014. How accurate is the model?

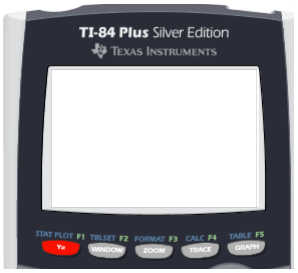
d. Going beyond the given domain in a model is called extrapolation. Explain why extrapolation can be dangerous when predicting future events.

7.6 –Polynomial Graphs

4. a. Create a 5th degree polynomial that has only1 zero. What polynomial did you create?

Polynomial_____

b. Sketch your polynomial graph to the right →



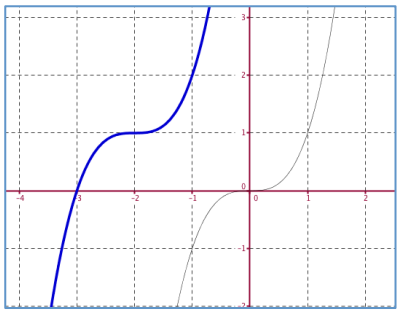
Algebra Skillz

GRAPH

Below, the graph of $f(x) = (x-4)^3 + 4$ is sketched in bold. Its parent function $f(x) = x^3$ is represented by the thin curve.

1. Describe the translation of the parent graph.

2. How does the translation relate to the equation?



SIMPLIFY

3. $-4\sqrt{20} + 2\sqrt{80} + \sqrt{45}$

4. $-2\sqrt{5}(1 - 2\sqrt{5})$

SOLVE

5. Solve:

$$3x^2(x+7)(7x-15) = 0$$

6. Factor and solve.

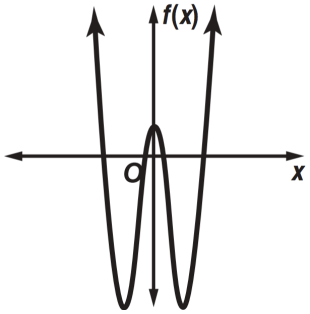
$$x^3 - 2x^2 + x = 0$$

SAT Review

MUTIPLE CHOICE

Which of the following could be the degree of f(x)?

(A) 2
(B) 3
(C) 4
(D) 5
(E) 7



Free Response

Find the degree of the following polynomial.

$$f(x) = x(x-3)^4$$