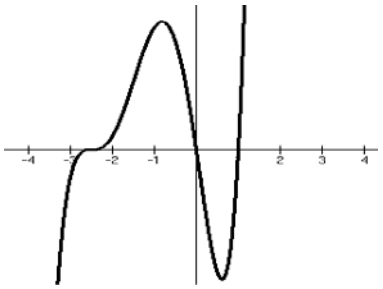
Pre-Calculus Worksheet Name: _____

Section 2.2 – Polynomial Functions DAY ONE

I. Find the requested information for each graph.

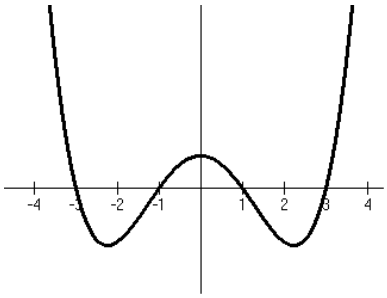
1.



End Behavior: _____
Even or Odd Degree? _____
+ or - Leading Coeff.: _____
# of relative extrema: _____
Zeros and their Muliplicity:

Possible Function (factored form):

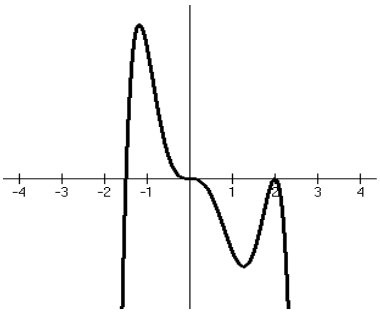
2.



End Behavior: _____
Even or Odd Degree? _____
+ or - Leading Coeff.: _____
# of relative extrema: _____
Zeros and their Muliplicity:

Possible Function (factored form):

3.



End Behavior: _____
Even or Odd Degree? _____
+ or - Leading Coeff.: _____
# of relative extrema: _____
Zeros and their Muliplicity:

Possible Function (factored form):

II. Determine the MAXIMUM possible number of relative extrema for each polynomial function. State the end behavior of the curve as well.

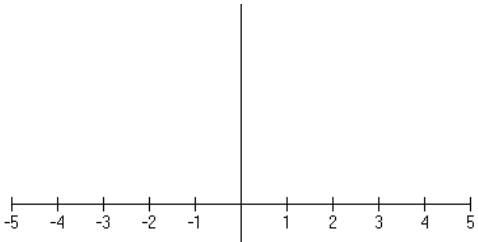
4. $y = \frac{1}{3}x^5 - 2x^4 + \ldots + x - 6$

5. $y = -5x^4 + 3x^3 + \ldots - 2x + 4$

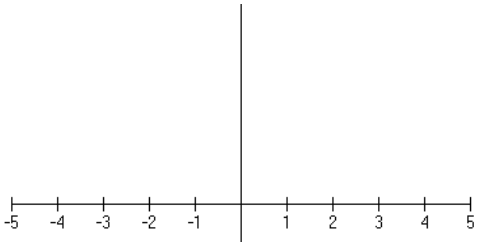
6. $y = -2x^{11} + x^{10} + \ldots + 5x - 1$

III. Factor each polynomial. Then identify its roots (and their multiplicity) along with its end behavior if order to sketch a graph of the function WITHOUT the calculator.

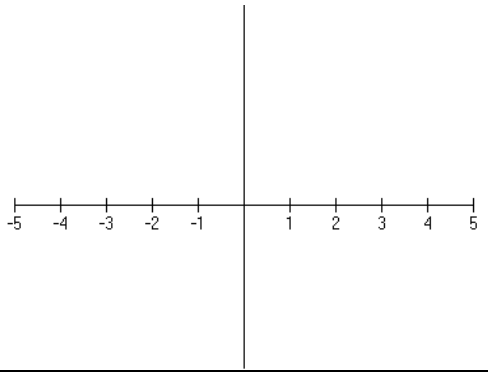
7. $f(x) = -x^3 + 9x$



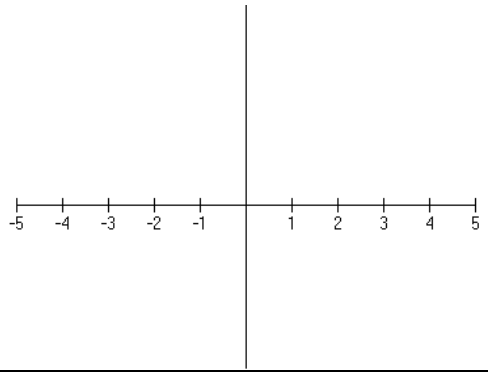
8. $g(x) = 4x^2 - x^4$



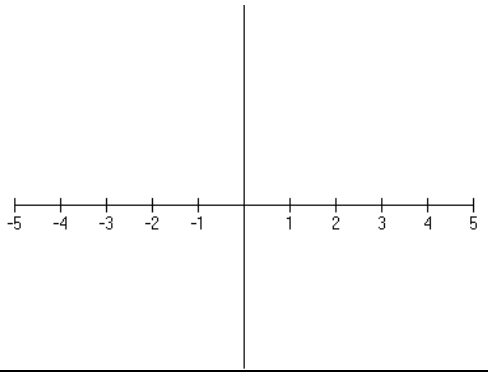
9. $f(x) = 3x^3 - 15x^2 + 18x$



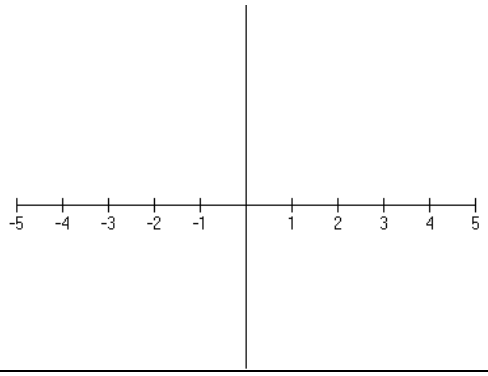
10. $f(x) = -5x^4 - x^5$



11. $g(x) = x^4 - 10x^2 + 9$

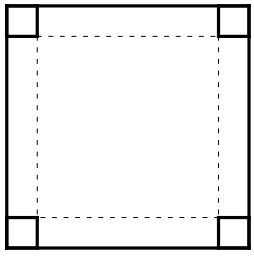


12. $f(x) = -4x^4 - 6x^3 + 40x^2$



IV. **Numerical and Graphical Analysis**… Use your brain!

13. An open box is to be made from a square piece of material, 36 inches on a side, by cutting equal squares with sides of length x from the corners and turning up the sides (see figure).



(a) Verify that the volume of the box is given by the function $V(x) = x(36 - 2x)^2$.
Show your work. Mark the diagram as well.

(b) Determine the domain of the function (within the constraints of the problem).

(c) Use a graphing utility to graph V and use the graph to estimate the value of x for which $V(x)$ is maximum. What are the resulting dimensions of the box and what is the maximum volume? **HINT: 2nd TRACE 5**