For each of the given polynomials, graph it on your calculator and make a rough sketch, focusing on the end behavior.

   



With your neighbor find any generalizations you think can be made about the end behavior of polynomial functions. Write your findings here.

For each of the given polynomials, graph it on your calculator and make a rough sketch, focusing on the x-intercepts.

   



With your group find any generalizations you think can be made about the x-intercepts of polynomial functions. Write your findings here.

For each of the given polynomials, use what you found earlier to make a rough sketch, focusing on the zeros.

  



Check your sketches with your group members and if needed on your calculator.

For each of the given polynomials, find the zeros (including multiplicity) and y-intercept, determine the end behavior and make a sketch of the graph. Be sure to accurately show all intercepts and end behavior.

1.  2. 

End Behavior: End Behavior:

 and as  and as 

Zeros: Zeros:

y-intercept: y-intercept:

3.  4. 

End Behavior: End Behavior:

 and as  and as 

Zeros: Zeros:

y-intercept: y-intercept:

Let teachers know they are going to act as students in a classroom. We are assuming they come with the pre-requisite knowledge of how to graph linear and quadratic functions, how to factor (including factoring by grouping, difference of squares, and quadratic in form), they know how to find x- and y-intercepts on a graph, and how to find zeros from the factored form of an equation, including multiplicity.

Launch:

* + Give each teacher a double sided piece of graph paper, have them graph the functions  and .
	+ Have two teachers make the graphs on the board and talk about how they knew how to graph those functions (y-ints, slope, x-int, etc). Ask questions about end behavior and intercepts
	+ Remind teachers that they are able to graph linear and quadratic functions using properties. Let them know we want to be able to graph higher level polynomials and we want to look for similar properties to do this.

Explore

* Give teachers the worksheets and have them work on the first section.
* After the talk with their neighbor, summarize the end behavior using the notation and as .
* Talk about how we didn’t have the accurate x-intercepts on the above graphs. Is there a way we can get the x-intercepts from the equations?
* Have teachers work on next section and discuss within their group. As groups get done done, check off their work and have them start working on the back.
* When everyone is done with front page and had a few minutes to work on back side, bring it back together and talk about patterns of zeros and multiplicity.
* Work on 1st problem together. Then have students work on own and then with group on other 3 problems.

Discuss/Summarize

* factored/standard forms – what is each good for.
* review end behavior
* review x-ints and y-int