MA103: Mathematical Modeling
Modeling with Polynomial Functions I **06 October 2025**

1. Understand some basic polynomial behaviors including: (a) longterm behavior of polynomials based on the sign of the leading coefficient and whether it is even or odd, and (b) how the number of possible local maxes and mins is determined by the degree of the polynomial.
2. Use polynomial models to make predictions and interpret the results in the context of real world scenarios
3. Build polynomial models and other models using Excel trendline
4. Understand R^2 as measurements of the fit of a model

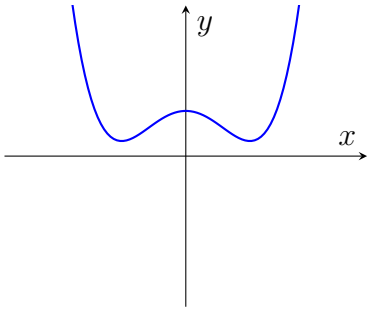
Warm Up:

Review each graph of data below do the following:

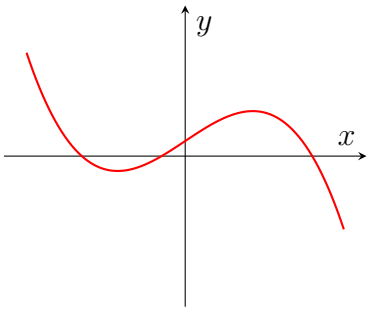
- Describe the long-term behavior in words and explain what this might imply in a real-world context.
- Identify how many local extrema you observe, then guess the degree of the polynomial.

Then, pick one graph and write a possible-real world scenario it could represent (one sentence will suffice).

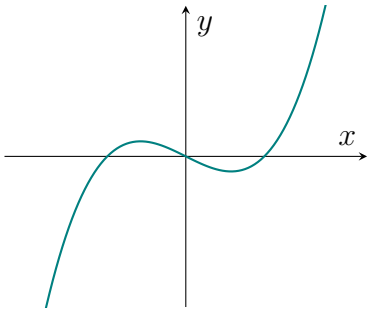
Graph A



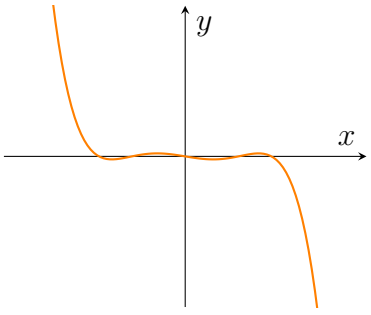
Graph B



Graph C



Graph D



Polynomials:

Example Problem:

A marketing team is tracking the cumulative, or total, sales of a product since its launch. The data for the first 10 days are below. Develop a model for the sales of the product and then estimate the cumulative sales after 12 days.

Day	Cumulative Sales
0	0
1	25
2	60
3	100
4	140
5	170
6	190
7	205
8	220
9	232
10	240

Practice Problem:

You've been asked to analyze the relationship between the years of experience (in years) an employee has and their corresponding salary (in dollars). Using the data below develop a model and predict the salary of an employee with 9 years of experience. Then predict the salary of an employee with 12 years experience. Are these predictions what we would expect?

Years	Salary ($)
1	50,000
2	55,000
3	65,000
4	80,000
5	110,000
6	150,000
7	200,000