

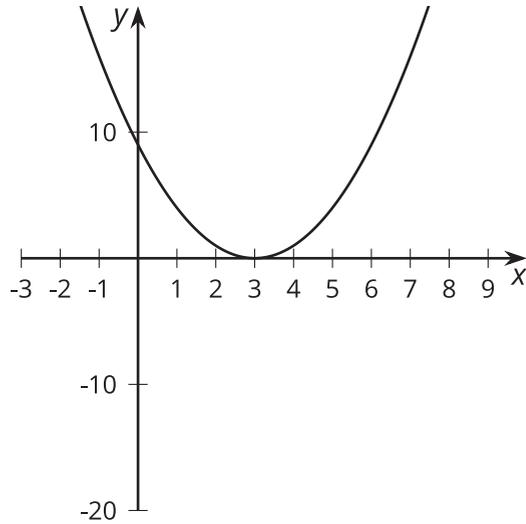
Unit 2 Lesson 10: Multiplicity

1 Notice and Wonder: Duplicate Factors (Warm up)

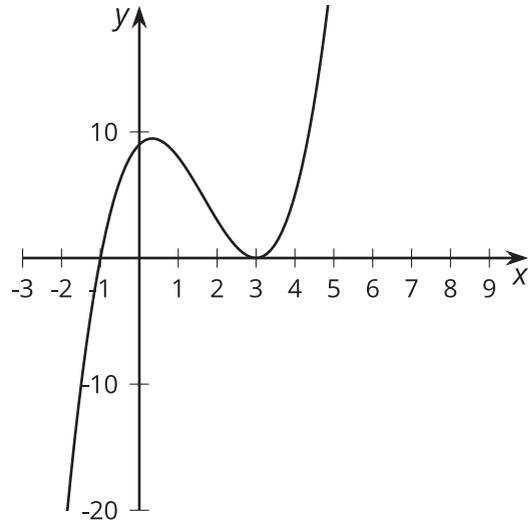
Student Task Statement

What do you notice? What do you wonder?

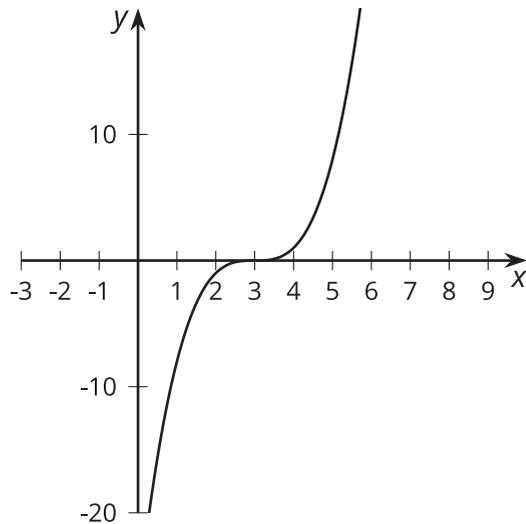
$$y = (x - 3)^2$$



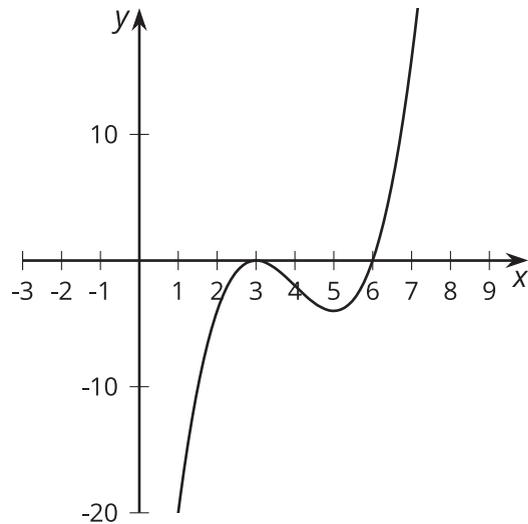
$$y = (x + 1)(x - 3)^2$$



$$y = (x - 3)^3$$



$$y = (x - 6)(x - 3)^2$$



2 Sketching Polynomials

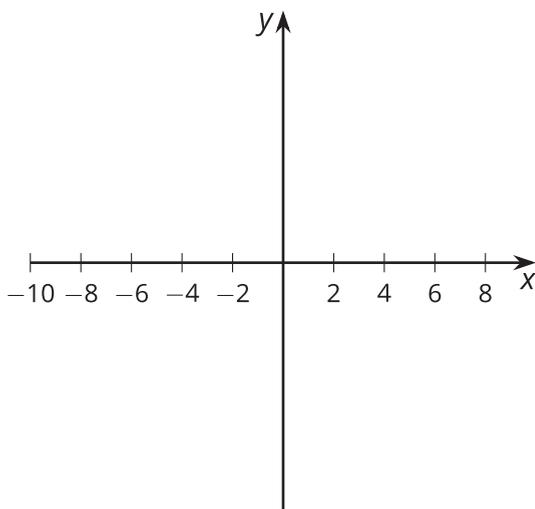
Student Task Statement

- For polynomials A – F :
 - Write the degree, all zeros, and complete the sentence about the end behavior.
 - Sketch a possible graph.
 - Check your sketch using graphing technology.

Pause here for your teacher to check your work.
- Create your own polynomial for your partner to figure out.
 - Create a polynomial with degree greater than 2 and less than 8 and write the equation in the space given.
 - Trade papers with a partner, then fill out the information about their polynomial and complete a sketch.
 - Trade papers back. Check your partner's sketch using graphing technology.

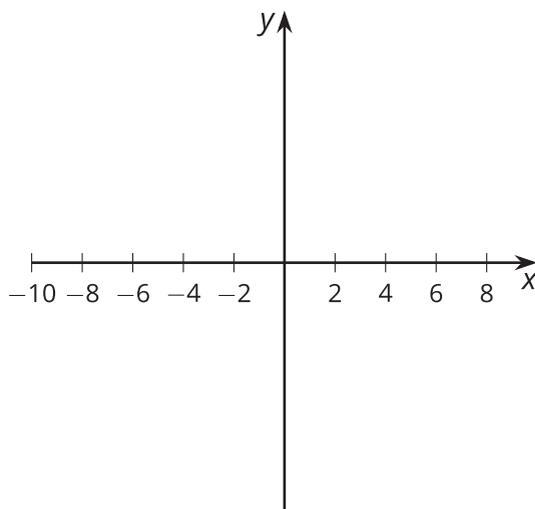
$$A(x) = (x + 2)(x - 2)(x - 8)$$

Degree: Zeros:
End behavior: As x gets larger and larger in the negative direction,



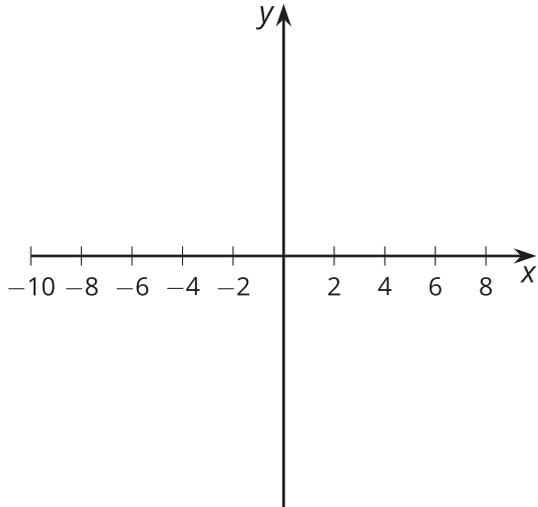
$$B(x) = -(x + 2)(x - 2)^2$$

Degree: Zeros:
End behavior: As x gets larger and larger in the negative direction,



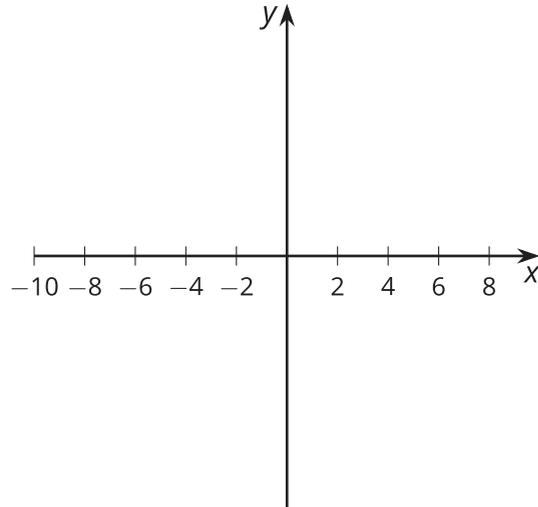
$$C(x) = (x + 6)(x + 2)^2$$

Degree: Zeros:
End behavior: As x gets larger and larger in the negative direction,



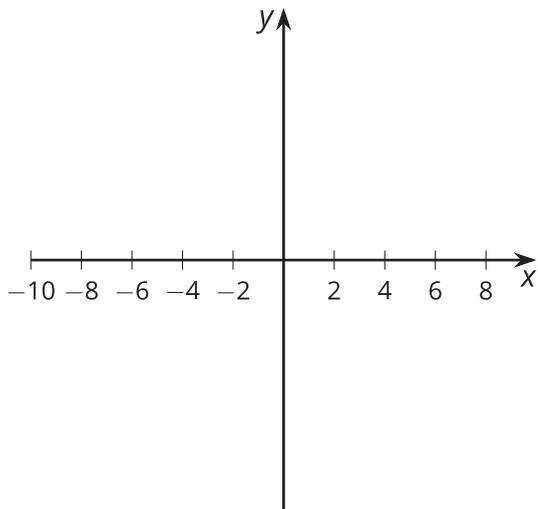
$$D(x) = -(x + 6)^2(x + 2)$$

Degree: Zeros:
End behavior: As x gets larger and larger in the negative direction,



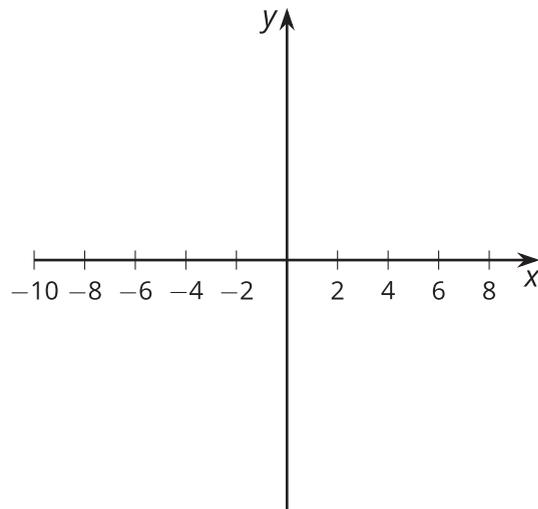
$$E(x) = (x + 4)(x - 2)^3$$

Degree: Zeros:
End behavior: As x gets larger and larger in the negative direction,



$$F(x) = x^3(x + 4)(x - 3)^2$$

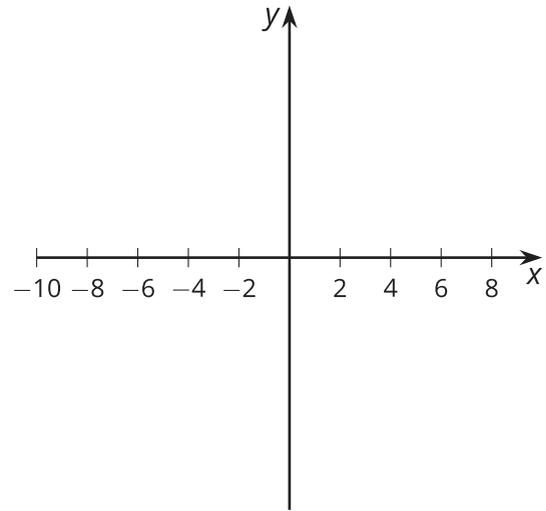
Degree: Zeros:
End behavior: As x gets larger and larger in the negative direction,



Your polynomial:

Degree: Zeros:

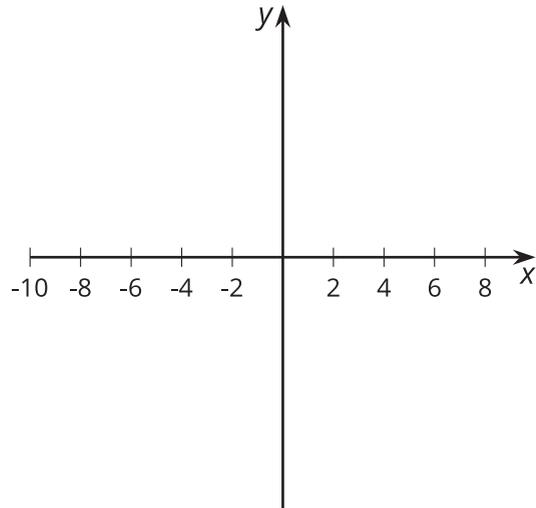
End behavior: As x gets larger and larger in the negative direction,



3 Using Knowledge of Zeros (Optional)

Student Task Statement

1. Sketch a graph for a polynomial function $y = f(x)$ that has 3 different zeros and $f(x) \geq 0$ for all values of x .



2. What is the smallest degree the polynomial could have?
3. What is a possible equation for the polynomial? Use graphing technology to see if your equation matches your sketch.