There exist an infinite number of polynomials that have zeros of x = 0 (with a multiplicity of two) and x = 1. We could write one of them to be: $x x (x-1)$
 $x^{2}(x-1)$
 $x^{3}-x^{2}$

Write the equation of a polynomial with the following zeros and use your graphing calculator to sketch its graph:

A. x = 1, x = -1, x = 2 B. x = -5, x = 2 (multiplicity of 2)

2

4

6

8

-8

-6

-4

-2

2

4

6

8

-2

-4

-6

-8

*x*

*y*

2

4

6

8

-8

-6

-4

-2

2

4

6

8

-2

-4

-6

-8

*x*

*y*

C. $x=1+\sqrt{3}, x=1-\sqrt{3}$ D. x = 1 (multiplicity of 3), x = 0 (multiplicity of 2)

2

4

6

8

-8

-6

-4

-2

2

4

6

8

-2

-4

-6

-8

*x*

*y*

2

4

6

8

-8

-6

-4

-2

2

4

6

8

-2

-4

-6

-8

*x*

*y*

What happens graphically at the zeros with even multiplicity?

What happens graphically at the zeros with odd multiplicity?

Sketching your very own polynomial!

$$f\left(x\right)=x^{4}-4x^{2}$$

1. Find the zeros and state their multiplicity. Based on the degree, how many zeros will there be?

2. Plot the zeros

3. Using the Leading Coefficient test draw in the beginning and ending behavior

4. Plot the y-intercept

5. Using what you have learned about multiplicity, sketch your curve (without using your calculator).

2

4

6

8

-8

-6

-4

-2

2

4

6

8

-2

-4

-6

-8

*x*

*y*