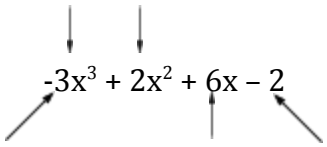
Topic:

Essential Question:

Polynomial:

Degree of a polynomial:

Standard Form of a polynomial:



Classifying Polynomials:

By Degree

Degree	Name
0	
1	
2	
3	
4	
5	
$n \geq 6$	

By Number of Terms

# Terms	Name
1	
2	
3	
$n \geq 4$	

Ex1: Write each polynomial in standard form, identify the leading coefficient, and classify it by degree amount of terms.

a) $4x + x + 2$ b) $3 + 12x^2$ c) x^4 d) $x^3 + 2x^2 - x^2 + x$

e) $(x^2 - 5)(x + 3)$ f) $x\,(x - 8)^2$ g) $(x - 2)\,(x + 3)\,(x + 4)$

Summary:

Classifying Polynomials Extra Practice:

Write each polynomial in standard form, identify the leading coefficient, and classify it by degree and amount of terms.

1) $4x + x + 2$

2) $3 + 12x^2$

3) x^4

4) $x^3 + 2x^2 - x^2 + x$

4) $(x^2 - 5)(x + 3)$

5) $x\,(x - 8)^2$

6) $(x - 2)\,(x + 3)\,(x + 4)$

7) $4x - 7x$

8) Write the equation of the polynomial in standard form.

$y = (x + 3)(x - 2)(x - 5)$

#015: https://student.desmos.com/join/4gtyfn

Topic:

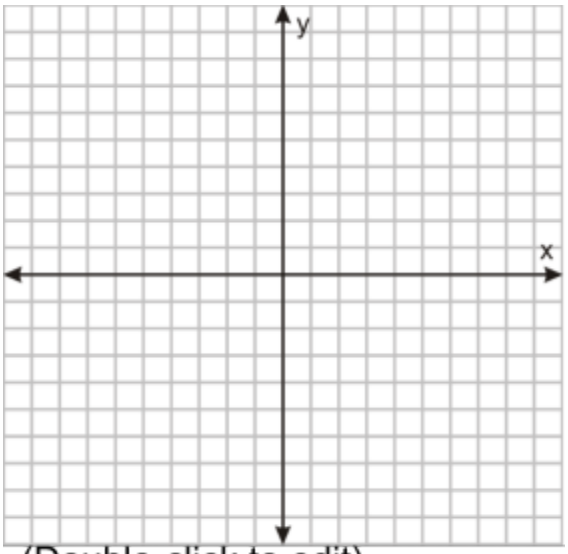
Essential Question:

Ex1: Graph $y = -x^4 + 3x^3 - 3x + 3$ in Desmos, then find the following (click on points):

- **x-intercepts/roots/zeros**:
- **End Behavior**:
- **Relative Maximum(s)**:
- **Relative Minimum(s)**:

Now, using that information graph the polynomial function:

- **Critical Points** (turning points):
- **Intervals**:
  - Increasing:
  - Decreasing:



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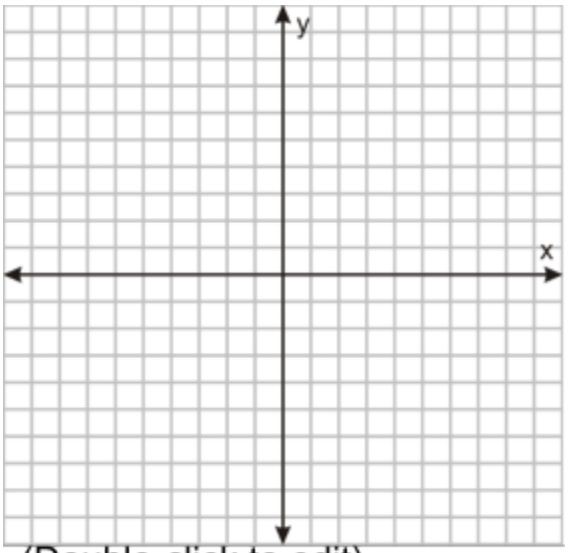
Ex2: Graph: $y = x^5 - x^4 - 2x^3 - 2x^2 + 2$

- **x-intercepts/roots/zeros**:
- **End Behavior**:
- **Relative Maximum(s)**:
- **Relative Minimum(s)**:
- **Critical Points** (turning points):
- **Intervals**:
  - Increasing:
  - Decreasing:



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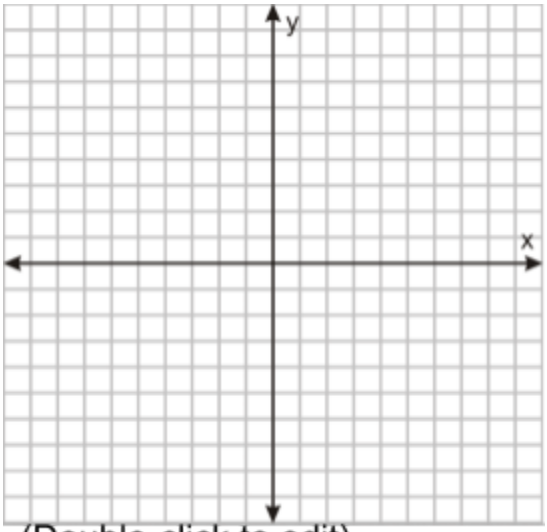
Summary:

Graphing Polynomials Extra Practice Graph the following using Desmos to help you find your points.

1) $y = -x^4 + x^3 + 2x^2$



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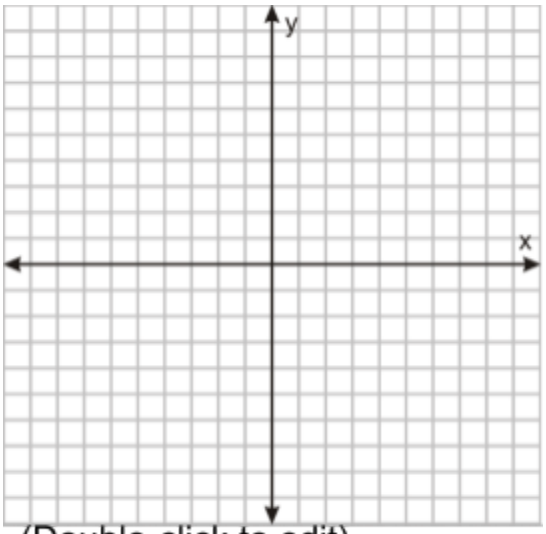
End Behavior:

x-intercepts/zeros:

Relative Minimum(s):

Relative Maximum(s):

2) $y = -x^5 + 4x^3 - 5x - 2$



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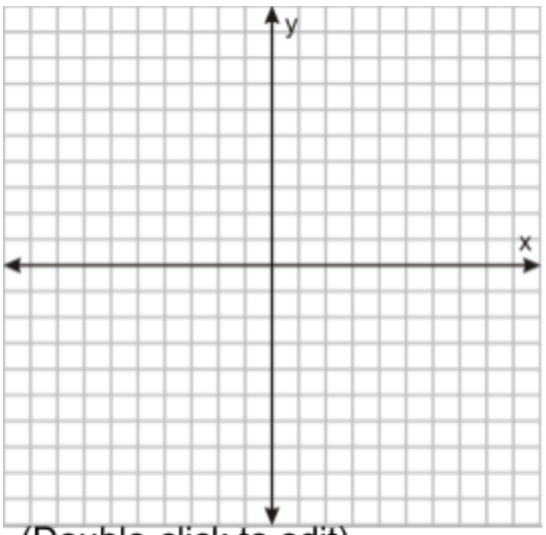
End Behavior:

x-intercepts/zeros:

Relative Minimum(s):

Relative Maximum(s):

3) $y = x^5 - 4x^3 + 4x - 1$



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End Behavior:

x-intercepts/zeros:

Relative Minimum(s):

Relative Maximum(s):

Topic:

Essential Question:

Real Zeros of Polynomials:

If *f* is a polynomial function and *a* is a real number, the following statements are equivalent.

1) x-intercepts (a, 0) 2) zeros x = a 3) factor (x - a) 4) Solution x = a

Ex1: Let's say our zeros are x = -2, 1, and 3. Write the standard form for that function.

Ex2: Find the zeros:

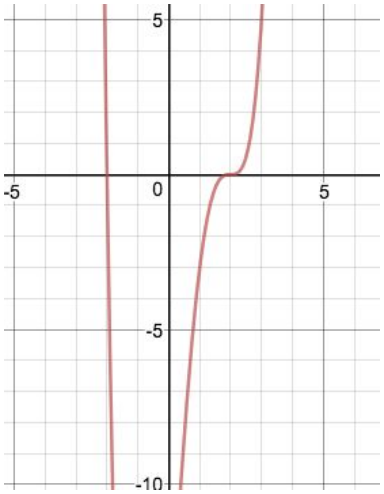
a) $f(x) = 3x^2 - 12x + 3$ b) $f(x) = -2x^3 + 6x^2 - 4.5x$

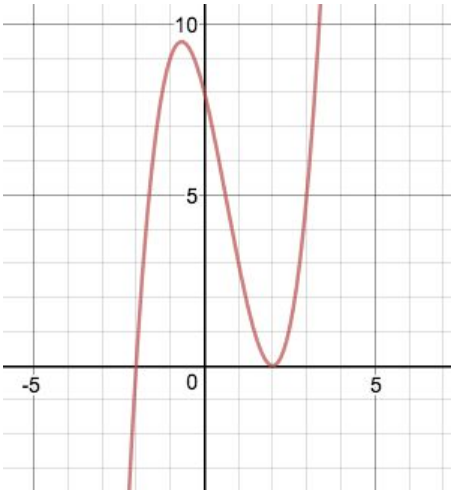
Multiplicity:

Ex3: Tell the degree and find the zeros for the function:

a) $f(x) = (x - 2)^3(x + 2)$ b) $f(x) = (x - 2)^2(x + 2)$

Now look at their graphs. What does the multiplicity look like?



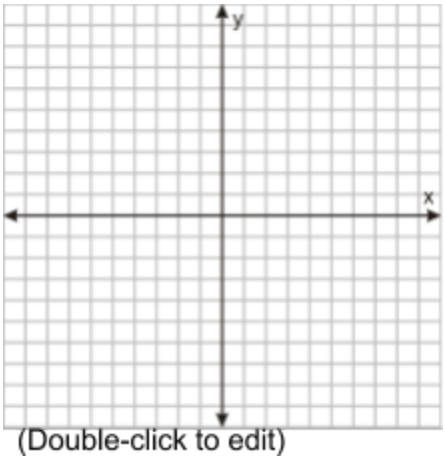


Summary:

Graphing Polynomials with Multiplicities Extra Practice

List the zeros (including multiplicities), degree, and end behavior of each. Then sketch a graph.

1) $y = (x + 1)(x – 2)(x + 4)$

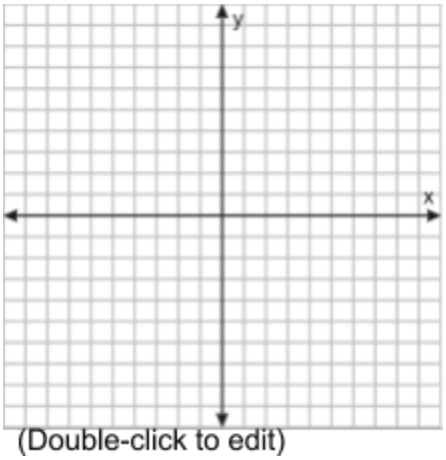


Zeros:

Degree:

End Behavior:

2) $y = (x + 3)^2(x – 5)^3$

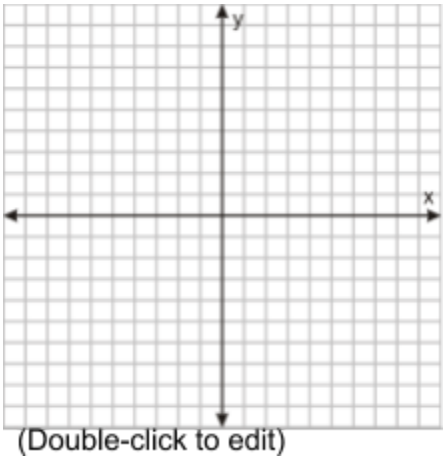


Zeros:

Degree:

End Behavior:

3) $y = -5x(x - 3)(x - 1)$

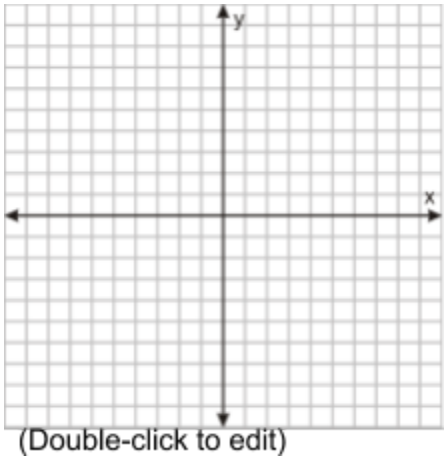


Zeros:

Degree:

End Behavior:

4) $y = x^4 + 4x^3 - 12x^2$

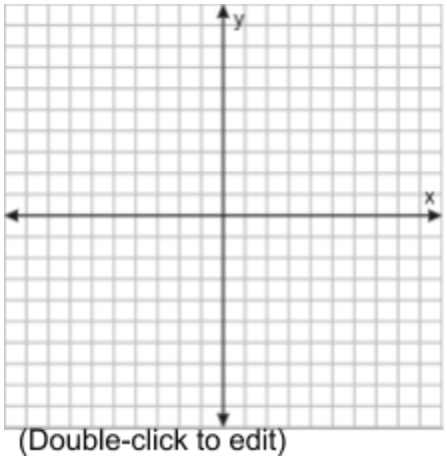


Zeros:

Degree:

End Behavior:

5) $y = x^3 - 64x$

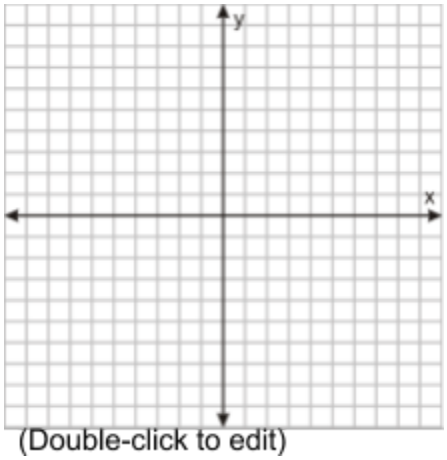


Zeros:

Degree:

End Behavior:

6) $y = x^2 - 6x + 8$



Zeros:

Degree:

End Behavior: