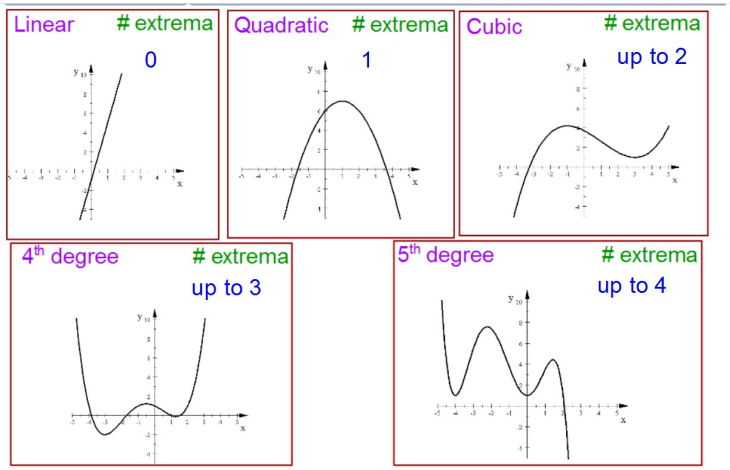
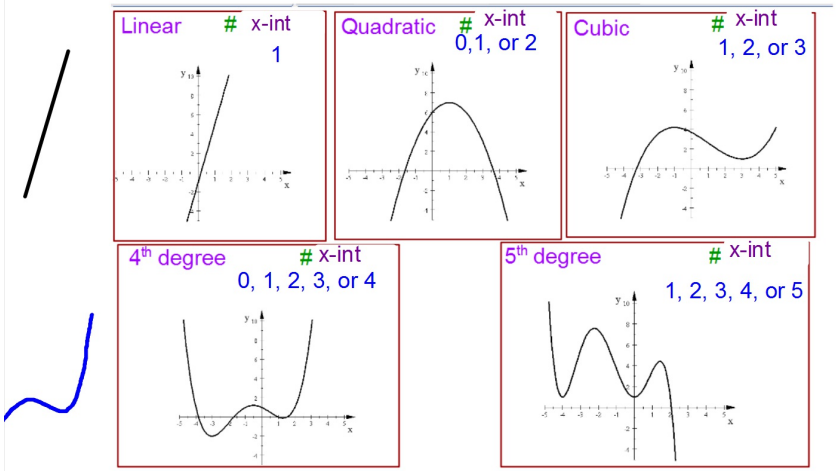


Number of extrema of a polynomial:

If the degree of the polynomial is n
then there can be up to n-1 extrema.



X - Intercepts -- Can have up to n x-intercepts.
n = degree of polynomial

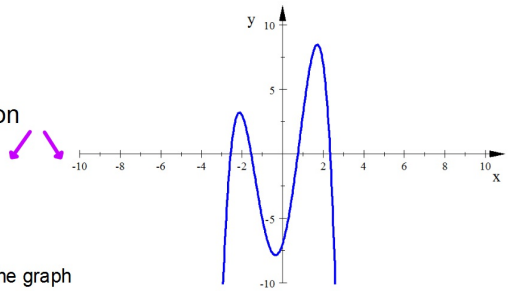
EVEN Functions may have no x-intecept or multiple x-intercepts.
ODD Functions must have at least 1 x-intercept

Graph the following equation in a Standard Window:

$y = -x^4 - x^3 + 7x^2 + 5x - 7$

Is this a "good" window for this function?

This is a negative even function so its end behavior is correct.



Graph can have up to 4 x-intercepts and the graph shows all 4 of them.

Graph can have up to 3 extremes and the graph show all 3 of them.

Since the graph shows the correct end behavior and shows the maximum number of x-intercepts and extremes this is a GOOD window to show the graph and all of its characteristics.

x-intercepts of a graph are also called:

- Real Zeros
- Real Roots
- Real Solutions

Y - intercepts -- All polynomials have exactly ONE y-intercept.

Every polynomial equation has exactly n solutions, where n is the degree of the polynomial.

Some of these solutions may be imaginary so not all solutions can be found on a graph.

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Answer questions #6 & 7 on SAS3

Agilemind website:

Exploring "Long-term Behavior and Real Zeros"

Page 10

6. How many distinct real zeros can a cubic function have?

1, 2, or 3

7. Think about linear, quadratic, and cubic polynomials. Based on these three function types, what seems to be the relationship between the degree of a polynomial and the number of distinct real zeros it will have?

Polynomials can have up to n distinct real zeros where n is the degree of the polynomial.

Even polynomials may have NO real zeros.

Odd polynomials must have AT LEAST ONE real zero.

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Answer questions #8 & 9 on SAS3

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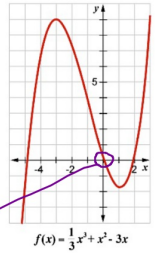
8. How can you determine the ***y***-intercept of the graph of a polynomial function?



If you have the graph of a polynomial you can determine the y-intercept by finding the point where the graph crosses the y-axis.

y-intercept appears to be zero.

If you can't tell from the graph and have the equation you simply replace x with zero and determine what y equals.

$f(0) = 1/3(0)^3 + (0)^2 - 2(0) = 0$

9. Consider the graph of the quadratic function $g(x) = -2x^2 - 3x + 6$. What are the coordinates of the ***y***-intercept?

Without the graph just replace x with zero.

$g(0) = -2(0)^2 - 3(0) + 6 = 6$

y-intercept is the point (0,6)

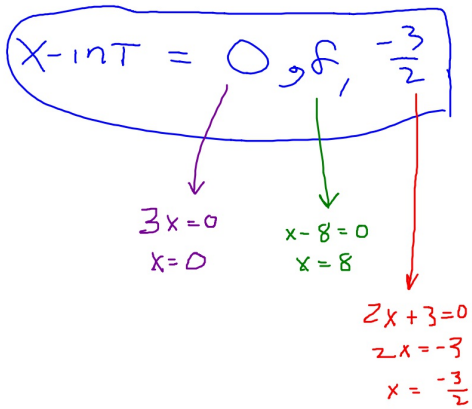
When in Standard Form, the y-intercept of a polynomial is always the constant.

x-intercepts are Real Zeros of a polynomial.

Given this polynomial in factored form state the x-intercepts of the graph:

$y = 3x(x - 8)(2x + 3)(x^2 + 7)$

x-intercepts are Real Solutions.



$x^2 + 7 = 0$

$x^2 = -7$

$x = \pm\sqrt{-7}$

these are not real solutions, therefore, they are not x-intercepts

Suppose you need to find a 3rd-degree polynomial function with zeros of 1, 2, and 4. Construct a polynomial equation with these zeros.

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Page 8

this page answers the previous question.

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Answer Question #10 on SAS3

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Hwk #24

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Guided Practice pages 1-11

You'll need to look up the formulas for
Volume of a Cylinder and a Sphere first.