

Pre-Calculus 12 Polynomial Functions

The degree of a polynomial function is the highest power of the variable in the equation.

Polynomial Functions

A polynomial function of degree n can be written in standard form as:

$f(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \dots + a_1 x + a_0$ where n is a non-negative integer.

The coefficient of the highest power of x is the lead coefficient.

The graph of a polynomial function is smooth and continuous, which means it has no sharp corners and can be drawn without lifting the pencil from the paper.

Sketching Polynomials

Steps:

1. Plot y-intercept (let $x = 0$)
2. Plot zeros (x-intercepts)
3. Check the coefficient and power of the leading term (positive or negative; odd or even) (end behaviour)

Note: When in doubt, you can always use a table of values to find points in between to help with graphing.

* Make sure you've read the Polynomial Functions handout booklet.

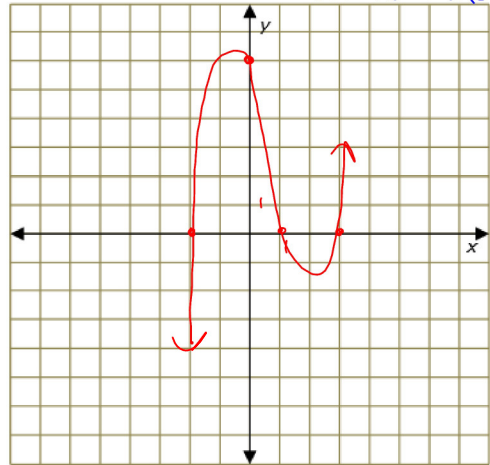
Sketching Poly Fcns.notebook

Ex. 1) Sketch the following: $f(x) = (x + 2)(x - 1)(x - 3)$

① y-int
 $f(0) = (0+2)(0-1)(0-3)$
 $= 6$

② zeros
 $0 = (x+2)(x-1)(x-3)$
 $x+2=0 \quad x-1=0 \quad x-3=0$
 $x=-2 \quad x=1 \quad x=3$

③ degree 3 ← odd
 opposite end behaviour
 $a=1$ lead coeff positive
 rise right
 fall left



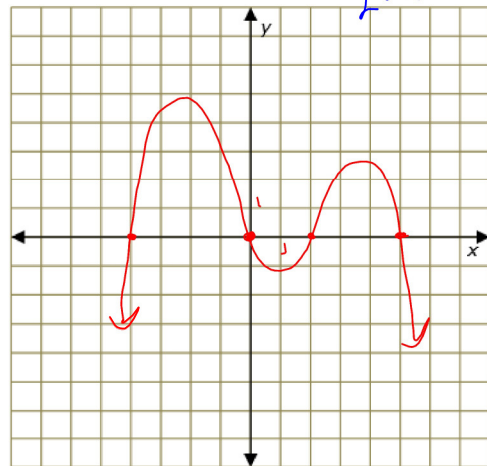
cubic function

Ex. 2) Sketch the following: $y = -x(x + 4)(x - 2)(x - 5)$

① y-int
 $y = -0(0+4)(0-2)(0-5)$
 $= 0$

② zeros
 $0 = -x(x+4)(x-2)(x-5)$
 $0, -4, 2, 5$

③ degree 4 ← even
 same end behavior
 lead coeff → negative
 falls right and left
 opens down



quartic function

work sheet # 1-5
 and
 sketch

$$f(x) = (x+1)(x-3)(x-5)$$

$$f(x) = -(x+3)(x+1)(x-2)(x-4)$$