Zeros / Roots / x-intercepts

- where the graph passes through the x-axis $(k, 0)$
- $y = 0$ → plug in to find.

A polynomial can have how many zeros? n (degree of polynomial)

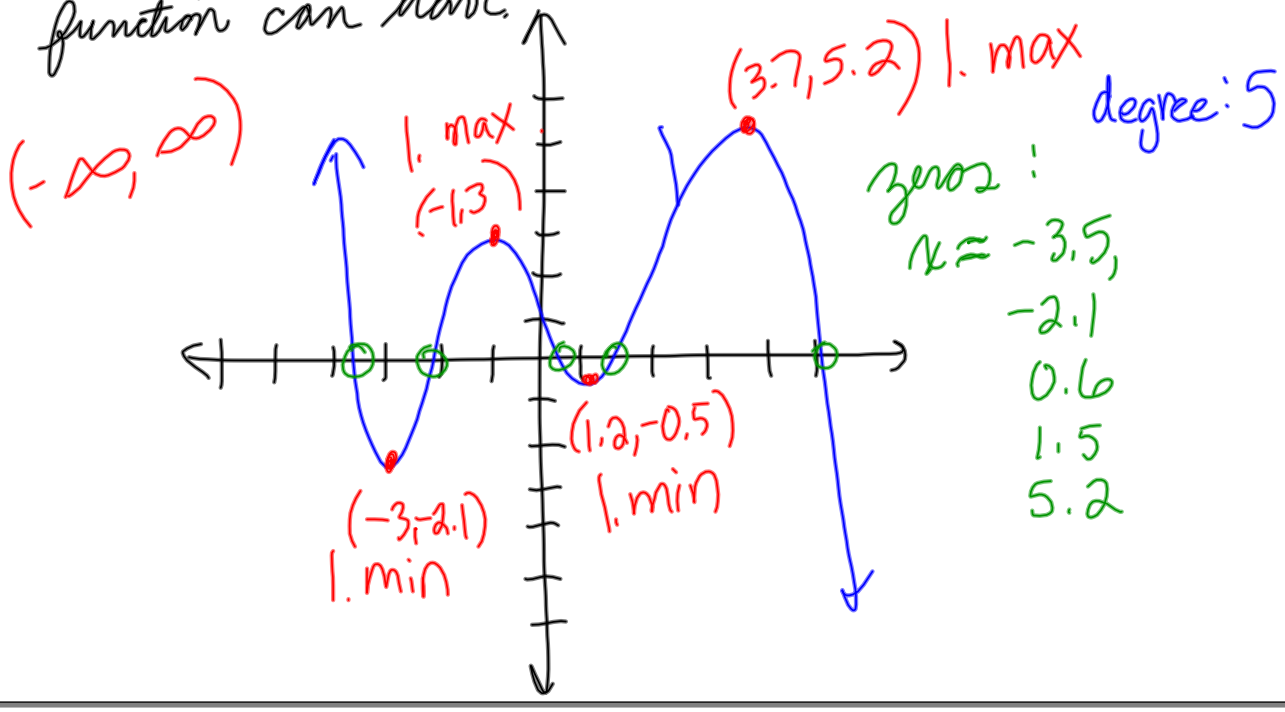
↳ up to n real zeros.
the remaining are imaginary

Ex: $f(x) = x^4 + 3x^3 - x^2 - 4x - 5$

$0 = x^4 + 3x^3 - x^2 - 4x - 5$

p. 148 (15 - 20)
Study Island

Estimate the coordinates of each turning point and state whether each corresponds to a local maximum or a local minimum. Then estimate all real zeros and determine the least degree the function can have.



Graph the function:

$$f(x) = 5(x-1)(x-2)(x-3) = 0$$

Zero Product Property

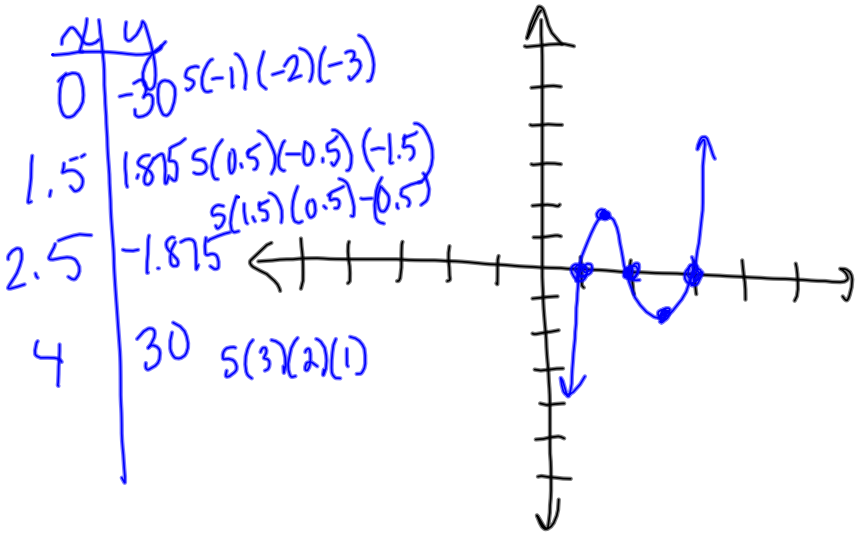
If $A \cdot B = 0$, then $A = 0$ or $B = 0$

$x - 1 = 0$ $x = 1$

$x - 2 = 0$ $x = 2$

$x - 3 = 0$ $x = 3$

x	y	
0	-30	$5(-1)(-2)(-3)$
1.5	1.875	$5(0.5)(-0.5)(-1.5)$
2.5	-1.875	$5(1.5)(0.5)(-0.5)$
4	30	$5(3)(2)(1)$



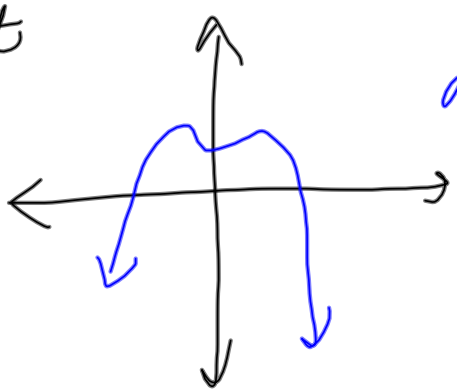
degree: 3

EB ↑ ↓

How many solutions or zeros does the following have?

$2x^{6} - 3x^{2} - x + 1 = 0$ 6

Ex: Describe the degree and leading coefficient



degree : 4

LC : negative

* S.I.

Graph $f(x) = ax^2 + bx + c$

$y = \boxed{a}x^2 + b x + c$

vertex : $\left(\boxed{\frac{-b}{2a}}, f\left(\frac{-b}{2a}\right)\right)$

$2 \cdot \frac{9}{4} + 6\left(-\frac{3}{2}\right) + 3$

$\frac{9}{2} - \frac{18}{2} + 3$

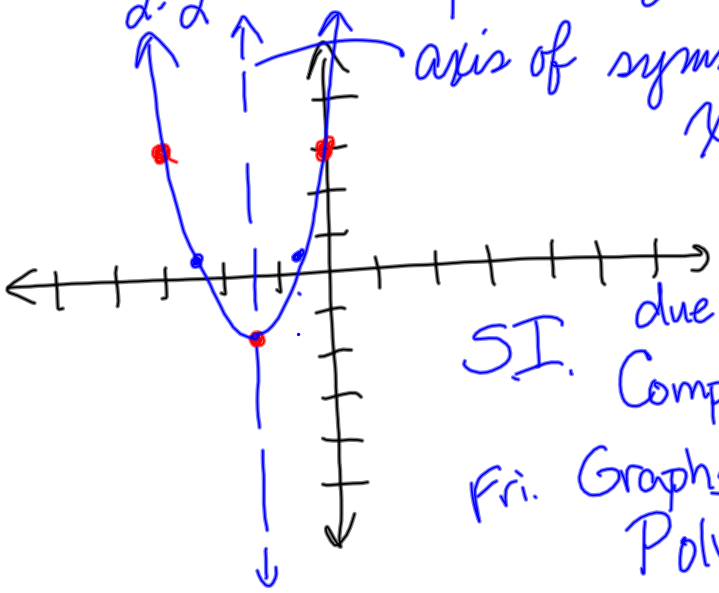
$-\frac{9}{2} + \frac{6}{2}$

$-\frac{3}{2}$

$\frac{-b}{2a} = \frac{-6}{2 \cdot 2} = \frac{-6}{4} = -\frac{3}{2}$

vertex $\left(-\frac{3}{2}, -\frac{3}{2}\right)$

x	y
$-\frac{3}{2}$	$-\frac{3}{2}$
0	3



axis of symmetry $x = -\frac{3}{2}$

SI. due tomorrow Complex Numbers

Fri. Graphs Polynomials