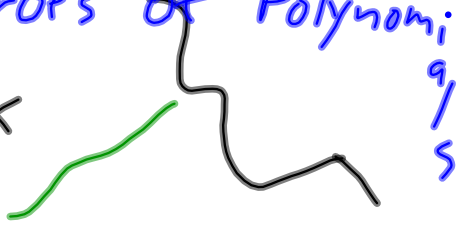
Factors and Zeros of Polynomials

$y = x^3 - 2x^2 - 15x$



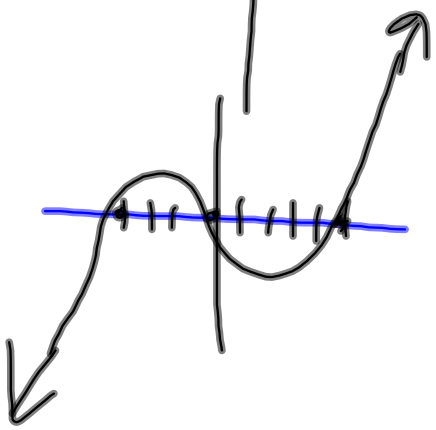
$y = x(x^2 - 2x - 15)$

	-2	-15
-2		-5, 3

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

0 5 -3

$y = x^3 - x^2 - 12x$



$y = x(x^2 - x - 12)$

	-1	-12
-1		-4, 3

$y = x(x-4)(x+3)$

Zero-Product Property:

When terms or binomials are Multiplied together set each term/binomial equal to zero and solve.

$y = x^3 + \ldots$

$0 = x(x-4)(x+3)$ ~~$y = x^2 + 2x + 3$~~

1) Separate each term/binomial.
2) Set each term/binomial equal to Zero.
3) Solve each term.

Zeroes

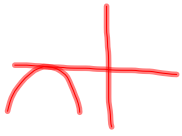
$x = 0$ | $x - 4 = 0$ → $+4\ +4$ → $x = 4$ | $x + 3 = 0$ → $-3\ -3$ → $x = -3$

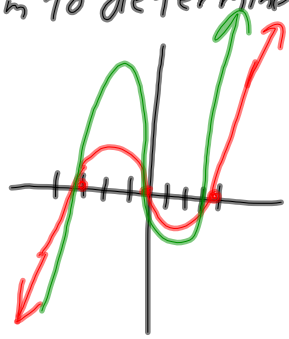
First term x^3

Zeroes $0, 4, -3$

Plotting a graph

1) Find Zeroes and First Term
2) Plot the zeroes on the X axis
3) Determine if any of the zeros have multiples.
4) Use The first term to determine the end behavior





Multiplicity of zero

$y = x^4 - 2x^3 - 8x^2$

$y = x^2(x^2 - 2x - 8)$

$y = x^2(x+2)(x-4)$

$x=0$ | $x=0$ | $x+2=0$ | $x-4=0$

$x=-2$ | $x=4$

Multiplicity of 2 ⇐ Bounces off the x axis.

15) $y = (x-3)^2(x+1)$

$x-3=0$ | $x-3=0$ | $x+1=0$

$+3\ +3$ | $+3\ +3$ | $-1\ -1$

$x=3$ | $x=3$ | $x=-1$

Zeroes = 3 · Mult of 2

= -1 - Mult of 1