
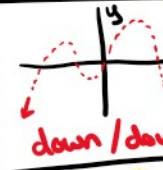

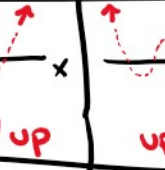


① Apply the Leading Coefficient Test  
 (used to determine the end behavior)

Degree	EVEN	EVEN	ODD	ODD
Leading Coefficient	POSITIVE	NEGATIVE	POSITIVE	NEGATIVE
Trick	$x^2$	$-x^2$	$x^3$	$-x^3$
Graph				
Example	$f(x) = 3x^4 - 2x + 5$	$f(x) = -4x^2 - 3x + 1$	$f(x) = x^5 - 2x^2 + 3x$	$f(x) = -2x^3 - 4x$

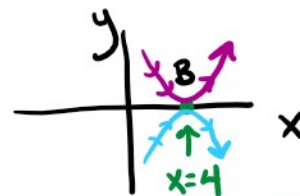
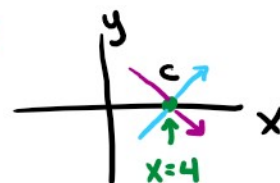
② Identify all zeros/roots → x-intercepts of graph

③ Determine multiplicity of each zero/root  
 ↳ the # of times a zero/root occurs in the linear factorization

IF the multiplicity of a zero/root is **ODD**, then the graph **CROSSES** the x-axis at this point.

IF the multiplicity of a zero/root is **EVEN**, then the graph **TOUCHES/BOUNCES OFF** the x-axis at this point.

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



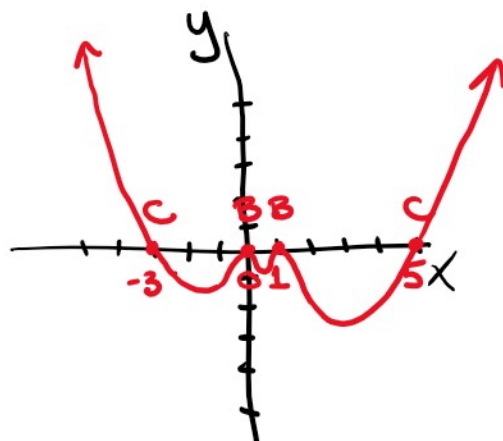
ex  $f(x) = 3x^6 - 12x^5 - 30x^4 + 84x^3 - 45x^2$   $f(x) = (x+3)(x-4)(x-4)$

① L.C. Test: positive/even ( $x^2$ ) up/up

②  $f(x) = 3x^2(x-1)(x-1)(x+3)(x-5)$

zeros:	$x=0$	$x=1$	$x=1$	$x=-3$	$x=5$
multiplicity:	twice	twice	twice	once	once
	BOUNCE	BOUNCE	BOUNCE	CROSS	CROSS

③ multiplicity:



② multiplying <sup>two</sup> BOUNCE <sup>two</sup> BOUNCE CROSS CROSS

+