

Multiplicity

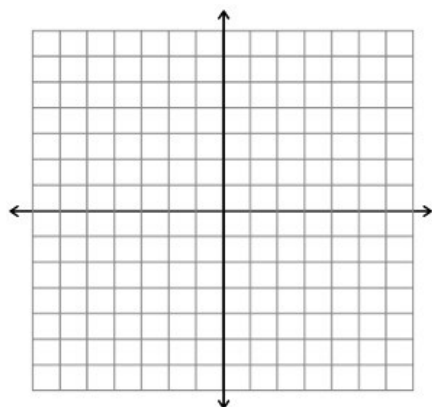
Multiplicity refers to the number of times a factor appears in the function. It usually appears as an exponent. Find the multiplicities of each zero: $f(x) = x^2(x - 2)(x + 3)^4(x - 1)^2$

Zeros of multiplicity one:	Zeros of multiplicity two:	Zeros of multiplicity three:	Zeros of multiplicity four:

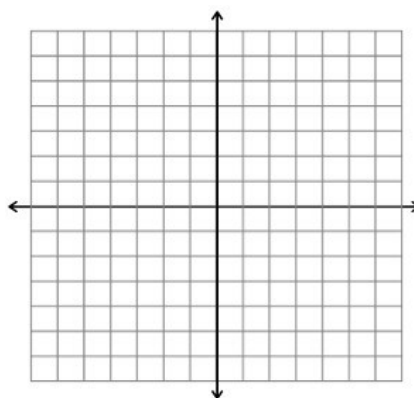
Investigate Multiplicity

Graph all four of these polynomials. Notice that they have the same zeros but with different multiplicities. How does the multiplicity of the zero affect the graph's behavior at the zero?

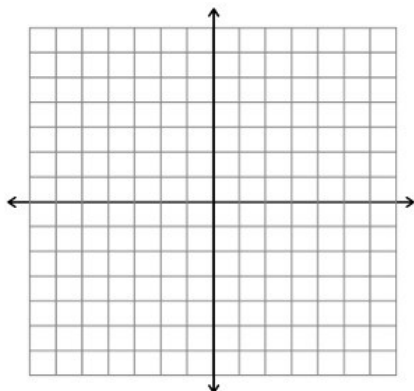
a. $p(x) = (x - 2)(x + 1)$



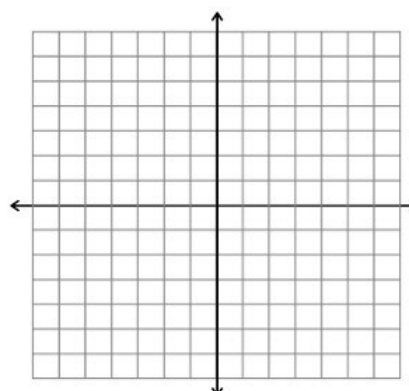
c. $p(x) = (x - 2)(x + 1)^3$



b. $p(x) = (x - 2)(x + 1)^2$



d. $p(x) = (x - 2)(x + 1)^4$



A few bullet points:

- X-intercepts with multiplicity of **one** (cross / touch) the x-axis like a _____.
- X-intercepts with **even** multiplicities (cross / touch) the x-axis like a _____.
- X-intercepts with other **odd** multiplicities (cross / touch) the x-axis like a _____.