3.3 Characteristics of Polynomial Functions (in *Factored Form*)

Math Learning Target:

"I can identify properties of polynomial functions when expressed in factored form.
I can express any polynomial function in its factored form, and then graph it."

Recall: To **factor** a number (or expression) means to determine the numbers (or expressions) that divide into it with a remainder of zero.

Recall: A **prime number** is a positive number that has only two unique factors: 1 and itself. Note that the number 1 is not prime.

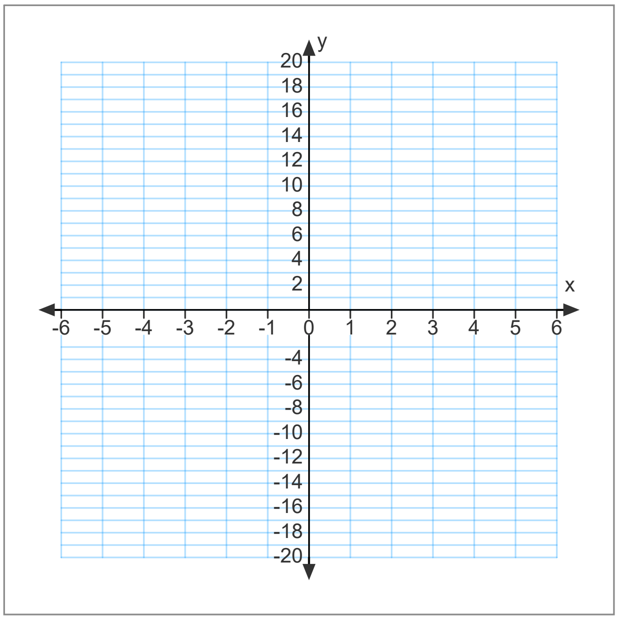
Recall: The **zeros** of a function $y=f(x)$ are all real numbers x such that $f(x) = 0$.
They correspond to the x-intercepts of the function $y=f(x)$. In the *INVESTIGATE* from a previous class, you learned that a polynomial function of degree n may have up to n distinct zeros.

If a polynomial function $y=f(x)$ with degree n has exactly n distinct zeros, then the factored forms are:

degree = 1	linear	$f(x) = a(x-p)$
degree = 2	quadratic	$f(x) = a(x-p)(x-q)$
degree = 3	cubic	$f(x) = a(x-p)(x-q)(x-r)$
degree = 4	quartic	$f(x) = a(x-p)(x-q)(x-r)(x-s)$
degree = 5	quintic	$f(x) = a(x-p)(x-q)(x-r)(x-s)(x-t)$
etc...	etc...	etc...

If a polynomial function $y=f(x)$ with degree n has less than n distinct zeros, but at least one zero, the function can still be expressed in factored form, but there will not be n distinct factors.

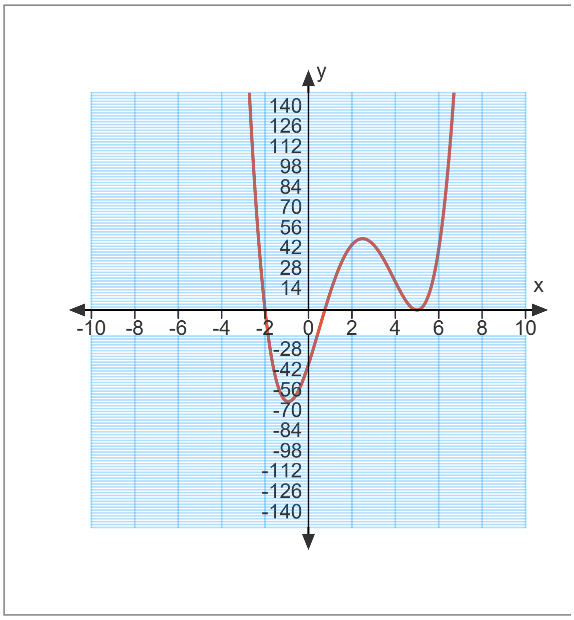
Ex.1 Sketch $f(x)=2(x+1)^2(x-3)$



Ex.2 Sketch $g(x)=-x^3+6x^2-9x$

Ex. 3 a) Determine the equation of the quartic function with zeros -2, ¾, 5(order 2) and a *y*-intercept of *y*= -37.5.

b) Determine at least two other functions that belong to the same family.



Now complete pp.146-148 #1, 2a, 4b, 6be, 8ab, 9ab, 10d, 13a, 16*

* for 16b you will need to use desmos