

# Factor Theorem

A polynomial  $f(x)$  has a factor  $x - k$  if and only if  $f(k) = 0$ .

## Example

$$f(x) = x^3 + 3x^2 - 4x - 12$$

given  $f(2) = 0$

## Your Turn

$$f(x) = 2x^3 + 11x^2 + 18x + 9$$

given  $f(-3) = 0$

Given Function with  $f(k) = 0$ .

Use synthetic division to find the other factors.

Interpret the 3<sup>rd</sup> row as a quadratic expression.

Factor the resulting polynomial.

Write your polynomial in factored form. Remember the one factor that was given  $(x - k)$ .

What would the 3<sup>rd</sup> row represent if  $f(x)$  was degree  $n$ ?