Finding Zeros of Polynomial Functions

Factor Theorem: A polynomial f(x) has a factor of x – k if and only if f(k) = 0

	Example	Your Turn
Given Function with f(k) = 0.	$f(x) = x^3 - 3x^2 - 13x + 15$ given $x + 3$	$f(x) = 2x^3 + x^2 - 40x - 75$ given $x - 5$
Use synthetic division to find the other factors.	DO opposite of $x+3$ $-3 \mid 1 \quad -3 \quad -13 \quad 15$ $\quad\quad\downarrow \quad -3 \quad 18 \quad -15$ $\quad\quad 1 \quad -6 \quad 5 \quad 0$	$x-5$ opp $5 \mid 2 \quad 1 \quad -40 \quad -75$ $\quad\quad\downarrow \quad 10 \quad 55 \quad 75$ $\quad\quad 2 \quad 11 \quad 15 \quad 0$
Interpret the 3rd row as a quadratic expression.	$x^2 - 6x + 5 = 0$	$2x^2 + 11x + 15 = 0$
Factor the resulting polynomial.	$(x-5)(x-1) = 0$ $x = 5, \; x = 1$	$x^2 + 11x + 30 = 0$ $(x + \frac{6}{2})(x + \frac{5}{2}) = 0$ $(x+3)(x + \frac{5}{2}) = 0$
Write your polynomial in factored form. Remember the one factor that was given (x – k).	$x = 5, \; x = 1, \; x = -3$	$x = -3, \; x = \frac{-5}{2}, \; x = 5$
Set each factor equal to zero.		

What is the relationship between the degree and the number of answers you have? degree = # of solutions