Chapter 3 Summary

A. Characteristics of Polynomials

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \dots + a_1 x^1 + a_0$$

Degree			
Constant term			
Number of possible <i>x</i> -intercepts			
Leading coefficient			
End behavior			
Туре			

- Even-numbered degrees have the same end behavior
- Odd-numbered degrees have the same end behavior

B. Long Division with Polynomials

Division Statement: When P(x) is divided by x - a

$$\frac{P(x)}{x-a} = Q(x) + \frac{R}{x-a} \qquad \text{or} \qquad P(x) = Q(x)(x-a) + R$$

a) Long Division

b) Synthetic Division

C. The Remainder Theorem

The Remainder Theorem states that when a polynomial P(x) is divided by (x - a), the remainder is P(a). R = P(a)

D. The Factor Theorem

The Factor Theorem states that x - a is a factor of a polynomial P(x), if and only if, P(a) = 0.

Integral Zero Theorem

If x - a is a factor of P(x) with integral coefficients, then "a" is a factor of the constant term of P(x).

E. Graphs of Polynomials

The **multiplicity** of a zero/root represents how many times a particular number is a zero for a given polynomial.

- Zeroes of odd multiplicity change sign at the zero.
- Zeroes of even multiplicity do not change sign at the zero.

Positive and negative intervals represent the x – values for which the polynomial is either above or below the x – axis.