Notes Factor and Remainder Theorems

The Remainder Theorem:

Suppose a polynomial f(x) is divided by x-c and yields $f(x) = (x-c) \cdot q(x) + r$ Then the remainder, r, is equal to the value f(c) = r.

Find the remainder:

EX1: $f(x) = 2x^3 + 7x^2 - x + 12$; $x + 4$	EX2: $f(x) = 6x^4 - 7x^3 - 11x^2 + 2x + 3$; $x+1$

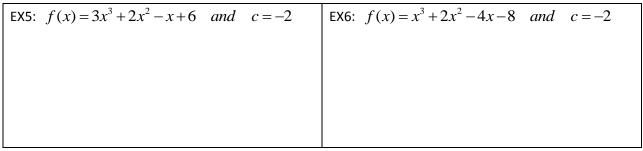
Use the Remainder Theorem to evaluate f(c)

Ex3: $f(x) = -x^3 + 11x^2 + 7x - 19$	and $c=5$	EX4: $f(x) = x^3 + 4x^2 - 7x$ and $c = 5$

Zero of a Polynomial:

A complex number, c, is said to be a zero of polynomial f, if f(c) = 0 (if when we synthetically divide we get a remainder of zero).

Determine if the number c , is a zero of polynomial f



Factor Theorem:

Let f(x) be a polynomial and c be a complex number. Then x-c is a factor of f(x) if and only if f(c) = 0.

Determine if c is a factor of f(x). If c is a factor, then factor f(x) completely.

EX7: $f(x) = x^3 + 2x^2 - 4x - 8$ and $c = -2$	EX8: $f(x) = -x^4 + 2x^2 + x + 3$ and $x - 1$

Factor f(x) completely given that c is a zero of f of multiplicity k

EX8: $f(x) = 4x^4 - 9x^3 + 3x^2 + 5x - 3$ and c = 1 of multiplicity of 3 Ex9: $f(x) = 3x^4 + 5x^3 - 3x^2 - 9x - 4$ and c = -1 of multiplicity of 3