Remainder Theorem and Factor Theorem Note

Example 1 : Determine the remainder of $(x^3 - 7x + 4) \div (x - 3)$ using synthetic division

Example 2 : Determine the remainder of $(3x^2 + 5x + 2) \div (x + 4)$ using synthetic division

Example 3 : Determine the remainder of $(4x^3 + 2x^2 + 1) \div (2x - 1)$ using synthetic division

---

Remainder Theorem:
If any polynomial *f(x)* is divided by divisor *(x-a)*, the remainder is equal to *f(a)*.
Factor Theorem: *(x-a)* is a factor of *f(x)* if *f(a) =0* ☺

Example 4 : Determine the remainder when $(x^4 - 3x^3 - 2x + 9) \div (x - 3)$

Example 5 : Determine the remainder when $(2x^3 - 7x + 4) \div (2x - 1)$

Example 6 : Determine the remainder when $(24 - 14x + x^3 - x^2) \div (x + 4)$

Can any of the divisors above be classified as "factors" of their respective polynomial? Explain.

Example 6 AGAIN: Factor: $f(x) = 24 - 14x + x^3 - x^2$

Example 7 : Factor: $f(x) - 2x^3 = -3x^2 - 18x - 8$

Homework Pg 170 #10,12,13