

MHF 4UI
Unit 1 Polynomials
Day 2 - Remainder Theorem (2.3)

Synthetic Division (Extended)

Example: Divide: $(12x^3 + 2x^2 + 11x + 16) \div (3x + 2)$

$$(6x^3 - 2x - 15x^2 + 5) \div (2x - 5)$$

Remainder Theorem: When a Polynomial $P(x)$ is divided by $(x - b)$, the remainder is $P(b)$.

Example 1: Use the remainder theorem to determine the remainder of the following:

a) $(x^2 - 5x - 3) \div (x - 2)$

b) $(x^3 + 3x^2 - x + 8) \div (x + 1)$

Remainder Theorem (extended) : When a polynomial is divided by $(ax - b)$, the remainder is

Example 2: Determine the remainder of $(6x^2 + 5x - 4) \div (3x + 4)$

Example 3: For the given polynomial, determine the value of k:

$$(x^3 + x^2 + kx - 17) \div (x - 2)$$

Example 4: When the polynomial $(4x^3 + mx^2 + nx + 11)$ is divided by $(x + 2)$, the remainder is -7 , when it is divided by $(x - 1)$, the remainder is 14 , what are the values of m and n ?