Synthetic Division and The Remainder Theorem

This is a shortcut to long-division by a linear binomial.
You must be dividing by a binomial of the form:

$x + c \qquad x - c \qquad ax + b \qquad ax - b$

$(4x^3 - 3x^2 + 2x - 3) \div (x - 2) =$

$\dfrac{5p^3 - 6p^2 + 3p + 14}{p + 1} =$

$$\frac{x^4+81}{x-3} =$$

$$(2x^3+5x^2-11x+4) \div (2x-1)$$

$P(x) = x^3 - 5x - 2$

a) Find P(2) by substitution.

b) Use synthetic division to find the remainder when P(x) is divided by x - 2.

Remainder Theorem:
If a polynomial P(x) is divided by x - c, then the remainder is P(c).

Use the remainder theorem to find P(4) if P(x) = $4x^6 - 25x^5 + 35x^4 + 17x^2$

Find the remainder when dividing $(x^{100} - 2x^{98} + 7x^2 - 1) \div (x-1)$