EX.0.1.6, Sauer

Explain how to evaluate the polynomial for a given input x, using as few operations as possible. How many multiplications and how many additions are required?

a. $p(x) = a_0 + a_5x^5 + a_{10}x^{10} + a_{15}x^{15}$

b. $p(x) = a_7x^7 + a_{12}x^{12} + a_{17}x^{17} + a_{22}x^{22} + a_{27}x^{27}$

a. $x^2 = x * x$

$x^4 = x^2 * x^2$

$x^5 = x^4 * x$

$p(x) = a_0 + x^5(a_5 + x^5(a_{10} + x^5 a_{15}))$

In total, 6 multiplications, 3 additions, 0 power operator

b. $x^2 = x * x$

$x^4 = x^2 * x^2$

$x^5 = x^4 * x$

$x^7 = x^5 * x^2$

$p(x) = x^7 * (a_7 + x^5(a_{12} + x^5(a_{17} + x^5(a_{22} + x^5 a_{27}))))$

In total, 9 multiplications, 4 additions, 0 power operator.