

# Algebra 1

## Domaci' ukol 6

58.  $f(x) = x^4, c = -1$

$$\begin{array}{r|rrrrr}
 & 1 & 0 & 0 & 0 & 0 \\
 -1 & 1 & -1 & 1 & -1 & \underline{1} \\
 -1 & 1 & -2 & 3 & \underline{-4} & \\
 -1 & 1 & -3 & \underline{6} & & \\
 -1 & 1 & -4 & & & \\
 -1 & 1 & & & & 
 \end{array}$$

$$x^4 = 1 - 4(x+1) + 6(x+1)^2 - 4(x+1)^3 + (x+1)^4$$

59. NSD( $f, g$ ),  $f(x) = x^5 - x^4 + x^3 - x^2 + x - 1, g(x) = x^4 - 2x^2 - 3x - 2$

$$\begin{array}{l}
 (x^5 - x^4 + x^3 - x^2 + x - 1) : (x^4 - 2x^2 - 3x - 2) = x - 1 + \frac{3x^3 - 3}{x^4 - 2x^2 - 3x - 2} \\
 \underline{-(x^5 - 2x^3 - 3x^2 - 2x)} \\
 -x^4 + 3x^3 + 2x^2 + 3x - 1 \\
 \underline{-(-x^4 + 2x^2 + 3x + 2)} \\
 3x^3 - 3 \rightarrow x^3 - 1
 \end{array}$$

$$(x^4 - 2x^2 - 3x - 2) : (x^3 - 1) = x - \frac{2x^2 + 2x + 2}{x^3 - 1}$$

$$-(x^4 \quad \quad -x)$$

$$\quad -2x^2 - 2x - 2 \rightsquigarrow x^2 + x + 1$$

$$(x^3 - 1) : (x^2 + x + 1) = x - 1$$

$$-(x^3 + x^2 + x)$$

$$\quad -x^2 - x - 1$$

$$\quad \quad 0$$

$$\text{NSD}(f, g) = \underline{\underline{x^2 + x + 1}}$$

60.  $\text{NSD}(f, g)$ ,  $f = x^4 - x^3 - 2x^2 + x + 1$ ,  $g = x^3 - x^2 - x + 1$

$$a) (x^4 - x^3 - 2x^2 + x + 1) : (x^3 - x^2 - x + 1) = x + \frac{-x^2 + 1}{x^3 - x^2 - x + 1}$$

$$-(x^4 - x^3 - x^2 + x)$$

$$\quad -x^2 + 1$$

$$(x^3 - x^2 - x + 1) : (x^2 - 1) = x - 1$$

$$-(x^3 \quad -x)$$

$$\quad -x^2 + 1$$

$$\quad \quad 0$$

$$\text{NSD}(f, g) = \underline{\underline{x^2 - 1}}$$

$$b) x^4 - x^3 - 2x^2 + x + 1 = \underbrace{x^4 + x^3 - 2x^3 - 2x^2 + x + 1} = x^3(x+1) - 2x^2(x+1) + (x+1) =$$

$$= (x+1) \cdot (x^3 - 2x^2 + 1) = (x+1) \cdot (\underbrace{x^3 - x^2 - x^2 + 1}) = (x+1)[x^2(x-1) - (x-1)(x+1)]$$

$$= (x+1)(x-1) \cdot (x^2 - x - 1)$$

$$x^3 - x^2 - x + 1 = x^2(x-1) - (x-1) = (x-1)(x^2 - 1) = (x-1) \cdot (x-1)(x+1)$$

$$\text{NSD}(f, g) = (x-1)(x+1) = \underline{\underline{x^2 - 1}}$$