Manual pag 123

E1 c) $f = X^{10} + 2X^4 + 3$ $a = i$ $g = X - i$

X^{10}	X^9	X^8	X^7	X^6	X^5	X^4	X^3	X^2	X^1	X^0
1	0	0	0	0	0	2	0	0	0	3
1										

1	1	i	-1	$-i$	1	1	1	i	-1	$-i$	4

X^9 X^8 X^7 X^6 X^5 X^4 X^3 X^2 X^1 X^0

$q = X^9 + iX^8 - X^7 - iX^6 + X^5 + X^4 + X^3 + iX^2 - X - i$

$r = 4$

d) $f = \hat{2}x^7 + \hat{4}x^6 + \hat{3}x + \hat{2}$; $a = \hat{2}$; $\mathbb{Z}_5$

$\hat{1} - \hat{2} - \hat{0} - \hat{2} = \hat{5} - \hat{2}$

$(q = x^6 - \hat{2} = x^{4+3})$

x^7	x^6	x^5	x^4	x^3	x^2	x^1	x^0
$\hat{2}$	$\hat{4}$	$\hat{0}$	$\hat{0}$	$\hat{0}$	$\hat{0}$	$\hat{3}$	$\hat{2}$
$\hat{2}$							
	$\hat{2}x^6$	$\hat{3}x^5$	$\hat{1}x^4$	$\hat{2}x^3$	$\hat{4}x^2$	$\hat{3}x$	$\hat{4}$

$q = \hat{2}x^6 + \hat{3}x^5 + x^4 + \hat{2}x^3 + \hat{4}x^2 + \hat{3}x + \hat{4}$

$r = \hat{0}$

$\mathbb{Z}_5 = \{\hat{0}, \hat{1}, \hat{2}, \hat{3}, \hat{4}\}$

$\hat{2} \to \{2, 4, 1, 2, 4, 1, \ldots\}$

$\hat{2}^5 = \hat{1}$

$\hat{5} \mid \hat{1}$

$\hat{2}$

Ex 123 $m \in K$: $f \in K[X]$; $g = x - a$;

a) $f = X^3 + mX^2 + 3X - m$; $a = 2$; $K = \mathbb{Q}$;

$r = 17$.

① Restul împărțirii polin f la $x - a$ este $r = f(a)$

$r = f(2) = 17 \Rightarrow 8 + 4m + 6 - m = 17 \Rightarrow$

$\Rightarrow 14 + 3m = 17 \Rightarrow 3m = 3 \Rightarrow \underline{m = 1}$

b) $f = X^4 + mX^2 + 2$; $a = -i$; $K = \mathbb{C}$; $r = 3+i$

$r = 3+i \Leftrightarrow f(-i) = 3+i \Rightarrow (-i)^4 + m \cdot (-i)^2 + 2 = 3+i \Rightarrow$

$\Rightarrow 1 - m + 2 = 3 + i \Rightarrow 3 - 3 - i = m \Rightarrow m = -i$

c) $f = \hat{2}X^4 + \hat{2}X^3 - mX + \hat{1}$; $a = \hat{2}$; $K = \mathbb{Z}_5$; $r = \hat{3}$

$r = \hat{3} \Leftrightarrow f(\hat{2}) = \hat{3} \Leftrightarrow \hat{4} + \hat{2} + \hat{5}m + \hat{1} = \hat{3} \Rightarrow$

$\Rightarrow \hat{5} \cdot m = \hat{3} \Rightarrow m = \hat{2}$;

$f = x^5 + 4x^4 + 3x^2 + x - 2 \quad ; \quad g = x - 2$

$g = 0 \Rightarrow x - 2 = 0 \Rightarrow x = 2$

	x^5	x^4	x^3	x^2	x^1	x^0
	1	4	0	3	1	−2
2	1	6	12	27	55	**108**

$$q = x^4 + 6x^3 + 12x^2 + 27x + 55$$

$$r = 108$$