Exercice 29.

- $p(x) = 5x^{100} + 7x^5 - x + 47 \quad ; \quad d(x) = x - 1$
- $Z_d = \{1\}$
- $r = p(1) = 5 \cdot 1 + 7 \cdot 1 - 1 + 47 = 58 \Rightarrow \boxed{\text{reste} = 58}$

Exercice 30.

- $p(x) = 3x^{100} + 5x^{85} - 4x^{38} + 2x^{17} - 6 \quad ; \quad d(x) = x + 1$
- $Z_d = \{-1\}$
- $r = p(-1) = 3 \cdot 1 + 5 \cdot (-1) - 4 \cdot 1 + 2 \cdot (-1) - 6 = -14 \Rightarrow \boxed{\text{reste} = -14}$

Exercice 14.

- $p(x) = x^4 - ax^3 + 3x^2 - 2ax - a^2$ est divisible par $d(x) = x - 2 \iff r = 0$
- $Z_d = \{2\}$
- $r = p(2) = 16 - a \cdot 8 + 3 \cdot 4 - 2a \cdot 2 - a^2 = 0 \iff$

$\iff a^2 + 12a - 28 = 0 \iff (a + 14)(a - 2) = 0 \Rightarrow \boxed{a_1 = -14 \text{ ou } a_2 = 2}$

- schéma de Horner pour $a_1 = -14$:

	1	14	3	28	− 196
2		2	32	70	196
	1	16	35	98	0

$$\boxed{q_1(x) = x^3 + 16x^2 + 35x + 98} \quad ; \quad r = 0$$

- schéma de Horner pour $a_2 = 2$:

	1	− 2	3	− 4	− 4
2		2	0	6	4
	1	0	3	2	0

$$\boxed{q_2(x) = x^3 + 3x + 2} \quad ; \quad r = 0$$

Exercice 15.

• $p(x) = ax^3 + x^2 + a^2x + 3a^2 + 11$ est divisible par $d(x) = x + 2 \iff r = 0$

• $Z_d = \{-2\}$

• $r = p(-2) = a \cdot (-8) + 4 + a^2 \cdot (-2) + 3a^2 + 11 = 0 \iff$

$\iff a^2 - 8a + 15 = 0 \iff (a-3)(a-5) = 0 \Rightarrow \boxed{a_1 = 3 \text{ ou } a_2 = 5}$

• schéma de Horner pour $a_1 = 3$:

	3	1	9	38
− 2		− 6	10	− 38
	3	− 5	19	0

$$\boxed{q_1(x) = 3x^2 - 5x + 19} \quad ; \quad r = 0$$

• schéma de Horner pour $a_2 = 5$:

	5	1	25	86
− 2		− 10	18	− 86
	5	− 9	43	0

$$\boxed{q_2(x) = 5x^2 - 9x + 43} \quad ; \quad r = 0$$

Exercice 16.

• $p(x) = a^2x^3 - 4ax + 3$ est divisible par $d(x) = x - 1 \iff r = 0$

• $Z_d = \{1\}$

• $r = p(1) = a^2 \cdot 1 - 4a \cdot 1 + 3 = 0 \iff$

$\iff a^2 - 4a + 3 = 0 \iff (a-1)(a-3) = 0 \Rightarrow \boxed{a_1 = 1 \text{ ou } a_2 = 3}$

• schéma de Horner pour $a_1 = 1$:

	1	0	− 4	3
1		1	1	− 3
	1	1	− 3	0

$$\boxed{q_1(x) = x^2 + x - 3} \quad ; \quad r = 0$$

• schéma de Horner pour $a_2 = 3$:

	9	0	− 12	3
1		9	9	− 3
	9	9	− 3	0

$$\boxed{q_2(x) = 9x^2 + 9x - 3} \quad ; \quad r = 0$$