№ 11

$P(x) = 2x^3 + ax^2 + bx - 6$

$x = -1$ – кор $\Rightarrow P(-1) = 0$

$x = 2$ – кор $\Rightarrow P(2) = 0$

$$\begin{cases} -2 + a - b - 6 = 0 \\ 16 + 4a + 2b - 6 = 0 \end{cases} \Leftrightarrow \begin{cases} a - b = 8 \mid \cdot 2 \\ 4a + 2b = -10 \end{cases} \Leftrightarrow$$

$$\Leftrightarrow \begin{cases} 2a - 2b = 16 \\ 4a + 2b = -10 \end{cases} \oplus \begin{cases} 6a = 6 \\ b = a - 8 \end{cases} \Leftrightarrow \begin{cases} a = 1 \\ b = -7 \end{cases}$$

$P(x) = 2x^3 + x^2 - 7x - 6.$

$Q(x) = x - 3 \Rightarrow \alpha = 3 \Rightarrow r = P(3) = 54 + 9 - 21 - 6 = 36$

ответ: $r = 36.$

№ 12

$P(x) = 3x^4 + (m-1)x^3 + 2x^2 - 5$

$Q(x) = x + 1 \to \alpha = -1, \; r = 7 \Rightarrow P(-1) = 7$

$3 - m + 1 + 2 - 5 = 7 \Rightarrow m = -6$

$P(x) = 3x^4 - 7x^3 + 2x^2 - 5$

$R(x) = x - 2 \Rightarrow \alpha = 2 \Rightarrow r = P(2) = 48 - 56 + 8 - 5 = -5$

ответ: $r = -5$

№ 19

$P(x) = x^3 + 2x^2 + ax + 7$

$x + 2 \to \alpha = -2, \; r = 17 \Rightarrow P(-2) = 17$

$-8 + 8 - 2a + 7 = 17 \Rightarrow -2a = 10 \to a = -5$

$P(x) = x^3 + 2x^2 - 5x + 7$

$x - 3 \Rightarrow \alpha = 3 \Rightarrow r = P(3) = 27 + 18 - 15 + 7 = 37$

ответ: $r = 37$

№ 21

$P(x) = x^3 + mx^2 - 4x + n$

$x = -2$ – кор. $\Rightarrow P(-2) = 0$.

$x - 4 \Rightarrow \alpha = 4, z = 12 \Rightarrow P(4) = 12$

$$\begin{cases} -8 + 4m + 8 + n = 0 \\ 64 + 16m - 16 + n = 12 \end{cases} \Rightarrow \begin{cases} 4m + n = 0 \\ 16m + n = -36 \end{cases} \quad (-) \Rightarrow$$

$$\Rightarrow \begin{cases} -12m = 36 \\ 4m + n = 0. \end{cases} \Leftrightarrow \begin{cases} m = -3 \\ n = 12 \end{cases}$$

$P(x) = x^3 - 3x^2 - 4x + 12 = x^2(x-3) - 4(x-3) =$

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

Ответ: $\boxed{P(x) = (x-3)(x-2)(x+2)}$

№ 23

$P(x) = x^3 - 2x^2 + ax + 24$

- $x - 3 \Rightarrow \alpha = 3, z = -3 \Rightarrow P(3) = -3$

$27 - 18 + 3a + 24 = -3. \Rightarrow 3a = -36$

$a = -12$

$P(x) = x^3 - 2x^2 - 12x + 24$

- $P(x) = x^2(x-2) - 12(x-2) = (x-2)(x^2 - 12)$

$P(x) = 0$

$$\begin{cases} x - 2 = 0 \\ x^2 = 12 \end{cases} \Rightarrow \begin{cases} x = 2 \\ x = 2\sqrt{3} \\ x = -2\sqrt{3} \end{cases}$$

$\boxed{S = \{-2\sqrt{3}; 2; 2\sqrt{3}\}.}$

Полиномы (многочлены) 8б 12кл

Т29

$P(x) = x^4 - 4x^3 + 4x^2 + ax + b$

$Q(x) = x^2 - 4x + 3.$

$$\begin{array}{l|l} x^4 - 4x^3 + 4x^2 + ax + b & x^2 - 4x + 3 \\ \underline{x^4 - 4x^3 + 3x^2} & \\ -x^2 + ax + b & x^2 + 1 \\ \underline{x^2 - 4x + 3} & \\ (a+4)x + (b-3) & \end{array}$$

$R = 0. \Rightarrow \begin{cases} a+4=0 \\ b-3=0 \end{cases} \leftrightarrow \begin{cases} a=-4 \\ b=3 \end{cases}$

$C(x) = x^2 + 1$

Т.24

$$\begin{array}{l|l} ax^3 + bx^2 - 73x + 102 & x^2 - 5x + 6 \\ \underline{-ax^3 - 5ax^2 + 6ax} & \\ (b+5a)x^2 + (-73-6a)x + 102 & ax + (b+5a) \\ \underline{(b+5a)x^2 + (-5b-25a)x + 6b + 30a} & \\ (-73+5b+19a)x + (102-6b-30a) & \end{array}$$

$$\begin{cases} 5b + 19a = 73 \mid 6 \\ -6b - 30a = -102 \mid 5 \end{cases} \rightarrow \begin{cases} 30b + 114a = 438 \\ -30b - 150a = -510 \end{cases}$$

$-36a = -72$

$a = 2.$

$30b = 438 - 228$

$30b = 210 \quad b = 7$

$C(x) = 2x + 1$

Т 37

$P(x) = x(x+1)(x-a) - 12$.

$x = 1$ — корень $\Rightarrow P(1) = 0$.

$1 \cdot 2 \cdot (1-a) = 12 \quad 1-a = 6 \quad a = -5$

$P(x) = (x^2+x)(x+5) - 12 = x^3 + 6x^2 + 5x - 12$.

	x^3	x^2	x^1	x^0
	1	6	5	−12
1	1	7	12	0.

$x^2 + 7x + 12 = 0$.

$x = -4$
$x = -3$
$x = 1$

$\boxed{P(x) = (x+4)(x+3)(x-1).}$

Т 39

$P(x) = x^3 + ax^2 - 5x + 6$

$P(1) = P(-2) \Rightarrow 1 + a - 5 + 6 = -8 + 4a + 10 + 6$

$-3a = 6 \quad a = -2$.

$P(x) = x^3 - 2x^2 - 5x + 6$.

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

$P(1) = 0$.
$P(-2) = 0$.

$x^3 - 2x^2 - 5x + 6 \;\big|\; x^2 + x - 2$
$x^3 + x^2 - 2x \qquad\quad x - 3$
$-3x^2 - 3x + 6$
0

$\boxed{P(x) = (x-1)(x+2)(x-3).}$

T42

$P(x) = 2x^5 + 5x^2 - m$

$x+2 \Rightarrow \alpha = -2, r = 0$ $\quad P(-2) = 0.$

$-64 + 20 - m = 0$ $\quad \boxed{m = -44.}$

T. 44.

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

- $Q(x) = x - 3 \Rightarrow \alpha = 3, r = -114$ $\quad P(3) = -114$

$-135 + 18 + a = -114$

$a = 3$

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

- $k(x) = x + 2 \Rightarrow \alpha = -2 \Rightarrow r = P(-2) = 40 + 8 + 3 = 51$

$\boxed{r = 51}$

T. 45

$P(x) = 2x^3 - 3x^2 - 5x + 7$

$x+2 \Rightarrow \alpha = -2 \Rightarrow r = P(-2) = -16 - 12 + 10 + 7 = -11$

$\boxed{r = -11}$

T. 49

$P(x) = x^3 - ax^2 + 6x - 7$

- $x - 2 \Rightarrow \alpha = 2, r = 7 \Rightarrow P(2) = 7$

$8 - 4a + 12 - 7 = 7 \Rightarrow -4a = -6 \Rightarrow a = \frac{3}{2}$

$P(x) = x^3 - \frac{3}{2}x^2 + 6x - 7$

- $x + 2 \Rightarrow \alpha = -2 \Rightarrow r = P(-2) = -8 - \frac{3}{2} \cdot 4 - 12 - 7 = -33$

$\boxed{r = -33}$

T. 51

$P(x) = 2x^3 - 5x^2 - 11x + m$

a) $x_2 = -1$ - rădăc. $\Rightarrow P(-1) = 0. \Rightarrow -2 - 5 + 11 + m = 0.$

$m = -4$

$P(x) = 2x^3 - 5x^2 - 11x - 4.$

b) $2x^3 - 5x^2 - 11x - 4 \;\big|\; x + 1$

$2x^3 + 2x^2 \qquad\qquad 2x^2 - 7x - 4$

$-7x^2 - 11x$

$-7x^2 - 7x$

$-4x - 4$

$-4x - 4$

$0.$

$2x^2 - 7x - 4 = 0.$

$\Delta = 49 + 32 = 81$

$\frac{7 \pm 9}{4}$

4

$-\frac{1}{2}.$