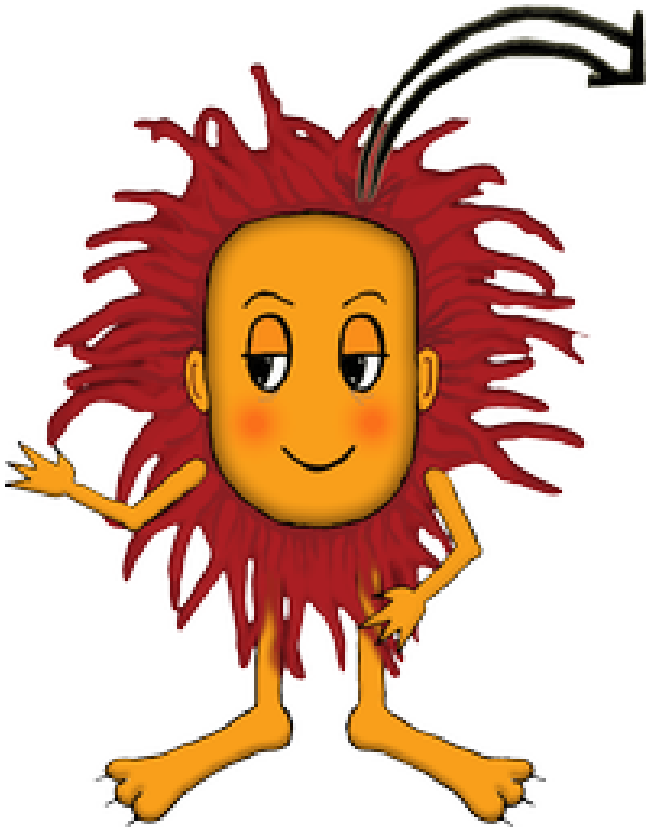
Velika logična pošast



Vrednost polinoma pri kompleksnem argumentu

Dan je polinom $P(x)$ z realnimi koeficienti in kompleksno število z.
Delimo ga s polinomom $(x-z)(x-\overline{z})=x^2-2px-q$
z Ruffini–Hornerjevim postopkom za deljenje s
kvadratnim polinomom. Ostanek je linearna funkcija $R(x)$ in
njena vrednost pri a je vrednost danega polinoma pri a.

1.

$P(x) = x^3 - 2x^2 + 3x + 1,\ z = 1 - 3i.$

2.

$$P(x) = 2x^5 + 2x^4 + 2x^3 + x + 3,\ z = 3 + i.$$

3.

$$P(x) = 4x^5 - 2x^4 + 2x^3 + 2x^2 + 3x - 2,\ z = -1 + 3i.$$

4.

$$P(x) = 2x^2 - x - 1,\ z = -3 + 2i.$$

5.

$$P(x) = 2x^3 + 3x^2 + x + 3,\ z = -3i.$$

6.

$$P(x) = x^5 + x^4 - x^3 - x^2 - x - 2,\ z = -1 - 3i.$$

7.

$$P(x) = 3x^4 + x^3 + 3x^2 + 2x + 3,\ z = 3.$$

8.

$$P(x) = 2x^4 - 2x^3 + 3,\ z = 2i.$$

9.

$$P(x) = x^4 - 2x^3 + x^2 - 2x,\ z = -1 + 2i.$$

10.

$$P(x) = 2x^4 - 2x^3 - x^2 + x + 1,\ z = 1 - 2i.$$

11.

$$P(x) = x^2 + 2x - 2,\ z = 2 - 2i.$$

12.

$$P(x) = x^3 + 3x^2 - 2x - 1,\ z = -2 - i.$$

13.

$$P(x) = 4x^3 + 2x^2 + x,\ z = -2 - 2i.$$

14.

$$P(x) = 3x^5 - x^4 - x^3 - x^2 + 2x + 2,\ z = 1.$$

15.

$$P(x) = 2x^4 - 2x^3 - 2x^2 + 3,\ z = -2 + 2i.$$

16.

$$P(x) = x^5 - x^4 + 3x^3 + x^2 - 2x - 1,\ z = -1.$$

17.

$$P(x) = 3x^4 - 2x^3 - x^2 + 2x,\ z = -3 - i.$$

18.

$$P(x) = 4x^5 + 2x^4 + 2x^3 - 2x^2 - 2x + 2,\ z = 3 - 3i.$$

19.

$$P(x) = x^4 + 2x - 1,\ z = 3i.$$

20.

$P(x) = 2x^3 + 2x^2 - 1,\ z = 3 + 2i.$

21.

$P(x) = x^5 - x^4 + 2x^3 - x^2 + 3x + 3,\ z = 3i.$

22.

$P(x) = 2x^5 + 2x^4 - 2x^3 + x^2 + 3x,\ z = -1.$

23.

$P(x) = 4x^4 + 3x^3 + 3x^2 - x + 3,\ z = 2 + i.$

24.

$P(x) = 4x^5 - x^4 + x^3 - x + 3,\ z = -2 + 2i.$

25.

$P(x) = x^2,\ z = 1 + 2i.$

26.

$P(x) = 3x^3 + 3x^2 + x + 1,\ z = 3.$

27.

$P(x) = x^2,\ z = -3 + i.$

28.

$P(x) = 4x^3 + 2x^2 - x - 2,\ z = 2 + i.$

29.

$P(x) = 2x^5 - x^4 - x^3 + 2x^2 - 2x + 3,\ z = -1 + 2i.$

30.

$P(x) = 4x^2,\ z = 1 - 2i.$

31.

$P(x) = x^3 + 3x^2 + 2x + 1,\ z = -3 - 2i.$

32.

$P(x) = 3x^4 + 3x^3 + 3x^2 - 2x - 2,\ z = -3 + 3i.$

33.

$P(x) = 4x^2 - 1,\ z = 0.$

34.

$P(x) = 2x^3 + 3x^2 + 3x + 3,\ z = 1 - 3i.$

35.

$P(x) = 2x^3 + x + 3,\ z = -3 + 3i.$

36.

$P(x) = 4x^5 + 2x^4 - 2x^3,\ z = 1 + 3i.$

37.

$P(x) = x^3 - 2x^2 + 2x - 2,\ z = -3 + i.$

38.

$P(x) = x^4 + x^3 - 2x^2 + 3x,\ z = 3.$

39.

$P(x) = 2x^4 + 3x^3 - 2x^2 - x + 2,\ z = 1 - 2i.$

40.

$P(x) = 2x^3 + 3x^2 + x + 3,\ z = -2i.$

41.

$P(x) = 4x^2 - 1,\ z = 1.$

42.

$P(x) = x^3 - x^2 - x - 1,\ z = 1 + i.$

43.

$P(x) = 3x^5 - x^4 - x^3 + 2x^2 + 2x + 1,\ z = 3 - i.$

44.

$P(x) = 3x^2 + 2,\ z = -1 + i.$

45.

$P(x) = 2x^5 + 3x^4 + x^3 + x^2 - 2x + 2,\ z = -1 + 2i.$

46.

$P(x) = 3x^3 + x^2 - 2x,\ z = 1 + 2i.$

47.

$P(x) = 2x^2 - x + 3,\ z = -3 + 2i.$

48.

$P(x) = 2x^2 + x,\ z = 2 - i.$

49.

$P(x) = x^5 + 2x^4 + x^3 + 2,\ z = -2 - 3i.$

50.

$P(x) = 3x^2 - x,\ z = -1 + i.$

Rešitve:

1.

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

$\boxed{z = 1 - 3i}$

$Q(x) = x^2 - 2x + 10$
$p = 1$
$q = -10$

−10			−10	0
2		2	0	
	1	0	−7	1

$S(x) = x$
$R(x) = 1 - 7x$
$P(1 - 3i) = -6 + 21i$

2.

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

$\boxed{z = 3 + i}$

$Q(x) = x^2 - 6x + 10$
$p = 3$
$q = -10$

−10			−20	−140	−660	−2560
6		12	84	396	1536	
	2	14	66	256	877	−2557

$S(x) = 2x^3 + 14x^2 + 66x + 256$
$R(x) = 877x - 2557$
$P(3 + i) = 74 + 877i$

3.

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

$\boxed{z = -1 + 3i}$

$Q(x) = x^2 + 2x + 10$
$p = -1$
$q = -10$

−10			−40	100	180	−1380
−2		−8	20	36	−276	
	4	−10	−18	138	−93	−1382

$S(x) = 4x^3 - 10x^2 - 18x + 138$
$R(x) = -93x - 1382$
$P(-1 + 3i) = -1289 - 279i$

4.

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

$z = -3 + 2i$

$Q(x) = x^2 + 6x + 13$
$p = -3$
$q = -13$

	2	−1	−1
−13			−26
−6		−12	
	2	−13	−27

$S(x) = 2$
$R(x) = -13x - 27$
$P(-3 + 2i) = 12 - 26i$

5.

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

$z = -3i$

$Q(x) = x^2 + 9$
$p = 0$
$q = -9$

	2	3	1	3
−9			−18	−27
0		0	0	
	2	3	−17	−24

$S(x) = 2x + 3$
$R(x) = -17x - 24$
$P(-3i) = -24 + 51i$

6.

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

$z = -1 - 3i$

$Q(x) = x^2 + 2x + 10$
$p = -1$
$q = -10$

	1	1	−1	−1	−1	−2
−10			−10	10	90	−270
−2		−2	2	18	−54	
	1	−1	−9	27	35	−272

$S(x) = x^3 - x^2 - 9x + 27$
$R(x) = 35x - 272$
$P(-1 - 3i) = -307 - 105i$

7.

$P(x) = 3\,x^4 + x^3 + 3\,x^2 + 2\,x + 3$

$z = 3$

$Q(x) = x^2 - 6\,x + 9$
$p = 3$
$q = -9$

	3	1	3	2	3
−9			−27	−171	−810
6		18	114	540	
	3	19	90	371	−807

$S(x) = 3\,x^2 + 19\,x + 90$
$R(x) = 371\,x - 807$
$P(3) = 306$

8.

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

$z = 2\,i$

$Q(x) = x^2 + 4$
$p = 0$
$q = -4$

	2	−2	0	0	3
−4			−8	8	32
0		0	0	0	
	2	−2	−8	8	35

$S(x) = 2\,x^2 - 2\,x - 8$
$R(x) = 8\,x + 35$
$P(2\,i) = 35 + 16\,i$

9.

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

$z = -1 + 2\,i$

$Q(x) = x^2 + 2\,x + 5$
$p = -1$
$q = -5$

	1	−2	1	−2	0
−5			−5	20	−20
−2		−2	8	−8	
	1	−4	4	10	−20

$S(x) = x^2 - 4\,x + 4$
$R(x) = 10\,x - 20$
$P(-1 + 2\,i) = -30 + 20\,i$

10.

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

$z = 1 - 2i$

$Q(x) = x^2 - 2x + 5$
$p = 1$
$q = -5$

	2	−2	−1	1	1
−5			−10	−10	35
2		4	4	−14	
	2	2	−7	−23	36

$S(x) = 2x^2 + 2x - 7$
$R(x) = 36 - 23x$
$P(1 - 2i) = 13 + 46i$

11.

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

$z = 2 - 2i$

$Q(x) = x^2 - 4x + 8$
$p = 2$
$q = -8$

	1	2	−2
−8			−8
4		4	
	1	6	−10

$S(x) = 1$
$R(x) = 6x - 10$
$P(2 - 2i) = 2 - 12i$

12.

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

$z = -2 - i$

$Q(x) = x^2 + 4x + 5$
$p = -2$
$q = -5$

	1	3	−2	−1
−5			−5	5
−4		−4	4	
	1	−1	−3	4

$S(x) = x - 1$
$R(x) = 4 - 3x$
$P(-2 - i) = 10 + 3i$

13.

$P(x) = 4\,x^3 + 2\,x^2 + x$

$z = -2 - 2\,i$

$Q(x) = x^2 + 4\,x + 8$
$p = -2$
$q = -8$

	4	2	1	0
−8			−32	112
−4		−16	56	
	4	−14	25	112

$S(x) = 4\,x - 14$
$R(x) = 25\,x + 112$
$P(-2 - 2\,i) = 62 - 50\,i$

14.

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

$z = 1$

$Q(x) = x^2 - 2\,x + 1$
$p = 1$
$q = -1$

	3	−1	−1	−1	2	2
−1			−3	−5	−6	−6
2		6	10	12	12	
	3	5	6	6	8	−4

$S(x) = 3\,x^3 + 5\,x^2 + 6\,x + 6$
$R(x) = 8\,x - 4$
$P(1) = 4$

15.

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

$z = -2 + 2\,i$

$Q(x) = x^2 + 4\,x + 8$
$p = -2$
$q = -8$

	2	−2	−2	0	3
−8			−16	80	−176
−4		−8	40	−88	
	2	−10	22	−8	−173

$S(x) = 2\,x^2 - 10\,x + 22$
$R(x) = -8\,x - 173$
$P(-2 + 2\,i) = -157 - 16\,i$

16.

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

$z = -1$

$Q(x) = x^2 + 2x + 1$
$p = -1$
$q = -1$

	1	−1	3	1	−2	−1
−1			−1	3	−8	12
−2		−2	6	−16	24	
	1	−3	8	−12	14	11

$S(x) = x^3 - 3x^2 + 8x - 12$
$R(x) = 14x + 11$
$P(-1) = -3$

17.

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

$z = -3 - i$

$Q(x) = x^2 + 6x + 10$
$p = -3$
$q = -10$

	3	−2	−1	2	0
−10			−30	200	−890
−6		−18	120	−534	
	3	−20	89	−332	−890

$S(x) = 3x^2 - 20x + 89$
$R(x) = -332x - 890$
$P(-3 - i) = 106 + 332i$

18.

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

$z = 3 - 3i$

$Q(x) = x^2 - 6x + 18$
$p = 3$
$q = -18$

	4	2	2	−2	−2	2
−18			−72	−468	−1548	−828
6		24	156	516	276	
	4	26	86	46	−1274	−826

$S(x) = 4x^3 + 26x^2 + 86x + 46$
$R(x) = -1274x - 826$
$P(3 - 3i) = -4648 + 3822i$

19.

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

$z = 3i$

$Q(x) = x^2 + 9$
$p = 0$
$q = -9$

	1	0	0	2	−1
−9			−9	0	81
0		0	0	0	
	1	0	−9	2	80

$S(x) = x^2 - 9$
$R(x) = 2x + 80$
$P(3i) = 80 + 6i$

20.

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

$z = 3 + 2i$

$Q(x) = x^2 - 6x + 13$
$p = 3$
$q = -13$

	2	2	0	−1
−13			−26	−182
6		12	84	
	2	14	58	−183

$S(x) = 2x + 14$
$R(x) = 58x - 183$
$P(3 + 2i) = -9 + 116i$

21.

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

$z = 3i$

$Q(x) = x^2 + 9$
$p = 0$
$q = -9$

	1	−1	2	−1	3	3
−9			−9	9	63	−72
0		0	0	0	0	
	1	−1	−7	8	66	−69

$S(x) = x^3 - x^2 - 7x + 8$
$R(x) = 66x - 69$
$P(3i) = -69 + 198i$

22.

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

$z = -1$

$Q(x) = x^2 + 2x + 1$
$p = -1$
$q = -1$

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

$S(x) = 2x^3 - 2x^2 + 3$
$R(x) = -3x - 3$
$P(-1) = 0$

23.

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

$z = 2 + i$

$Q(x) = x^2 - 4x + 5$
$p = 2$
$q = -5$

	4	3	3	−1	3
−5			−20	−95	−295
4		16	76	236	
	4	19	59	140	−292

$S(x) = 4x^2 + 19x + 59$
$R(x) = 140x - 292$
$P(2 + i) = -12 + 140i$

24.

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

$z = -2 + 2i$

$Q(x) = x^2 + 4x + 8$
$p = -2$
$q = -8$

	4	−1	1	0	−1	3
−8			−32	136	−296	96
−4		−16	68	−148	48	
	4	−17	37	−12	−249	99

$S(x) = 4x^3 - 17x^2 + 37x - 12$
$R(x) = 99 - 249x$
$P(-2 + 2i) = 597 - 498i$

25.

$P(x) = x^2$

$z = 1 + 2\,i$

$Q(x) = x^2 - 2\,x + 5$
$p = 1$
$q = -5$

	1	0	0
−5			−5
2		2	
	1	2	−5

$S(x) = 1$
$R(x) = 2\,x - 5$
$P(1 + 2\,i) = -3 + 4\,i$

26.

$P(x) = 3\,x^3 + 3\,x^2 + x + 1$

$z = 3$

$Q(x) = x^2 - 6\,x + 9$
$p = 3$
$q = -9$

	3	3	1	1
−9			−27	−189
6		18	126	
	3	21	100	−188

$S(x) = 3\,x + 21$
$R(x) = 100\,x - 188$
$P(3) = 112$

27.

$P(x) = x^2$

$z = -3 + i$

$Q(x) = x^2 + 6\,x + 10$
$p = -3$
$q = -10$

	1	0	0
−10			−10
−6		−6	
	1	−6	−10

$S(x) = 1$
$R(x) = -6\,x - 10$
$P(-3 + i) = 8 - 6\,i$

28.

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

$z = 2 + i$

$Q(x) = x^2 - 4\,x + 5$
$p = 2$
$q = -5$

−5	4	2	−1	−2
4			−20	−90
		16	72	
	4	18	51	−92

$S(x) = 4\,x + 18$
$R(x) = 51\,x - 92$
$P(2 + i) = 10 + 51\,i$

29.

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

$z = -1 + 2\,i$

$Q(x) = x^2 + 2\,x + 5$
$p = -1$
$q = -5$

−5	2	−1	−1	2	−2	3
−2			−10	25	5	−145
		−4	10	2	−58	
	2	−5	−1	29	−55	−142

$S(x) = 2\,x^3 - 5\,x^2 - x + 29$
$R(x) = -55\,x - 142$
$P(-1 + 2\,i) = -87 - 110\,i$

30.

$P(x) = 4\,x^2$

$z = 1 - 2\,i$

$Q(x) = x^2 - 2\,x + 5$
$p = 1$
$q = -5$

−5	4	0	0
2			−20
		8	
	4	8	−20

$S(x) = 4$
$R(x) = 8\,x - 20$
$P(1 - 2\,i) = -12 - 16\,i$

31.

$P(x) = x^3 + 3\,x^2 + 2\,x + 1$

$z = -3 - 2\,i$

$Q(x) = x^2 + 6\,x + 13$
$p = -3$
$q = -13$

−13			−13	39
−6		−6	18	
	1	−3	7	40

$S(x) = x - 3$
$R(x) = 7\,x + 40$
$P(-3 - 2\,i) = 19 - 14\,i$

32.

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

$z = -3 + 3\,i$

$Q(x) = x^2 + 6\,x + 18$
$p = -3$
$q = -18$

−18			−54	270	−702
−6		−18	90	−234	
	3	−15	39	34	−704

$S(x) = 3\,x^2 - 15\,x + 39$
$R(x) = 34\,x - 704$
$P(-3 + 3\,i) = -806 + 102\,i$

33.

$P(x) = 4\,x^2 - 1$

$z = 0$

$Q(x) = x^2$
$p = 0$
$q = 0$

0			0
0		0	
	4	0	−1

$S(x) = 4$
$R(x) = -1$
$P(0) = -1$

34.

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

$z = 1 - 3i$

$Q(x) = x^2 - 2x + 10$
$p = 1$
$q = -10$

	2	3	3	3
−10			−20	−70
2		4	14	
	2	7	−3	−67

$S(x) = 2x + 7$
$R(x) = -3x - 67$
$P(1 - 3i) = -70 + 9i$

35.

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

$z = -3 + 3i$

$Q(x) = x^2 + 6x + 18$
$p = -3$
$q = -18$

	2	0	1	3
−18			−36	216
−6		−12	72	
	2	−12	37	219

$S(x) = 2x - 12$
$R(x) = 37x + 219$
$P(-3 + 3i) = 108 + 111i$

36.

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

$z = 1 + 3i$

$Q(x) = x^2 - 2x + 10$
$p = 1$
$q = -10$

	4	2	−2	0	0	0
−10			−40	−100	220	1440
2		8	20	−44	−288	
	4	10	−22	−144	−68	1440

$S(x) = 4x^3 + 10x^2 - 22x - 144$
$R(x) = 1440 - 68x$
$P(1 + 3i) = 1372 - 204i$

37.

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

$z = -3 + i$

$Q(x) = x^2 + 6x + 10$
$p = -3$
$q = -10$

−10	1	−2	2	−2
−6			−10	80
	1	−6	48	
		−8	40	78

$S(x) = x - 8$
$R(x) = 40x + 78$
$P(-3 + i) = -42 + 40i$

38.

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

$z = 3$

$Q(x) = x^2 - 6x + 9$
$p = 3$
$q = -9$

−9	1	1	−2	3	0
6			−9	−63	−279
	1	6	42	186	
		7	31	126	−279

$S(x) = x^2 + 7x + 31$
$R(x) = 126x - 279$
$P(3) = 99$

39.

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

$z = 1 - 2i$

$Q(x) = x^2 - 2x + 5$
$p = 1$
$q = -5$

−5	2	3	−2	−1	2
2			−10	−35	−10
	2	4	14	4	
		7	2	−32	−8

$S(x) = 2x^2 + 7x + 2$
$R(x) = -32x - 8$
$P(1 - 2i) = -40 + 64i$

40.

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

$z = -2i$

$Q(x) = x^2 + 4$
$p = 0$
$q = -4$

	2	3	1	3
−4			−8	−12
0		0	0	
	2	3	−7	−9

$S(x) = 2x + 3$
$R(x) = -7x - 9$
$P(-2i) = -9 + 14i$

41.

$P(x) = 4x^2 - 1$

$z = 1$

$Q(x) = x^2 - 2x + 1$
$p = 1$
$q = -1$

	4	0	−1
−1			−4
2		8	
	4	8	−5

$S(x) = 4$
$R(x) = 8x - 5$
$P(1) = 3$

42.

$P(x) = x^3 - x^2 - x - 1$

$z = 1 + i$

$Q(x) = x^2 - 2x + 2$
$p = 1$
$q = -2$

	1	−1	−1	−1
−2			−2	−2
2		2	2	
	1	1	−1	−3

$S(x) = x + 1$
$R(x) = -x - 3$
$P(1 + i) = -4 - i$

43.

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

$z = 3 - i$

$Q(x) = x^2 - 6\,x + 10$
$p = 3$
$q = -10$

	3	−1	−1	2	2	1
−10			−30	−170	−710	−2580
6		18	102	426	1548	
	3	17	71	258	840	−2579

$S(x) = 3\,x^3 + 17\,x^2 + 71\,x + 258$
$R(x) = 840\,x - 2579$
$P(3 - i) = -59 - 840\,i$

44.

$P(x) = 3\,x^2 + 2$

$z = -1 + i$

$Q(x) = x^2 + 2\,x + 2$
$p = -1$
$q = -2$

	3	0	2
−2			−6
−2		−6	
	3	−6	−4

$S(x) = 3$
$R(x) = -6\,x - 4$
$P(-1 + i) = 2 - 6\,i$

45.

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

$z = -1 + 2\,i$

$Q(x) = x^2 + 2\,x + 5$
$p = -1$
$q = -5$

	2	3	1	1	−2	2
−5			−10	5	35	−100
−2		−4	2	14	−40	
	2	−1	−7	20	−7	−98

$S(x) = 2\,x^3 - x^2 - 7\,x + 20$
$R(x) = -7\,x - 98$
$P(-1 + 2\,i) = -91 - 14\,i$

46.

$P(x) = 3\,x^3 + x^2 - 2\,x$

$z = 1 + 2\,i$

$Q(x) = x^2 - 2\,x + 5$
$p = 1$
$q = -5$

	3	1	−2	0
−5			−15	−35
2		6	14	
	3	7	−3	−35

$S(x) = 3\,x + 7$
$R(x) = -3\,x - 35$
$P(1 + 2\,i) = -38 - 6\,i$

47.

$P(x) = 2\,x^2 - x + 3$

$z = -3 + 2\,i$

$Q(x) = x^2 + 6\,x + 13$
$p = -3$
$q = -13$

	2	−1	3
−13			−26
−6		−12	
	2	−13	−23

$S(x) = 2$
$R(x) = -13\,x - 23$
$P(-3 + 2\,i) = 16 - 26\,i$

48.

$P(x) = 2\,x^2 + x$

$z = 2 - i$

$Q(x) = x^2 - 4\,x + 5$
$p = 2$
$q = -5$

	2	1	0
−5			−10
4		8	
	2	9	−10

$S(x) = 2$
$R(x) = 9\,x - 10$
$P(2 - i) = 8 - 9\,i$

49.

$P(x) = x^5 + 2\,x^4 + x^3 + 2$

$z = -2 - 3\,i$

$Q(x) = x^2 + 4\,x + 13$
$p = -2$
$q = -13$

	1	2	1	0	0	2
−13			−13	26	52	−546
−4		−4	8	16	−168	
	1	−2	−4	42	−116	−544

$S(x) = x^3 - 2\,x^2 - 4\,x + 42$
$R(x) = -116\,x - 544$
$P(-2 - 3\,i) = -312 + 348\,i$

50.

$P(x) = 3\,x^2 - x$

$z = -1 + i$

$Q(x) = x^2 + 2\,x + 2$
$p = -1$
$q = -2$

	3	−1	0
−2			−6
−2		−6	
	3	−7	−6

$S(x) = 3$
$R(x) = -7\,x - 6$
$P(-1 + i) = 1 - 7\,i$