x4. Rastavi na faktore koristeći se formulom za razliku kvadrata

$$a^2 - b^2 = (a-b)\cdot(a+b)$$

1) $a^2 b^2 - c^2$

2) $100x^4 - 49y^6$

3) $x^4 - y^4$

4) $a^4 b^6 - c^8$

5) $x^6 - y^6$

6) $x^8 - y^8$

7) $x^4 - 81$

8) $81x^4 - 1$

9) $16 - x^4$

10) $25 - a^4$

11) $625x^4 - 1$

12) $x^4 y^2 - 9$

13) $x^2 y^6 - 16$

14) $(a+b)^2 - 9$

15) $a^2 - (b-c)^2$

16) $a^4 - (a^2 + b^3)^2$

17) $25 - (x-3)^2$

18) $36 - (5-y)^2$

19) $81x^2 - (4x - 3y)^2$

20) $(x^2 + 9)^2 - 36x^2$

21) $16x^2 - (x^2 + 4)^2$

22) $(x^2 + x)^2 - 16$

23) $25 - (a^4 - b^2)^2$

24) $49 - (a^4 - 7)^2$

25 $)(x^2 + y^2)^2 - 4x^2 y^2$

26) $(x^2 + 9y^2)^2 - 36x^2 y^2$

27) $25x^2 - (4x - 3)^2$

28) $(25x^2 + 9y^2)^2 - 900x^2 y^2$

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

30) $(x^2 + y^2)^2 - 9$

31) $49x^2 - (5y - 7x)^2$

32) $25x^2 - (y - x)^2$

33) $16a^2 - 9(a-b)^2$

34) $49(x-y)^2 - 25(x+y)^2$

35) $9(x-y)^2 - 16(x+y)^2$

36) $x^2 - y^2 - y + x$

37) $(x^2 + y^2)^2 - 4x^2 y^2$

38) $(x^4 + 4y^6)^2 - 16x^4 y^6$

39) $(x+y)^2 - 9x^4 y^2$

40) $(x^2 - 6x)^2 - 81$

41) $625 - (x^2 - 10x)^2$

42) $(a^2 + 3a)^2 - 4$

43) $(a-b)^3 - 9(a-b)$

44) $(x^2 - 25)^2 + 9(x^2 - 25)$

45) $x^2(x-1) - y^2(x-1)$

46) $25(x+y)^2 - 16(x-y)^2$

47) $49(x^2 + y^3)^3 - 4(x^2 + y^3)$

48) $(x-1)^3 - 9(x-1)$

49) $a^5 - a^4 - a + 1$

50) $x^2 - 4x + 4 - y^2$

51) $a^4 - 2a^2 + 1 - b^2$

52) $x^2 - xy + 3y - 9$

53) $x^2 - xy - 5y - 25$

54) $a^2 - 2ab + b^2 - c^2$

55) $9a^2 - 12ab + 4b^2 - c^2$

1) $a^2b^2 - c^2 = (ab)^2 - c^2 = (ab-c) \cdot (ab+c)$

             $\downarrow$ $\downarrow$

       $a^2 \;-\; b^2 = (a-b) \cdot (a+b)$

2) $100x^4 - 49y^6 = 10^2 \cdot (x^2)^2 - 7^2 \cdot (y^3)^2 =$

                $= (10x^2)^2 - (7y^3)^2 =$ dobili smo izraz: $a^2 - b^2$ rastavimo ga na faktore

                $= (10x^2 - 7y^3) \cdot (10x^2 - 7y^3)$

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

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

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

      Dodatno objašnjenje za one koji još nisu shvatili:

        $x^4 - y^4 = \underbrace{(x^2)^2 - (y^2)^2}_{\text{ovo je } a^2 - b^2} =$

             $= \underbrace{(x^2 - y^2)}_{\text{ovo je } a^2 - b^2} \cdot (x^2 + y^2) =$

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

4) $a^4b^6 - c^8 = (a^2b^3)^2 - (c^4)^2 =$

          $= (a^2b^3 - c^4) \cdot (a^2b^3 + c^4)$

      Dodatno objašnjenje

        $a^4b^6 - c^8 = a^{2 \cdot 2} \cdot b^{3 \cdot 2} - c^{4 \cdot 2} =$ $\rightarrow c^8 = c^{4 \cdot 2} = (c^4)^2$

          $= (a^2)^2 \cdot (b^3)^2 - (c^4)^2 =$

          $= (a^2b^3)^2 - (c^4)^2 =$

          $= (a^2b^3 - c^4) \cdot (a^2b^3 + c^4)$

5) $x^6 - y^6 = x^{3 \cdot 2} - y^{3 \cdot 2} =$

$\qquad = \left(x^3\right)^2 - \left(y^3\right)^2 =$

$\qquad = \left(x^3 - y^3\right) \cdot \left(x^3 + y^3\right) =$

$\qquad = \left(x - y\right) \cdot \left(x^2 + xy + y^2\right) \cdot \left(x + y\right) \cdot \left(x^2 - xy + y^2\right) =$

$\qquad = \left(x - y\right) \cdot \left(x + y\right) \cdot \left(x^2 + xy + y^2\right) \cdot \left(x^2 - xy + y^2\right)$

Dodatno objašnjenje

$x^6 - y^6 = x^{3 \cdot 2} - y^{3 \cdot 2} =$

$\qquad = \left(x^3\right)^2 - \left(y^3\right)^2 = \qquad \rightarrow \quad$ ovdje imamo razliku kvadrata: $a^2 - b^2 ...$

$\qquad = \left(x^3 - y^3\right) \cdot \left(x^3 + y^3\right) = \qquad \rightarrow \quad$ ovdje imamo razliku i zbroj kubova: $a^3 - b^3 \; i \; a^3 + b^3$

$\qquad = \left(x - y\right) \cdot \left(x^2 + xy + y^2\right) \cdot \left(x + y\right) \cdot \left(x^2 - xy + y^2\right) =$

$\qquad = \left(x - y\right) \cdot \left(x + y\right) \cdot \left(x^2 + xy + y^2\right) \cdot \left(x^2 - xy + y^2\right)$

6) $x^8 - y^8 = x^{4 \cdot 2} - y^{4 \cdot 2} =$

$\qquad = \left(x^4\right)^2 - \left(y^4\right)^2 =$

$\qquad = \left(x^4 - y^4\right) \cdot \left(x^4 + y^4\right) =$

$\qquad = \left[\left(x^2\right)^2 - \left(y^2\right)^2\right] \cdot \left(x^4 + y^4\right) =$

$\qquad = \left(x^2 - y^2\right) \cdot \left(x^2 + y^2\right) \cdot \left(x^4 + y^4\right) =$

$\qquad = \left(x - y\right) \cdot \left(x + y\right) \cdot \left(x^2 + y^2\right) \cdot \left(x^4 + y^4\right)$

Dodatno objašnjenje

$x^8 - y^8 = x^{4 \cdot 2} - y^{4 \cdot 2} =$

$\qquad = \underbrace{\left(x^4\right)^2 - \left(y^4\right)^2}_{a^2 - b^2} = \qquad \rightarrow \quad$ ovdje imamo razliku kvadrata: $a^2 - b^2$

$\qquad = \left(x^4 - y^4\right) \cdot \left(x^4 + y^4\right) =$

$\qquad = \underbrace{\left[\left(x^2\right)^2 - \left(y^2\right)^2\right]}_{a^2 - b^2} \cdot \left(x^4 + y^4\right) = \qquad \rightarrow \quad$ ovdje imamo R.KV. : $a^2 - b^2$

$\qquad = \underbrace{\left(x^2 - y^2\right)}_{a^2 - b^2} \cdot \left(x^2 + y^2\right) \cdot \left(x^4 + y^4\right) = \qquad \rightarrow \quad$ ovdje imamo: $a^2 - b^2$

$\qquad = \left(x - y\right) \cdot \left(x + y\right) \cdot \left(x^2 + y^2\right) \cdot \left(x^4 + y^4\right)$

7) $x^4 - 81 = \left(x^2\right)^2 - 9^2 =$

$$= \left(x^2 - 9\right) \cdot \left(x^2 + 9\right) =$$

$$= \left(x^2 - 3^2\right) \cdot \left(x^2 + 9\right) =$$

$$= \left(x - 3\right) \cdot \left(x + 3\right) \cdot \left(x^2 + 9\right)$$

8) $81x^4 - 1 = 9^2 \cdot \left(x^2\right)^2 - 1^2 =$

$$= \left(9x^2\right)^2 - 1^2 =$$

$$= \left(9x^2 - 1\right) \cdot \left(9x^2 + 1\right) =$$

$$= \left(3^2 x^2 - 1^2\right) \cdot \left(9x^2 + 1\right) =$$

$$= \left[\left(3x\right)^2 - 1^2\right] \cdot \left(9x^2 + 1\right) =$$

$$= \left(3x - 1\right) \cdot \left(3x + 1\right) \cdot \left(9x^2 + 1\right)$$

9) $16 - x^4 = 4^2 - \left(x^2\right)^2 =$

$$= \left(4 - x^2\right) \cdot \left(4 + x^2\right) =$$

$$= \left(2^2 - x^2\right) \cdot \left(x^2 + 4\right) =$$

$$= \left(2 - x\right) \cdot \left(2 + x\right) \cdot \left(x^2 + 4\right) = \left(2 - x\right) \cdot \left(x + 2\right) \cdot \left(x^2 + 4\right)$$

10) $25 - a^4 = 5^2 - \left(a^2\right)^2 =$

$$= \left(5 - a^2\right) \cdot \left(5 + a^2\right)$$

11) $625x^4 - 1 = 25^2 \cdot \left(x^2\right)^2 - 1^2 =$

$$= \left(25x^2\right)^2 - 1^2 = \qquad \rightarrow \quad \text{R.KV.}$$

$$= \left(25x^2 - 1\right) \cdot \left(25x^2 + 1\right) =$$

$$= \left(5^2 \cdot x^2 - 1^2\right) \cdot \left(25x^2 + 1\right) =$$

$$= \left[\left(5x\right)^2 - 1^2\right] \cdot \left(25x^2 + 1\right) = \qquad \rightarrow \text{R.KV.}$$

$$= \left(5x - 1\right) \cdot \left(5x + 1\right) \cdot \left(25x^2 + 1\right)$$

12) $x^4 y^2 - 9 = \left(x^2\right)^2 \cdot y^2 - 3^2 =$
$$= \left(x^2 y\right)^2 - 3^2 =$$
$$= \left(x^2 y - 3\right) \cdot \left(x^2 y + 3\right)$$

13) $x^2 y^6 - 16 = x^2 \cdot \left(y^3\right)^2 - 4^2 =$
$$= \left(x y^3\right)^2 - 4^2 =$$
$$= \left(x y^3 - 4\right) \cdot \left(x y^3 + 4\right)$$

14) $\left(a + b\right)^2 - 9 = \left(a + b\right)^2 - 3^2 =$
$$= \left(a + b - 3\right) \cdot \left(a + b + 3\right)$$

15) $a^2 - \left(b - c\right)^2 = \left[a - \left(b - c\right)\right] \cdot \left[a + \left(b - c\right)\right] =$
$$= \left(a - b + c\right) \cdot \left(a + b - c\right)$$

16) $a^4 - \left(a^2 + b^3\right)^2 = \left(a^2\right)^2 - \left(a^2 + b^3\right)^2 =$
$$= \left[a^2 - \left(a^2 + b^3\right)\right] \cdot \left[a^2 + \left(a^2 + b^3\right)\right] =$$
$$= \left(a^2 - a^2 - b^3\right) \cdot \left(a^2 + a^2 + b^3\right) =$$
$$= -b^3 \cdot \left(2a^2 + b^3\right)$$

17) $25 - \left(x - 3\right)^2 = 5^2 - \left(x - 3\right)^2 =$
$$= \left[5 - \left(x - 3\right)\right] \cdot \left[5 + \left(x - 3\right)\right] =$$
$$= \left(5 - x + 3\right) \cdot \left(5 + x - 3\right) =$$
$$= \left(8 - x\right) \cdot \left(x + 2\right)$$

18) $36 - \left(5 - y\right)^2 = 6^2 - \left(5 - y\right)^2 =$
$$= \left[6 - \left(5 - y\right)\right] \cdot \left[6 + \left(5 - y\right)\right] =$$
$$= \left(6 - 5 + y\right) \cdot \left(6 + 5 - y\right) =$$
$$= \left(1 + y\right) \cdot \left(11 - y\right) = \left(y + 1\right) \cdot \left(11 - y\right)$$

19) $81x^2 - (4x-3y)^2 = 9^2 \cdot x^2 - (4x-3y)^2 =$

$= (9x)^2 - (4x-3y)^2 =$

$= \left[9x - (4x-3y)\right] \cdot \left[9x + (4x-3y)\right] =$

$= (9x - 4x + 3y) \cdot (9x + 4x - 3y) =$

$= (5x + 3y) \cdot (13x - 3y)$

20) $(x^2+9)^2 - 36x^2 = (x^2+9)^2 - 6^2 \cdot x^2 =$

$= (x^2+9)^2 - (6x)^2 =$

$= (x^2 + 9 - 6x) \cdot (x^2 + 9 + 6x) =$

$= (x^2 - 6x + 9) \cdot (x^2 + 6x + 9) =$

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

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

Dodatno objašnjenje

$(x^2+9)^2 - 36x^2 = (x^2+9)^2 - 6^2 \cdot x^2 =$

$= \underbrace{(x^2+9)^2 - (6x)^2}_{a^2 - b^2} =$ imamo R.KV.

$= (x^2 + 9 - 6x) \cdot (x^2 + 9 + 6x) =$

$= (x^2 - 6x + 9) \cdot (x^2 + 6x + 9) =$ treba prepoznati: $(a^2 \pm 2ab + b^2) = (a \pm b)^2$

$= \underbrace{(x^2 - 2 \cdot x \cdot 3 + 3^2)}_{\text{kvadrat razlike}} \cdot \underbrace{(x^2 + 2 \cdot x \cdot 3 + 3^2)}_{\text{kvadrat zbroja}} =$

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

21) $16x^2 - (x^2+4)^2 = 4^2 \cdot x^2 - (x^2+4)^2 =$

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

$= \left[4x - (x^2+4)\right] \cdot \left[4x + (x^2+4)\right] =$

$= (4x - x^2 - 4) \cdot (4x + x^2 + 4) =$

$= (-x^2 + 4x - 4) \cdot (x^2 + 4x + 4) =$

$= -1 \cdot (x^2 - 4x + 4) \cdot (x^2 + 2 \cdot x \cdot 2 + 2^2) =$

$= -1 \cdot \underbrace{(x^2 - 2 \cdot x \cdot 2 + 2^2)}_{a^2 - 2ab + b^2} \cdot \underbrace{(x^2 + 2 \cdot x \cdot 2 + 2^2)}_{a^2 + 2ab + b^2} = -1 \cdot (x-2)^2 \cdot (x+2)^2$

22) $\left(x^2 + x\right)^2 - 16 = \left(x^2 + x\right)^2 - 4^2 =$

$\qquad = \left(x^2 + x - 4\right) \cdot \left(x^2 + x + 4\right)$

23) $25 - \left(a^4 - b^2\right)^2 = 5^2 - \left(a^4 - b^2\right)^2 =$

$\qquad = \left[5 - \left(a^4 - b^2\right)\right] \cdot \left[5 + \left(a^4 - b^2\right)\right] =$

$\qquad = \left(5 - a^4 + b^2\right) \cdot \left(5 + a^4 - b^2\right) =$

$\qquad = \left(-a^4 + b^2 + 5\right) \cdot \left(a^4 - b^2 + 5\right)$

24) $49 - \left(a^4 - 7\right)^2 = 7^2 - \left(a^4 - 7\right)^2 =$

$\qquad = \left[7 - \left(a^4 - 7\right)\right] \cdot \left[7 + \left(a^4 - 7\right)\right] =$

$\qquad = \left(7 - a^4 + 7\right) \cdot \left(7 + a^4 - 7\right) =$

$\qquad = \left(7 + 7 - a^4\right) \cdot \left(7 - 7 + a^4\right) =$

$\qquad = \left(14 - a^4\right) \cdot a^4$

$\qquad = a^4 \cdot \left(14 - a^4\right)$

25) $\left(x^2 + y^2\right)^2 - 4x^2 y^2 = \left(x^2 + y^2\right)^2 - 2^2 \cdot x^2 \cdot y^2 =$

$\qquad = \left(x^2 + y^2\right) - \left(2xy\right)^2 =$

$\qquad = \left(x^2 + y^2 - 2xy\right) \cdot \left(x^2 + y^2 + 2xy\right) =$

$\qquad = \left(x^2 - 2xy + y^2\right) \cdot \left(x^2 + 2xy + y^2\right) =$

$\qquad = \left(x - y\right)^2 \cdot \left(x + y\right)^2$

26) $\left(x^2 + 9y^2\right)^2 - 36x^2 y^2 = \left(x^2 + 9y^2\right)^2 - 6^2 \cdot x^2 \cdot y^2 =$

$\qquad = \left(x^2 + 9y^2\right)^2 - \left(6xy\right)^2 =$

$\qquad = \left(x^2 + 9y^2 - 6xy\right) \cdot \left(x^2 + 9y^2 + 6xy\right) =$

$\qquad = \left(x^2 - 6xy + 3^2 \cdot y^2\right) \cdot \left(x^2 + 6xy + 3^2 \cdot y^2\right) =$

$\qquad = \left[x^2 - 2 \cdot x \cdot 3y + \left(3y\right)^2\right] \cdot \left[x^2 + 2 \cdot x \cdot 3y + \left(3y\right)^2\right] =$

$\qquad = \left(x - 3y\right)^2 \cdot \left(x + 3y\right)^2$

27)　$25x^2 - (4x-3)^2 = 5^2 \cdot x^2 - (4x-3)^2 =$

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

$$= \left[5x - (4x-3) \right] \cdot \left[5x + (4x-3) \right] =$$

$$= (5x - 4x + 3) \cdot (5x + 4x - 3) =$$

$$= (x+3) \cdot (9x-3)$$

28)　$\left(25x^2 + 9y^2 \right)^2 - 900x^2 y^2 = \left(25x^2 + 9y^2 \right)^2 - 30^2 \cdot x^2 \cdot y^2 =$

$$= \left(25x^2 + 9y^2 \right)^2 - (30xy)^2 =$$

$$= \left(25x^2 + 9y^2 - 30xy \right) \cdot \left(25x^2 + 9y^2 + 30xy \right) =$$

$$= \left(5^2 \cdot x^2 - 30xy + 3^2 \cdot y^2 \right) \cdot \left(5^2 \cdot x^2 + 30xy + 3^2 \cdot y^2 \right) =$$

$$= \left[(5x)^2 - 2 \cdot 5x \cdot 3y + (3y)^2 \right] \cdot \left[(5x)^2 + 2 \cdot 5x \cdot 3y + (3y)^2 \right] =$$

$$= (5x - 3y)^2 \cdot (5x + 3y)^2$$

29)　$\left(x^2 - 2 \right)^2 - \left(x^2 + 3 \right)^2 = \left[x^2 - 2 - \left(x^2 + 3 \right) \right] \cdot \left[x^2 - 2 + \left(x^2 + 3 \right) \right] =$

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

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

$$= -5 \cdot \left(2x^2 + 1 \right)$$

30)　$\left(x^2 + y^2 \right)^2 - 9 = \left(x^2 + y^2 \right)^2 - 3^2 =$

$$= \left(x^2 + y^2 - 3 \right) \cdot \left(x^2 + y^2 + 3 \right)$$

31)　$49x^2 - (5y - 7x)^2 = 7^2 \cdot x^2 - (5y - 7x)^2 =$

$$= (7x)^2 - (5y - 7x)^2 =$$

$$= \left[7x - (5y - 7x) \right] \cdot \left[7x + (5y - 7x) \right] =$$

$$= (7x - 5y + 7x) \cdot (7x + 5y - 7x) =$$

$$= (7x + 7x - 5y) \cdot (7x - 7x + 5y) =$$

$$= (14x - 5y) \cdot 5y =$$

$$= 5y \cdot (14x - 5y)$$

32) $25x^2 - (y-x)^2 = 5^2 \cdot x^2 - (y-x)^2 =$

$\qquad = (5x)^2 - (y-x)^2 =$

$\qquad = \left[5x - (y-x) \right] \cdot \left[5x + (y-x) \right] =$

$\qquad = (5x - y + x) \cdot (5x + y - x) =$

$\qquad = (6x - y) \cdot (4x + y)$

33) $16a^2 - 9(a-b)^2 = 4^2 \cdot a^2 - 3^2 \cdot (a-b)^2 =$

$\qquad = (4a)^2 - \left[3 \cdot (a-b) \right]^2 =$

$\qquad = (4a)^2 - (3a - 3b)^2 =$

$\qquad = \left[4a - (3a - 3b) \right] \cdot \left[4a + (3a - 3b) \right] =$

$\qquad = (4a - 3a + 3b) \cdot (4a + 3a - 3b) =$

$\qquad = (a + 3b) \cdot (7a - 3b)$

34) $49(x-y)^2 - 25(x+y)^2 = 7^2 \cdot (x-y)^2 - 5^2 \cdot (x+y)^2 =$

$\qquad = \left[7 \cdot (x-y) \right]^2 - \left[5 \cdot (x+y) \right]^2 =$

$\qquad = (7x - 7y)^2 - (5x + 5y)^2 =$

$\qquad = \left[7x - 7y - (5x + 5y) \right] \cdot \left[7x - 7y + (5x + 5y) \right] =$

$\qquad = (7x - 7y - 5x - 5y) \cdot (7x - 7y + 5x + 5y) =$

$\qquad = (7x - 5x - 7y - 5y) \cdot (7x + 5x + 5y - 7y) =$

$\qquad = (2x - 12y) \cdot (12x - 2y) = \qquad$ to možemo ostaviti i u ovom obliku

$\qquad = 2 \cdot (x - 6y) \cdot 2 \cdot (6x - y) =$

$\qquad = 4 \cdot (x - 6y) \cdot (6x - y)$

35) $9(x-y)^2 - 16(x+y)^2 = 3^2 \cdot (x-y)^2 - 4^2 \cdot (x+y)^2 =$

$\qquad = \left[3 \cdot (x-y) \right]^2 - \left[4 \cdot (x+y) \right]^2 =$

$\qquad = (3x - 3y)^2 - (4x + 4y)^2 =$

$\qquad = \left[(3x - 3y) - (4x + 4y) \right] \cdot \left[(3x - 3y) + (4x + 4y) \right]^2 =$

$\qquad = (3x - 3y - 4x - 4y) \cdot (3x - 3y + 4x + 4y) =$

$\qquad = (-x - 7y) \cdot (7x + y) =$

$\qquad = -1 \cdot (x + 7y) \cdot (7x + y)$

36) $x^2 - y^2 - y + x = (x-y)\cdot(x+y) + x - y =$

$\qquad\qquad = (x-y)\cdot(x+y) + 1\cdot(x-y) =$

$\qquad\qquad = (x-y)\cdot(x+y+1)$

uputa:

$\underbrace{x^2 - y^2}_{a^2 - b^2} - y + x = \underbrace{(x-y)\cdot(x+y)}_{=(a-b)\cdot(a+b)} + x - y =$ $\qquad$ prepoznaj razliku kvadrata (R.KV.)

$\qquad\qquad = (x-y)\cdot(x+y) + 1\cdot(x-y) =$ $\qquad$ izlučimo zajednički faktor: $(x-1)$

$\qquad\qquad = (x-y)\cdot(x+y+1)$

37) $(x^2 + y^2)^2 - 4x^2y^2 = (x^2 + y^2)^2 - 2^2 \cdot x^2 \cdot y^2 =$

$\qquad\qquad = (x^2 + y^2)^2 - (2xy)^2 =$

$\qquad\qquad = (x^2 + y^2 - 2xy)\cdot(x^2 + y^2 + 2xy) =$

$\qquad\qquad = (x^2 - 2xy + y^2)\cdot(x^2 + 2xy + y^2) =$

$\qquad\qquad = (x-y)^2 \cdot (x+y)^2$

38) $(x^4 + 4y^6)^2 - 16x^4y^6 = (x^4 + 4y^6)^2 - 4^2 \cdot (x^2)^2 \cdot (y^3)^2 =$

$\qquad\qquad = (x^4 + 4y^6)^2 - (4x^2y^3)^2 =$

$\qquad\qquad = (x^4 + 4y^6 - 4x^2y^3)\cdot(x^4 + 4y^6 + 4x^2y^3) =$

$\qquad\qquad = (x^4 - 4x^2y^3 + 4y^6)\cdot(x^4 + 4x^2y^3 + 4y^6) =$

$\qquad\qquad = \left[(x^2)^2 - 2\cdot x^2 \cdot 2\cdot y^3 + (2y^3)^2\right]\cdot\left[(x^2)^2 + 2\cdot x^2 \cdot 2\cdot y^3 + (2y^3)^2\right] =$

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

39) $(x+y)^2 - 9x^4y^2 = (x+y)^2 - 3^2 \cdot (x^2)^2 \cdot y^2 =$

$\qquad\qquad = (x+y)^2 - (3x^2y)^2 =$

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

40) $\left(x^2-6x\right)^2-81=\left(x^2-6x\right)^2-9^2=$

$$=\left(x^2-6x-9\right)\cdot\left(x^2-6x+9\right)=$$

$$=\left(x^2-6x-9\right)\cdot\left(x^2-2\cdot x^2\cdot 3+3^2\right)=$$

$$=\left(x^2-6x-9\right)\cdot\left(x-3\right)^2$$

41) $625-\left(x^2-10x\right)^2=25^2-\left(x^2-10x\right)^2=$

$$=\left[25-\left(x^2-10x\right)\right]\cdot\left[25+\left(x^2-10x\right)\right]=$$

$$=\left(25-x^2+10x\right)\cdot\left(25+x^2-10x\right)=$$

$$=\left(-x^2+10x+25\right)\cdot\left(x^2-10x+25\right)=$$

$$=\left(-x^2+10x+25\right)\cdot\left(x^2-2\cdot x\cdot 5+5^2\right)=$$

$$=\left(-x^2+10x+25\right)\cdot\left(x-5\right)^2$$

42) $\left(a^2+3a\right)^2-4=\left(a^2+3a\right)^2-2^2=$

$$=\left(a^2+3a-2\right)\cdot\left(a^2+3a+2\right)$$

43) $\left(a-b\right)^3-9\left(a-b\right)=\left(a-b\right)^{1+2}-9\cdot\left(a-b\right)=$

$$=\left(a-b\right)^1\cdot\left(a-b\right)^2-9\cdot\left(a-b\right)^1=$$

$$=\left(a-b\right)^1\cdot\left[\left(a-b\right)^2-9\right]=$$

$$=\left(a-b\right)\cdot\left[\left(a-b\right)^2-3^2\right]=$$

$$=\left(a-b\right)\cdot\left(a-b-3\right)\cdot\left(a-b+3\right)$$

dodatna uputa: $\left(a-b\right)^3=\left(a-b\right)^{1+2}=\left(a-b\right)^1\cdot\left(a-b\right)^2$

$\left(a-b\right)^3-9\left(a-b\right)=\left(a-b\right)^{1+2}-9\cdot\left(a-b\right)=$

$$=\left(a-b\right)^1\cdot\left(a-b\right)^2-9\cdot\left(a-b\right)^1=$$

$$=\left(a-b\right)^1\cdot\left[\left(a-b\right)^2-9\right]=$$

izlučimo z.f. $\left(a-b\right)^1$

$$=\left(a-b\right)\cdot\underbrace{\left[\left(a-b\right)^2-3^2\right]}_{a^2-b^2}=$$

u uglatoj zagradi imamo R.K.

$$=\left(a-b\right)\cdot\left(a-b-3\right)\cdot\left(a-b+3\right)$$

44) $\left(x^2 - 25\right)^2 + 9\left(x^2 - 25\right) = \left(x^2 - 25\right) \cdot \left(x^2 - 25\right) + 9 \cdot \left(x^2 - 25\right) =$

$$= \left(x^2 - 25\right) \cdot \left[\left(x^2 - 25\right) + 9\right] =$$

$$= \left(x^2 - 5^2\right) \cdot \left(x^2 - 25 + 9\right) =$$

$$= \left(x - 5\right) \cdot \left(x + 5\right) \cdot \left(x^2 - 16\right) =$$

$$= \left(x - 5\right) \cdot \left(x + 5\right) \cdot \left(x^2 - 4^2\right) =$$

$$= \left(x - 5\right) \cdot \left(x + 5\right) \cdot \left(x - 4\right) \cdot \left(x + 4\right)$$

45) $x^2\left(x - 1\right) - y^2\left(x - 1\right) = \left(x - 1\right) \cdot \left(x^2 - y^2\right) =$

$$= \left(x - 1\right) \cdot \left(x - y\right) \cdot \left(x + y\right)$$

46) $25\left(x + y\right)^2 - 16\left(x - y\right)^2 = 5^2 \cdot \left(x + y\right)^2 - 4^2 \cdot \left(x - y\right)^2 =$

$$= \left[5 \cdot \left(x + y\right)\right]^2 - \left[4 \cdot \left(x - y\right)\right]^2 =$$

$$= \left(5x + 5y\right)^2 - \left(4x - 4y\right)^2 =$$

$$= \left[\left(5x + 5y\right) - \left(4x - 4y\right)\right] \cdot \left[\left(5x + 5y\right) + \left(4x - 4y\right)\right] =$$

$$= \left(5x + 5y - 4x + 4y\right) \cdot \left(5x + 5y + 4x - 4y\right) =$$

$$= \left(x + 9y\right) \cdot \left(9x + y\right)$$

47) $49\left(x^2 + y^3\right)^3 - 4\left(x^2 + y^3\right) = 49\left(x^2 + y^3\right)^1 \cdot \left(x^2 + y^3\right)^2 - 4\left(x^2 + y^3\right)^1 =$

$$= \left(x^2 + y^3\right) \cdot \left[49\left(x^2 + y^3\right)^2 - 4\right] =$$

$$= \left(x^2 + y^3\right) \cdot \left(7^2 \cdot \left(x^2 + y^3\right)^2 - 2^2\right) =$$

$$= \left(x^2 + y^3\right) \cdot \left[\left(7 \cdot \left(x^2 + y^3\right)\right)^2 - 2^2\right] =$$

$$= \left(x^2 + y^3\right) \cdot \left[\left(7x^2 + 7y^3\right)^2 - 2^2\right] =$$

$$= \left(x^2 + y^3\right) \cdot \left(7x^2 + 7y^3 - 2\right) \cdot \left(7x^2 + 7y^3 + 2\right)$$

48) $(x-1)^3 - 9(x-1) = (x-1)^1 \cdot (x-1)^2 - 9 \cdot (x-1) =$

$$= (x-1) \cdot \left[(x-1)^2 - 9 \right] =$$
$$= (x-1) \cdot \left[(x-1)^2 - 3^2 \right] =$$
$$= (x-1) \cdot (x-1-3) \cdot (x-1+3) =$$
$$= (x-1) \cdot (x-4) \cdot (x+2)$$

49) $a^5 - a^4 - a + 1 = a^{4+1} - a^4 - 1 \cdot (a-1) =$

$$= a^4 \cdot a^1 - a^4 \cdot 1 - 1 \cdot (a-1) =$$
$$= a^4 \cdot (a-1) - 1 \cdot (a-1) =$$
$$= (a-1) \cdot (a^4 - 1) =$$
$$= (a-1) \cdot \left[(a^2)^2 - 1^2 \right] =$$
$$= (a-1) \cdot (a^2 - 1) \cdot (a^2 + 1) =$$
$$= (a-1) \cdot (a-1) \cdot (a+1) \cdot (a^2 + 1)$$

Dodatna uputa:

$a^5 - a^4 - a + 1 = a^{4+1} - a^4 - 1 \cdot (a-1) = \qquad \rightarrow \qquad a^5 = a^{4+1} = a^4 \cdot a^1$

$= \underbrace{a^4 \cdot a^1 - a^4 \cdot 1}_{\text{izlučimo z.f.}} - 1 \cdot (a-1) = \qquad \rightarrow \qquad$ u prva dva člana izlučimo z.f. a^4

$= a^4 \cdot (a-1) - 1 \cdot (a-1) = \qquad \rightarrow \qquad$ izlučimo z.f. $(a-1)$

$= (a-1) \cdot \underbrace{(a^4 - 1)}_{a^2 - b^2} = \qquad \rightarrow \qquad$ treba prepoznati R.KV.

$= (a-1) \cdot \left[(a^2)^2 - 1^2 \right] =$

$= (a-1) \cdot \underbrace{(a^2 - 1)}_{a^2 - b^2} \cdot (a^2 + 1) = \qquad \rightarrow \qquad$ srednja zagrada je opet R.KV.

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

50) $x^2 - 4x + 4 - y^2 = x^2 - 2 \cdot x \cdot 2 + 2^2 - y^2 =$

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

Dodatna uputa:

$\underbrace{x^2 - 4x + 4}_{\substack{\text{ovo je} \\ \text{kvadrat razlike}}} - y^2 = \underbrace{x^2 - 2 \cdot x \cdot 2 + 2^2}_{a^2 - 2 \cdot a \cdot b + b^2 = (a-b)^2} - y^2 = \underbrace{(x-2)^2 - y^2}_{a^2 - b^2} = (x-2-y) \cdot (x-2+y)$

51) $a^4 - 2a^2 + 1 - b^2 = \left(a^2\right)^2 - 2 \cdot a \cdot 1 + 1^2 - b^2 =$

$$= \left(a^2 - 1\right)^2 - b^2 =$$

$$= \left(a^2 - 1 - b\right) \cdot \left(a^2 - 1 + b\right) =$$

$$= \left(a^2 - b - 1\right) \cdot \left(a^2 + b - 1\right)$$

52) $x^2 - xy + 3y - 9 = x^2 - 9 - xy + 3y =$

$$= x^2 - 3^2 - x \cdot y + 3 \cdot y =$$

$$= \left(x - 3\right) \cdot \left(x + 3\right) - y \cdot \left(x - 3\right)$$

$$= \left(x - 3\right) \cdot \left(x + 3 - y\right)$$

53) $x^2 - xy - 5y - 25 = x^2 - 25 - xy - 5y =$

$$= x^2 - 5^2 - x \cdot y - 5 \cdot y =$$

$$= \left(x - 5\right) \cdot \left(x + 5\right) - y \cdot \left(x + 5\right) =$$

$$= \left(x + 5\right) \cdot \left(x - 5 - y\right)$$

54) $a^2 - 2ab + b^2 - c^2 = \left(a - b\right)^2 - c^2 =$

$$= \left(a - b - c\right) \cdot \left(a - b + c\right)$$

55) $9a^2 - 12ab + 4b^2 - c^2 = 3^2 \cdot a^2 - 2 \cdot 3 \cdot 2 \cdot a \cdot b + 2^2 \cdot b^2 - c^2 =$

$$= \left(3a\right)^2 - 2 \cdot 3a \cdot 2b + \left(2b\right)^2 - c^2 =$$

$$= \left(3a - 2b\right)^2 - c^2 =$$

$$= \left(3a - 2b - c\right) \cdot \left(3a - 2b + c\right)$$