ΑΝΑΛΥΣΗ ΣΕ ΓΙΝΟΜΕΝΟ ΠΡΩΤΩΝ ΠΑΡΑΓΟΝΤΩΝ

Ενδεικτικές Επαναληπτικές Δραστηριότητες 1

Α) Να αναλύσετε σε γινόμενο πρώτων παραγόντων τις πιο κάτω παραστάσεις:

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

2) $4\chi - 16 = 4(x-4)$

3) $16\chi^2 - 4\chi = 4x(4x-1)$

4) $25\chi^4 + 10\chi^2 + 15 = 5(5x^4+2x^2+3)$

5) $\chi^3 - \chi = x(x^2-1) = x(x-1)(x+1)$

6) $25\omega^2 - 16 = (5\omega-4)(5\omega+4)$

7) $\alpha\chi - \alpha\psi - 3\chi + 3\psi = a(x-\psi) - 3(x-\psi) = (x-\psi)(a-3)$

8) $\chi^2 - 6\chi - 27 = (x-9)(x+3)$

9) $\frac{x^2}{9} - 1 = \left(\frac{x}{3}-1\right)\left(\frac{x}{3}+1\right)$

10) $\alpha\beta - 4\beta + \alpha\gamma - 4\gamma = a(b+\gamma) - 4(b+\gamma) = (b+\gamma)(a-4)$

11) $3\chi^2 - 27 = 3(x^2-9) = 3(x-3)(x+3)$

12) $2\alpha^3 + 54 = 2(a^3+27) = 2(a+3)(a^2-3a+9)$

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

14) $1 + 9x^2 + 6x = (3x+1)^2$

15) $16\alpha^3\beta^4 - 12\alpha^5 = 4\alpha^3(4\beta^4 - 3\alpha^2)$

16) $\alpha^5 - \alpha^2 = \alpha^2(\alpha^3 - 1) = \alpha^2(\alpha - 1)(\alpha^2 + \alpha + 1)$

17) $2\alpha^{20} - 32\alpha^{16} = 2\alpha^{16}(\alpha^4 - 16) = 2\alpha^{16}(\alpha^2 + 4)(\alpha^2 - 4) = 2\alpha^{16}(\alpha^2 + 4)(\alpha - 2)(\alpha + 2)$

18) $2\alpha^3 + 8\alpha^2 + 8\alpha = 2\alpha(\alpha^2 + 4\alpha + 4) = 2\alpha(\alpha + 2)^2$

19) $3(\chi - \psi) + 6\psi(\psi - \chi) = 3(x - \psi) - 6\psi(x - \psi) = (x - \psi)(3 - 6\psi) = 3(x - \psi)(1 - 2\psi)$

20) $x^{2012} - x^{2015} = x^{2012}(1 - x^3) = x^{2012}(1 - x)(1 + x + x^2)$

B) Να αναλύσετε πλήρως σε γινόμενο παραγόντων.

1) $\alpha\beta(\chi^2 + \psi^2) + \chi\psi(\alpha^2 + \beta^2) = \alpha\beta x^2 + \alpha\beta\psi^2 + x\psi\alpha^2 + x\psi\beta^2$

$= \alpha x(\beta x + \alpha\psi) + \beta\psi(\alpha\psi + x\beta)$

$= (\beta x + \alpha\psi)(\alpha x + \beta\psi)$

2) $(\alpha + 1)^2 - 9 = [(a+1) - 3][(a+1) + 3]$

$= (a + 1 - 3)(a + 1 + 3)$

$= (a - 2)(a + 4)$

3) $\chi^3 - \psi^3 + \chi^2 - \psi^2 = (x - \psi)(x^2 + x\psi + \psi^2) + (x - \psi)(x + \psi)$

$= (x - \psi)(x^2 + x\psi + \psi^2 + x + \psi)$

4) $\alpha\beta + \alpha + 2\beta + \beta^2 + 1 = a(b + 1) + (b + 1)^2$

$= (b + 1)[a + (b + 1)]$

$= (b + 1)(a + b + 1)$

5) $3\chi^5 + 9\chi^4 + 2\chi^3 + 6\chi^2 + \chi + 3 = 3x^4(x + 3) + 2x^2(x + 3) + 1(x + 3)$

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

6) $(\chi-\psi)^2-(\chi+\psi)^2 = [(x-\psi)-(x+\psi)][(x-\psi)+(x+\psi)]$

$= (x-\psi-x-\psi)(x-\psi+x+\psi)$

$= -2\psi \cdot 2x$

$= -4x\psi$

7) $(2\omega+4)(\omega^2-1)-(3\omega+6)(\omega-1)^2 = 2(\omega+2)(\omega-1)(\omega+1)-3(\omega+2)(\omega-1)^2$

$= (\omega+2)(\omega-1)[2(\omega+1)-3(\omega-1)]$

$= (\omega+2)(\omega-1)(2\omega+2-3\omega+3)$

$= (\omega+2)(\omega-1)(5-\omega)$

8) $\chi^2+4\chi-36\alpha-12+\alpha\chi^2 = (x+6)(x-2)-\alpha(36-x^2)$

$= (x+6)(x-2)-\alpha(6-x)(6+x)$

$= (x+6)[(x-2)-\alpha(6-x)]$

$= (x+6)(x-2-6\alpha+\alpha x)$

9) $\alpha^2-\beta^2-\gamma^2-10\alpha+25+2\beta\gamma = (\alpha^2-10\alpha+25)-(\beta^2-2\beta\gamma+\gamma^2)$

$= (\alpha-5)^2-(\beta-\gamma)^2$

$= [(a-5)-(b-\gamma)][(a-5)+(b-\gamma)]$

$= (a-5-b+\gamma)(a-5+b-\gamma)$

10) $100\omega^3+100\omega^2-\omega-1 = 100\omega^2(\omega+1)-1(\omega+1)$

$= (\omega+1)(100\omega^2-1)$

$= (\omega+1)(10\omega-1)(10\omega+1)$