

ΔΙΑΓΩΝΙΣΜΑ ΣΕ ΡΗΤΕΣ ΠΑΡΑΣΤΑΣΕΙΣ (Γ' ΓΥΜΝΑΣΙΟΥ)

Να απλοποιήσετε τις παρακάτω παραστάσεις:

$$\alpha. \frac{8}{4-x^2} + \frac{x}{x-2} - \frac{x}{x+2} = \frac{8-x^2-2x+x^2-2x}{(2-x)(2+x)} = \frac{4(2-x)}{(2-x)(2+x)} = \frac{4}{2+x}$$

(6 μονάδες)

$$\beta. \frac{x+1}{x-2} + \frac{x+2}{x-3} - \frac{x^2+2x-10}{x^2-5x+6} = \frac{x^2-3x+x-3+x^2-4-x^2-2x+10}{(x-2)(x-3)} =$$

$$\frac{x^2-4x+3}{(x-2)(x-3)} = \frac{(x-1)(x-3)}{(x-2)(x-3)} = \frac{x-1}{x-2}$$

(6 μονάδες)

$$\gamma. \frac{x-3}{3x^2+x} - \frac{x+3}{x-3x^2} - \frac{x}{9x^2-1} + \frac{4x^2-7}{9x^3-x} = \frac{3x^2-9x-x+3+3x^2+9x+x+3-x^2+4x^2+7}{x(3x-1)(3x+1)} =$$

$$\frac{(3x-1)(3x+1)}{x(3x-1)(3x+1)} = \frac{1}{x}$$

(8 μονάδες)

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Να απλοποιήσετε τις παρακάτω παραστάσεις:

$$\alpha. \frac{x}{x-3} - \frac{x}{x+3} + \frac{18}{9-x^2} = \frac{x^2+3x-x^2+3x-18}{(x-3)(x+3)} = \frac{6(x-3)}{(x-3)(x+3)} = \frac{6}{x+3}$$

(6 μονάδες)

$$\beta. \frac{x-2}{x+1} + \frac{x+3}{x+2} - \frac{x^2+5x+5}{x^2+3x+2} = \frac{x^2-4+x^2+3x+x+3-x^2-5x-5}{(x+1)(x+2)} = \frac{x^2-x-6}{(x+2)(x+1)} =$$

$$\frac{(x+2)(x-3)}{(x+2)(x+1)} = \frac{x-3}{x+1}$$

(6 μονάδες)

$$\gamma. \frac{x-2}{2x^2+x} - \frac{x+2}{x-2x^2} - \frac{x}{4x^2-1} + \frac{x^2-5}{4x^3-x} = \frac{(x-2)(2x-1) + (2x+1)(x+2) - x^2 + x^2 - 5}{x(2x-1)(2x+1)} =$$

$$\frac{2x^2-x-4x+2+2x^2+4x+x+2-5}{x(2x-1)(2x+1)} = \frac{4x^2-1}{x(2x-1)(2x+1)} = \frac{1}{x}$$

(8 μονάδες)

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Να απλοποιήσετε τις παρακάτω παραστάσεις:

$$α) \frac{4}{a-2} + \frac{a-2}{a} - \frac{8}{a^2-2a} = \frac{4a+a^2-4a+4-8}{a(a-2)} = \frac{(a-2)(a+2)}{a(a-2)} = \frac{a+2}{a}$$

(6 μονάδες)

$$β) \frac{y^2}{x+y} + \frac{x^2}{x-y} - \frac{2xy^2}{x^2-y^2} = \frac{y^2(x-y) + x^2(x+y) - 2xy^2}{x^2-y^2} = \frac{xy^2 - y^3 + x^3 + x^2y - 2xy^2}{(x-y)(x+y)} =$$

$$\frac{x^3 - y^3 - xy^2 + x^2y}{(x-y)(x+y)} = \frac{x^2(x+y) - y^2(y+x)}{(x-y)(x+y)} = \frac{(x+y)(x+y)(x-y)}{(x-y)(x+y)} = x+y$$

(6 μονάδες)

$$γ) \frac{2\chi - \psi}{\chi\psi} - \frac{\chi + 2\psi}{\chi^2 + \chi\psi} + \frac{\chi}{\chi\psi + \psi^2} = \frac{(2\chi - \psi)(\chi + \psi) - \psi(\chi + 2\psi) + \chi^2}{\chi\psi(\chi + \psi)} =$$

$$\frac{2\chi^2 + 2\chi\psi - \chi\psi - \psi^2 - \chi\psi - 2\psi^2 + \chi^2}{\chi\psi(\chi + \psi)} = \frac{3(\chi + \psi)(\chi - \psi)}{\chi\psi(\chi + \psi)} = \frac{3(\chi - \psi)}{\chi\psi}$$

(8 μονάδες)

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Να απλοποιήσετε τις παρακάτω παραστάσεις:

α)

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

$$\frac{3x^2 - 3x - x + 1 - x^2 - 2x + 1 - 2x^2 + 4x}{(x-1)(x-2)} = \frac{-2(x-1)}{(x-1)(x-2)} = \frac{-2}{x-2}$$

(6 μονάδες)

β)

$$\frac{\psi}{\chi} - \frac{\chi+\psi}{\chi-\psi} + \frac{\psi^2}{\chi^2-\chi\psi} - \frac{\chi(\chi+\psi)}{2\psi(\psi-\chi)} = \frac{2\psi^2(\chi-\psi) - 2\chi\psi(\chi+\psi) + 2\psi^3 + \chi^2(\chi+\psi)}{2\chi\psi(\chi-\psi)} =$$

$$\frac{2\chi\psi^2 - 2\psi^3 - 2\chi^2\psi - 2\chi\psi^2 + 2\psi^3 + \chi^3 + \chi^2\psi}{2\chi\psi(\chi-\psi)} = \frac{\chi^3 - \chi^2\psi}{2\chi\psi(\chi-\psi)} = \frac{\chi^2(\chi-\psi)}{2\chi\psi(\chi-\psi)} = \frac{\chi}{2\psi}$$

=

(6 μονάδες)

γ)

$$\frac{\alpha-2}{2\alpha+1} + \frac{2\alpha+1}{1-2\alpha} - \frac{2-6\alpha^2-9\alpha}{4\alpha^2-1} = \frac{(\alpha-2)(2\alpha-1) - (2\alpha+1)^2 - 2 + 6\alpha^2 + 9\alpha}{(2\alpha-1)(2\alpha+1)} =$$

$$\frac{2\alpha^2 - \alpha - 4\alpha + 2 - 4\alpha^2 - 4\alpha - 1 - 2 + 6\alpha^2 + 9\alpha}{(2\alpha-1)(2\alpha+1)} = \frac{(2\alpha-1)(2\alpha+1)}{(2\alpha-1)(2\alpha+1)} = 1$$

(8 μονάδες)