

ΑΠΑΝΤΗΣΕΙΣ ΘΕΜΑΤΩΝ Β' ΓΥΜΝΑΣΙΟΥ 30/11/2014

ΘΕΜΑ 1°

A) α) Σ β) Λ γ) Λ δ) Λ ε) Σ στ) Λ ζ) Λ η) Λ

B) α) $A=5-3\alpha+2(\alpha+3\beta)-5(2\beta-3\alpha)+\beta-7=5-3\alpha+2\alpha+6\beta-10\beta+15\alpha+\beta-7=14\alpha-3\beta-2$

$$\beta) A=14\left(-\frac{1}{2}\right)-3(-2)-2=-7+6-2=-3$$

ΘΕΜΑ 2°

A) α) $5^2 \cdot 5^2 \cdot 5 = 5^5$, β) $(-7)^9 = -7^9$, γ) $\left(-\frac{1}{3}\right)^{16} = \left(\frac{1}{3}\right)^{16}$, δ) $(2,5)^{19}$,

ε) $(-10)^6 = 10^6$, στ) $3^{-2} = \frac{1}{3^2}$, ζ) $5^{8+3} = 5^{11}$, η) $(-5)^{21} = -5^{21}$

θ) $9^{12-1} = 9^{11}$, ι) $3^5 \cdot 3^4 = 3^9$

$$B) \text{ i) } \left(-\frac{2}{7}\right)^8 \cdot \left(\frac{7}{3}\right)^8 \cdot \left(\frac{3}{2}\right)^8 \cdot 2^8 = \frac{2^8}{\cancel{7^8}} \cdot \frac{\cancel{7^8}}{\cancel{3^8}} \cdot \frac{\cancel{3^8}}{\cancel{2^8}} \cdot 2^8 = 2^8$$

ii)

$$\frac{12^5}{(-6)^5} + \frac{32^4}{(-16)^4} + \frac{(-10)^3}{(-5)^3} = -\left(\frac{12}{6}\right)^5 + \left(\frac{32}{16}\right)^4 + \left(\frac{10}{5}\right)^3 = -2^5 + 2^4 + 2^3 = -32 + 16 + 8 = -32 + 24 = -8$$

Γ) i) $\mu = (-1)^{101} + (-1)^{102} + (-1)^{103} = -1 + 1 - 1 = -1$, άρα $-x = 1 \Rightarrow x = -1$

ii) $(-1-1)x = 4 \Rightarrow -2x = 4 \Rightarrow x = -2$

iii) $(-1+1)x = -1-1 \Rightarrow 0x = -2$, αδύνατη

ΘΕΜΑ 3°

$$A) \text{ i) } \frac{3x}{2} - \left(\frac{x}{3} - 5\right) = 6 - \left(\frac{x}{6} - 2\right) \Leftrightarrow \cancel{\frac{3x}{2}} - \cancel{\frac{x}{3}} + 6 \cdot 5 = 6 \cdot 6 - \cancel{\frac{x}{6}} + 6 \cdot 2 \Leftrightarrow$$

$$\Leftrightarrow 9x - 2x + 30 = 36 - x + 12 \Leftrightarrow 8x = 18 \Leftrightarrow x = \frac{18}{8} \Leftrightarrow x = \frac{9}{4}$$

$$\text{ii) } 7 - \left(\frac{t+1}{4} + \frac{t}{3} \right) = 14 - \left(\frac{t-1}{2} - \frac{t+9}{12} \right) \Leftrightarrow 7 - \frac{t+1}{4} - \frac{t}{3} = 14 - \frac{t-1}{2} + \frac{t+9}{12} \Leftrightarrow$$

$$\Leftrightarrow 12 \cdot 7 - 3(t+1) - 4t = 12 \cdot 14 - 6(t-1) + t + 9 \Leftrightarrow 84 - 3t - 3 - 4t = 168 - 6t + 6 + t + 9 \Leftrightarrow$$

$$\Leftrightarrow -2t = 102 \Leftrightarrow t = -51$$

$$\text{B) i) } \lambda - 3 = 0 \Rightarrow \lambda = 3$$

$$\text{ii) } \lambda x - 2x = -5 \Rightarrow (\lambda - 2)x = -5, \text{ \acute{a}\rho\alpha \text{ \theta}\alpha \text{ \pi\rho}\acute{\epsilon}\pi\epsilon\iota \lambda - 2 = 0 \Rightarrow \lambda = 2}$$

$$\text{iii) } \lambda x + 5x = -1 \Rightarrow (\lambda + 5)x = -1, \text{ \acute{a}\rho\alpha \text{ \theta}\alpha \text{ \pi\rho}\acute{\epsilon}\pi\epsilon\iota \lambda + 5 = 0 \Rightarrow \lambda = -5}$$

$$\text{iv) } \lambda x - 2x - 4x = -5 \Rightarrow \lambda x - 6x = -5 \Rightarrow (\lambda - 6)x = -5, \text{ \acute{a}\rho\alpha \text{ \theta}\alpha \text{ \pi\rho}\acute{\epsilon}\pi\epsilon\iota \lambda - 6 = 0 \Rightarrow \lambda = 6}$$

$$\text{Γ) } \frac{x+2}{3} = \frac{3x-4}{4} \Leftrightarrow 4(x+2) = 3(3x-4) \Rightarrow 4x+8 = 9x-12 \Rightarrow -5x = -20 \Rightarrow x = 4$$

Για $x = 4$, η δεϋτερη εξίσωση γίνεται:

$$\cancel{12} \frac{4\alpha - 2}{\cancel{4}} + \cancel{12} \frac{2(\alpha - 4)}{\cancel{3}} = \cancel{12} \frac{1 - 4\alpha}{\cancel{2}} \Rightarrow 12\alpha - 6 + 8\alpha - 32 = 6 - 24\alpha \Rightarrow 44\alpha = 44 \Rightarrow \alpha = 1$$

ΘΕΜΑ 4^ο

$$\text{A) } \left(\frac{1}{2} - \frac{1}{6} \right)^{-2} - (-3)^{-1} \cdot (x-2) = \left(-\frac{2}{3} \right)^{-3} \cdot x - \left(-\frac{3}{2} \right)^3 + 2^{-2} \Rightarrow$$

$$\Rightarrow \left(\frac{3}{6} - \frac{1}{6} \right)^{-2} - \left(-\frac{1}{3} \right) \cdot (x-2) = \left(-\frac{3}{2} \right)^3 \cdot x + \frac{3^3}{2^3} + \frac{1}{2^2} \Rightarrow$$

$$\Rightarrow \left(\frac{2}{6} \right)^{-2} + \frac{1}{3}(x-2) = -\frac{27}{8}x + \frac{27}{8} + \frac{1}{4} \Rightarrow$$

$$\Rightarrow \left(\frac{1}{3} \right)^{-2} + \frac{1}{3}(x-2) = -\frac{27}{8}x + \frac{27}{8} + \frac{1}{4} \Rightarrow$$

$$\Rightarrow 3^2 + \frac{1}{3}(x-2) = -\frac{27}{8}x + \frac{27}{8} + \frac{1}{4} \Rightarrow$$

$$\Rightarrow 9 + \frac{1}{3}(x-2) = -\frac{27}{8}x + \frac{27}{8} + \frac{1}{4} \Rightarrow$$

$$\Rightarrow 24 \cdot 9 + 24 \cdot \frac{1}{3}(x-2) = -24 \cdot \frac{27}{8}x + 24 \cdot \frac{27}{8} + 24 \cdot \frac{1}{4} \Rightarrow$$

$$\Rightarrow 216 + 8x - 16 = -3 \cdot 27x + 3 \cdot 27 + 6 \Rightarrow$$

$$\Rightarrow 216 + 8x - 16 = -81x + 81 + 6 \Rightarrow 89x = -113 \Rightarrow x = -\frac{113}{89}$$

B) i) $-3(x-2) - 11 = (3-6)x - 5 \Rightarrow -3x + 6 - 11 = -3x - 5 \Rightarrow 0x = 0$, είναι ταυτότητα, δηλαδή έχει άπειρες λύσεις.

ii) $\mu(1-2) - 11 = (3+2\mu) \cdot 1 - 5 \Rightarrow -\mu - 11 = 3 + 2\mu - 5 \Rightarrow -3\mu = 9 \Rightarrow \mu = -3$