# Β΄ ΛΥΚΕΙΟΥ
# ΑΛΓΕΒΡΑ
# ΓΕΝΙΚΗΣ ΠΑΙΔΕΙΑΣ

# ΑΠΑΝΤΗΣΕΙΣ

## ΘΕΜΑ 1ο

**Α**. θεωρία σχολικό βιβλίο σελ. 28

**Β**. iii

**Γ**. α)Λ β)Σ γ)Λ δ)Σ ε)Λ

**Δ**. α. $συν(α-β)=συνα\cdot συνβ+ημα\cdot ημβ$

β. $\ell oge\cdot \ell n10=\dfrac{\ell ne}{\ell n10}\cdot \ell n10=1$

γ. $\ell og\dfrac{θ_1}{θ_2}=\ell ogθ_1-\ell ogθ_2$

## ΘΕΜΑ 2ο

Α. Πρέπει : $x^2=1\cdot(2-x)\Leftrightarrow x^2=2-x\Leftrightarrow x^2+x-2=0$

$Δ=1+8=9$

$x=\dfrac{-1\pm 3}{2}=\begin{cases}1\\-2\end{cases}$

Β. Πρέπει : $\left.\begin{array}{l}P(1)=0\\P(-2)=0\end{array}\right\}\Leftrightarrow\left.\begin{array}{l}1^4+(α-β)\cdot 1^3-(2α-3β)\cdot 1^2+1-2=0\\(-2)^4+(α-β)(-2)^3-(2α-3β)(-2)^2+(-2)-2=0\end{array}\right\}$

$\Leftrightarrow\left.\begin{array}{l}1+α-β-2α+3β+1-2=0\\16-8α+8β-8α+12β-2-2=0\end{array}\right\}\Leftrightarrow\left.\begin{array}{l}-α+2β=0\\-16α+20β=-12\end{array}\right\}\Leftrightarrow$

$\left.\begin{array}{l}-α+2β=0\\-4α+5β=-3\end{array}\right\}\Leftrightarrow\left.\begin{array}{l}α=2β\\-8β+5β=-3\end{array}\right\}\Leftrightarrow\begin{array}{l}α=2\\β=1\end{array}$

## ΘΕΜΑ 3ο

**Α**. Πρέπει : $\alpha_2 - \alpha_1 = \alpha_3 - \alpha_2 \Leftrightarrow \frac{1}{2}\sigma\upsilon\nu 2\alpha - 1 = -2\eta\mu^2\alpha - \frac{1}{2}\sigma\upsilon\nu 2\alpha \Leftrightarrow \sigma\upsilon\nu 2\alpha = 1 - 2\eta\mu^2\alpha$ (ισχύει)

**Β**. $\omega = \alpha_2 - \alpha_1 = \frac{1}{2}\sigma\upsilon\nu 2\alpha - 1 = \frac{1-2\eta\mu^2\alpha}{2} - 1 = -\eta\mu^2\alpha - \frac{1}{2}$

$$S4 = -2 \Leftrightarrow \frac{4}{2}\left[2\cdot 1 + (4-1)\cdot\left(-\eta\mu^2\alpha - \frac{1}{2}\right)\right] = -2 \Leftrightarrow 4 - 6\eta\mu^2\alpha - 3 = -2$$

$6\eta\mu^2\alpha = 3 \Leftrightarrow \eta\mu^2\alpha = \frac{1}{2}$ → $\eta\mu\alpha = \frac{\sqrt{2}}{2}$ ή $\eta\mu\alpha = -\frac{\sqrt{2}}{2}$

$\eta\mu\alpha = \eta\mu\frac{\pi}{4}$

$\alpha = 2\kappa\pi + \frac{\pi}{4}$ η $\alpha = 2\kappa\pi + \frac{3\pi}{4}$ ή

$\eta\mu\alpha = \eta\mu\left(-\frac{\pi}{4}\right)$

$\alpha = 2\kappa\pi - \frac{\pi}{4}$ η $\alpha = 2\kappa\pi + \frac{5\pi}{4}$ , $\kappa \in z$

**Γ**. $S_{103} = \frac{103}{2}\left[2\cdot 1 + (103-1)\cdot\left(-\eta\mu^2\frac{\pi}{4} - \frac{1}{2}\right)\right] = 103[1 + 51\cdot(-1)] = 103\cdot(-50) = -5150$

**Δ.** $S_5 = \frac{5}{2}\left[2\cdot 1 + (5-1)\cdot\left(-\eta\mu^2\alpha - \frac{1}{2}\right)\right] = 5[1 - 2\eta\mu^2\alpha - 1] = -10\eta\mu^2\alpha \neq 0$ , $\alpha \in \left(0, \frac{\pi}{2}\right)$

( Αν $S_5 = 0 \Leftrightarrow \cdots \eta\mu^2\alpha = 0$ Άτοπο)

Άρα ο βαθμός του πολυωνύμου είναι 5.

## ΘΕΜΑ 4ο

**Α**. Πρέπει $2e^{2x+1} + e^{x+1} > 0$ Άρα $x \in R$ δηλαδή $A_f = R$

$f(0) = \ell n\left(2e^{2\cdot 0+1} + e^{0+1}\right) = \ell n(2e + e) = \ell n3e = \ell n3 + \ell ne = \ell n3 + 1$

**Β**. $f(x) = 1 \Leftrightarrow \ell n\left(2e^{2\cdot x+1} + e^{x+1}\right) = \ell ne \xleftrightarrow{\ell nx:1-1} 2e^{2\cdot x+1} + e^{x+1} = e$

$2e\cdot e^{2x} + e\cdot e^{x} - e = 0 \Leftrightarrow e\left(2e^{2x} + e^{x} - 1\right) = 0 \Leftrightarrow \left.\begin{matrix} 2\left(e^{x}\right)^2 + e^{x} - 1 = 0 \\ \theta\varepsilon\tau\omega \quad e^{x} = y \end{matrix}\right\} \Rightarrow$

$2y^2 + y - 1 = 0 \cdots$ → $y = -1$ η $y = \frac{1}{2}$

Άρα $e^{x} = -1$ ΑΔΥΝΑΤΗ ή $e^{x} = \frac{1}{2} \Leftrightarrow \ell ne^{x} = \ell n\frac{1}{2} \Leftrightarrow x\cdot\ell ne = \ell n1 - \ell n2 \Leftrightarrow x = -\ell n2$

**Γ**. $f(x) < 1 \Leftrightarrow \ldots 2e^{2x} + e^{x} - 1 < 0$ , $-1 < e^{x} < \frac{1}{2}$, $e^{x} > -1 \Leftrightarrow x \in R$

$e^{x} < \frac{1}{2} \xleftrightarrow{\ell nx\uparrow} \ell ne^{x} < \ell n\frac{1}{2} \Leftrightarrow x < -\ell n2$

Άρα $x \in (-\infty, -\ell n2)$