

ΑΠΑΝΤΗΣΕΙΣ
ΑΛΓΕΒΡΑ Β' ΛΥΚΕΙΟΥ ΓΕΝΙΚΗΣ ΠΑΙΔΕΙΑΣ

Θέμα Α

A1. Σχολικό Βιβλίο

A2. Σχολικό Βιβλίο

A3. α. Σ

β. Σ

γ. Λ

δ. Σ

ε. Σ

Θέμα Β

$$B1. \left. \begin{array}{l} P(-2)=0 \\ P(3)=35 \end{array} \right\} \Rightarrow a = -1, \beta = 3$$

$$B2. \alpha) P(x)=0 \Rightarrow x^3 - x^2 + x + 14 = 0$$

$$\begin{array}{r|rrrr} 1 & -1 & 1 & 14 & \\ & & -2 & 6 & -14 \\ \hline 1 & -3 & 7 & 0 & \end{array} \quad \begin{array}{l} -2 \\ \\ \end{array}$$

$x^2 - 3x + 7$

Από σχήμα Horner έχουμε:

$$(x+2)(x^2 - 3x + 7) = 0 \Rightarrow x = -2$$

$$\text{Αφού } \Delta = 9 - 4 \cdot 7 < 0$$

$$\beta) P(x) < 0 \Rightarrow (x+2)(x^2 - 3x + 7) < 0 \Rightarrow x+2 < 0 \Rightarrow x < -2$$

$$P(x) = 2Q(x) - x^3 - x \Rightarrow x^3 - x^2 + x + 14 = 2\kappa x + 2\lambda x^2 + 2x + 14 - x^3 - x \Rightarrow$$

$$B3. (2 - 2\kappa)x^3 - (1 + 2\lambda)x^2 = 0 \Rightarrow$$

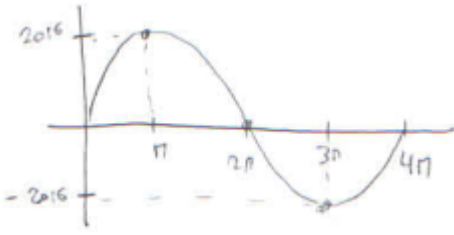
$$2 - 2\kappa = 0$$

Και

$$2\lambda + 1 = 0$$

$$\text{Άρα } \kappa = 1, \lambda = -\frac{1}{2}$$

Θέμα Γ



Γ1. $f_{\max} = 2016, f_{\min} = -2016$

Γ2. $T = 4\pi$

Γ3. $f(x) = 2016\sigma\nu\nu\left(x - \frac{\pi}{3}\right) \Rightarrow \eta\mu\frac{x}{2} = \sigma\nu\nu\left(x - \frac{\pi}{3}\right) \Rightarrow \sigma\nu\nu\left[\pi - \frac{x}{2}\right] = \sigma\nu\nu\left[x - \frac{\pi}{3}\right] \Rightarrow$

$$\pi - \frac{x}{2} = 2\kappa\pi \pm \left(x - \frac{\pi}{3}\right) \Rightarrow$$

$$-\frac{3}{2}x = 2\kappa\pi - \frac{\pi}{3} - \pi \quad \text{ή} \quad \frac{x}{2} = 2\kappa\pi + \frac{\pi}{3} - \pi \Rightarrow$$

$$-\frac{3}{2}x = 2\kappa\pi - \frac{4\pi}{3} \quad \text{ή} \quad \frac{x}{2} = 2\kappa\pi - \frac{2\pi}{3} \Rightarrow$$

$$x = -\frac{4\kappa\pi}{3} + \frac{8\pi}{9} \quad \text{ή} \quad x = 4\kappa\pi - \frac{4\pi}{3}, \kappa \in \mathbb{Z}$$

Γ4. $f(x) = -2016\sqrt{3}\sigma\nu\nu\frac{x}{2} \Rightarrow 2016\eta\mu\frac{x}{2} = -2016\sqrt{3}\sigma\nu\nu\frac{x}{2} \Rightarrow \epsilon\phi\frac{x}{2} = -\sqrt{3}, \frac{x}{2} \neq \kappa\pi \pm \frac{\pi}{2}$

$$\Rightarrow \epsilon\phi\frac{x}{2} = \epsilon\phi\left(-\frac{\pi}{3}\right) \Rightarrow \frac{x}{2} = \kappa\pi - \frac{\pi}{3} \Rightarrow x = 2\kappa\pi - \frac{2\pi}{3}, \kappa \in \mathbb{Z}$$

Θέμα Δ.

Δ1. $D_f = \mathbb{R}^* \quad D_g = (0, +\infty)$

Αφού $e^{4x} - 1 > 0 \Rightarrow (e^{2x} - 1)(e^{2x} + 1) > 0 \Rightarrow e^{2x} > 1 \Rightarrow x > 0$

Δ2. $f(e) = 2, f(1) = 0, g(1) = \ln\frac{e^4 - 1}{e^2 + 1} = \ln(e^2 - 1)$

$$e^{f(e)} - e^{f(1)} = e^2 - e^0 = e^2 - 1 = e^{g(1)}$$

Δ3. $g(x) = \ln 2 \Rightarrow \ln(e^{2x} - 1) = \ln 2 \Rightarrow e^{2x} = 3 \Rightarrow 2x = \ln 3 \Rightarrow x = \frac{\ln 3}{2} \Rightarrow x = \ln\sqrt{3} > 0$

Δ4. $g(x) < 0 \Rightarrow \ln\left(\frac{e^{4x} - 1}{e^{2x} + 1}\right) < 0 \Rightarrow \ln(e^{2x} - 1) < \ln 1 \Rightarrow e^{2x} < 2 \Rightarrow 2x < \ln 2 \Rightarrow x < \ln\sqrt{2}$

Άρα $x \in (0, \ln\sqrt{2})$