



ΦΥΛΛΟ ΕΡΓΑΣΙΑΣ

ΕΞΕΤΑΖΟΜΕΝΗ ΕΝΟΤΗΤΑ : ΟΡΙΟ ΡΗΤΗΣ ΣΥΝΑΡΤΗΣΗΣ ΣΤΟ $x_0 \in \mathbb{R}$ (ΜΟΡΦΗΣ $\frac{0}{0}$)

Εργασία 1^η

Να υπολογίσετε τα παρακάτω όρια:

$$\ell_1 = \ell \lim_{x \rightarrow -2} \frac{x^4 - 16}{x^3 + 8}. \quad \ell_2 = \ell \lim_{x \rightarrow -1} \frac{x^3 + 1}{x^2 - 4x - 5}. \quad \ell_3 = \ell \lim_{x \rightarrow 1} \frac{x^3 - 3x + 2}{x^4 - 4x + 3}. \quad \ell_4 = \ell \lim_{x \rightarrow 1} \frac{x^4 - 2x^2 + 1}{x^3 + 3x^2 - 6x + 2}.$$

$$\ell_5 = \ell \lim_{x \rightarrow 2} \frac{x^3 - x^2 - x - 2}{x^3 - 8}. \quad \ell_6 = \ell \lim_{x \rightarrow 5} \frac{x^2 - 25}{x^2 - 7x + 10}. \quad \ell_7 = \ell \lim_{x \rightarrow 0} \frac{(1+x)^3 - 1}{x^2 - x}. \quad \ell_8 = \ell \lim_{x \rightarrow 5} \frac{x^3 - 25x}{x^2 - 7x + 10}.$$

$$\ell_9 = \ell \lim_{x \rightarrow 2} \frac{x^3 - 3x^2 + 5x - 6}{x - 2}. \quad \ell_{10} = \ell \lim_{x \rightarrow 0} \frac{3x^2 + x}{x^3 - 4x}. \quad \ell_{11} = \ell \lim_{x \rightarrow 1} \frac{\ell n^3 x + 2\ell n x}{\ell n^2 x + \ell n x}. \quad \ell_{12} = \ell \lim_{x \rightarrow 3} \frac{x - 3}{\frac{1}{x} - \frac{1}{3}}.$$

$$\ell_{13} = \ell \lim_{x \rightarrow 2/3} \frac{3x^2 - 8x + 4}{9x^2 - 4}. \quad \ell_{14} = \ell \lim_{x \rightarrow 2} \frac{\frac{1}{x} - \frac{1}{2}}{x - 2}. \quad \ell_{15} = \ell \lim_{x \rightarrow 1} \frac{x^4 - 1}{x^3 - 1}.$$

Εργασία 2^η

Να υπολογίσετε τα παρακάτω όρια:

$$\ell_1 = \ell \lim_{x \rightarrow 2} \left(\frac{3x}{x-2} - \frac{6}{x-2} \right). \quad \ell_2 = \ell \lim_{x \rightarrow 1} \left(\frac{1}{1-x} - \frac{3}{1-x^3} \right). \quad \ell_3 = \ell \lim_{x \rightarrow 1} \left(\frac{x}{x^2 - 1} - \frac{2}{x^2 + 2x - 3} \right)$$

$$\ell_4 = \ell \lim_{x \rightarrow 2} \left(\frac{x^2}{x^2 + 2x + 4} - \frac{3x + 6}{x^3 - 8} + \frac{1}{x-2} \right). \quad \ell_5 = \ell \lim_{x \rightarrow 1} \left(\frac{x^2 + x + 1}{x-1} + \frac{5x-2}{x^2 - 3x + 2} \right).$$

Εργασία 3^η

Αποδείξτε ότι :

$$\alpha. \lim_{x \rightarrow 2} \frac{x^3 - 8}{x^2 - 5x + 6} = -12$$

$$\beta. \lim_{x \rightarrow 2} \frac{x^2 - 4x + 4}{x^2 + x - 6} = 0$$

$$\gamma. \lim_{x \rightarrow 2} \frac{x^3 - 8}{x^2 - 4} = 3$$

$$\delta. \lim_{x \rightarrow 2} \frac{x^3 - 5x^2 + 8x - 4}{(x-2)(x^2 - 4)} = \frac{1}{4}$$

$$\epsilon. \lim_{x \rightarrow 1} \left(\frac{1}{x-1} - \frac{2}{x^2 - 1} \right) = \frac{1}{2}$$

$$\sigma\tau. \lim_{x \rightarrow -3} \frac{(x+1)^3 + 8}{2(x-1)^2 - 32} = -\frac{3}{4}$$

$$\zeta. \lim_{x \rightarrow 1} \frac{x^\mu - 1}{x^\nu - 1} = \frac{\mu}{\nu} \quad \mu, \nu \in \mathbb{N}^*$$

$$\eta. \lim_{x \rightarrow 1} \frac{vx^{v+1} - (v+1)x + 1}{x-1} = v^2 - 1$$