

ΕΠ4 - 2129

A3.  $\forall \epsilon \in \mathbb{R}^+$ ,  $f(x) = |x|$ , στο  $x = 0$ .

A4.  $\Sigma - \Lambda - \Lambda - \Sigma - \Lambda$

ΘΕΜΑ Β

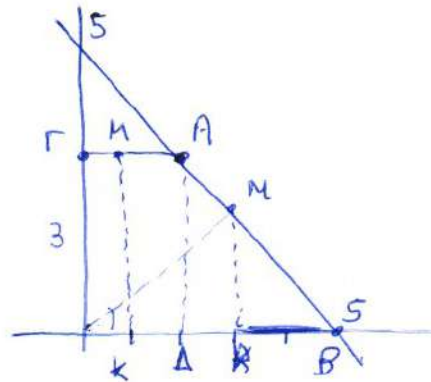
B1.  $AM = 2-x$ ,  $MB = -x+5$ ,  $AB = 5-x$

$$A\Delta B = \frac{3 \cdot 3}{2} = \frac{9}{2}$$

$$MKB = (2-x) \cdot 3 + \frac{9}{2} = \frac{21}{2} - 3x, \quad 0 \leq x \leq 2$$

Αν  $x > 2$ ,  $\Delta B = 5-x$ ,  $M\Delta = -x+5$

$$MKB = \frac{(5-x)(-x+5)}{2} = \frac{(5-x)^2}{2}, \quad 2 < x \leq 5$$



B2.  $\lim_{x \rightarrow 2^-} \left( \frac{21}{2} - 3x \right) = \frac{9}{2}$      $\lim_{x \rightarrow 2^+} \frac{(5-x)^2}{2} = \frac{9}{2} = f(2)$  άρα  $f$  συνεχής στο 2, άρα  $f$  συν. στο  $[0,5]$ .

$$\lim_{x \rightarrow 2^-} \frac{\frac{21}{2} - 3x - \frac{9}{2}}{x-2} = \lim_{x \rightarrow 2^-} \frac{-3(x-2)}{x-2} = -3$$

$$\lim_{x \rightarrow 2^+} \frac{\frac{(5-x)^2}{2} - \frac{9}{2}}{x-2} = \lim_{x \rightarrow 2^+} \frac{16 - 10x + x^2}{2(x-2)} = \lim_{x \rightarrow 2^+} \frac{(x-2)(x-8)}{2(x-2)} = -3$$

άρα  $f$  παραγ. στο 2 με  $f'(x) = \begin{cases} -3, & 0 \leq x \leq 2 \\ -(5-x) = x-5, & 2 < x \leq 5 \end{cases}$

B3.  $f(t) = \begin{cases} \frac{21}{2} - 3x(t), & 0 \leq x \leq 2 \\ \frac{(5-x(t))^2}{2}, & 2 < x \leq 5 \end{cases}$      $f'(t) = \begin{cases} -3x'(t) \\ (x(t)-5) \cdot x'(t) \end{cases}$

άρα  $f'(t_0) = -6 \text{ m/s}$

B4. θ στα  $-x+5=1 \Rightarrow x=4$  άρα  $x(t_1) = 4$

$$\epsilon_{\varphi} \theta(t) = \frac{-x(t)+5}{x(t)} \Rightarrow \frac{1}{\sin^2 \theta(t)} \cdot \theta'(t) = -\frac{5x'(t)}{x^2(t)} \quad \text{από την οριζ. t,}$$

$$\sin \theta = \frac{1}{\sqrt{17}} \quad \text{άρα } \sin \theta(t_1) = \frac{4}{\sqrt{17}} \quad \text{από την οριζ. t,}$$

$$\theta'(t_1) = -\frac{5 \cdot 2}{16} \cdot \frac{16}{17} \Rightarrow \theta'(t_1) = -\frac{10}{17} \text{ rad/s}$$