

## Θέμα 19

A.  $f(x) = (x^2 + 4x + 5)^{20}$

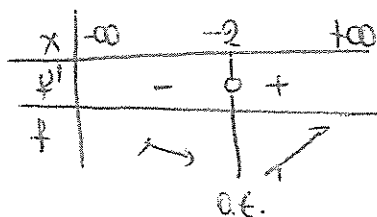
$$f'(x) = 20(x^2 + 4x + 5)^{19} \cdot (2x + 4)$$

$$f'(x) = 0 \Leftrightarrow x^2 + 4x + 5 = 0 \quad \text{ή} \quad 2x + 4 = 0$$

$$\Delta = 16 - 20 = -4 < 0$$

$$2x = -4$$

$$x = -2$$



Η  $f$  παρουσιάζει στο  $x = -2$  α.ε.

$$\text{το } f(-2) = 1$$

B.  $\lim_{h \rightarrow 0} \frac{f(-2+h) - f(-2)}{h} = f'(-2) = 20 \cdot 1^{19} \cdot 0 = 0$

Γ.  $f'(x) = 0 \Leftrightarrow x = -2$

$$\varepsilon: y - f(-2) = f'(-2)(x+2) \Leftrightarrow y - 1 = 0 \Leftrightarrow y = 1$$

Δ<sub>1</sub>. A(x, 1)

$$x'(t) = 2t \text{ cm/sec}$$

$$t=0 \quad B(0, 5^{20})$$

$$x'(t) = 2t$$

$$\text{Άρα } x(t) = t^2 + C$$

$$t=0: 0 = 0 + C \Rightarrow C = 0$$

$$\text{Άρα } x(t) = t^2$$

$$AO = \sqrt{(0-x)^2 + (0-1)^2} = \sqrt{x^2 + 1}$$

$$g(x) = \sqrt{x^2 + 1}$$

$$g'(x) = \frac{1}{2\sqrt{x^2 + 1}} \cdot 2x = \frac{x}{\sqrt{x^2 + 1}}$$

$$g'(1) = \frac{1}{2} \text{ cm/sec}$$

Δ<sub>2</sub>.  $AO = \sqrt{x^2(t) + 1} = \sqrt{t^2 + 1}$

$$h(t) = \sqrt{t^2 + 1}$$

$$h'(t) = \frac{1}{2\sqrt{t^2 + 1}} \cdot 2t = \frac{t}{\sqrt{t^2 + 1}}$$

$$t=1 \quad h'(1) = \frac{1}{2} \text{ cm/sec}$$

$$t=-1 \quad h'(-1) = -\frac{1}{2} \text{ cm/sec}$$

$$\left. \begin{array}{l} x(t) = t^2 \\ x(t) = 1 \end{array} \right\} \Rightarrow t^2 = 1 \quad t=1 \text{ ή } t=-1$$