EXAMEN 1 2º TRIMESTRE

EJERCICIO 4

a) $f(x) = (ax^2 + bx) \cdot e^{-x}$

$$f'(x) = (2ax + b)e^{-x} + (ax^2 + bx) \cdot (-1) \cdot e^{-x} =$$
$$= (2ax + b - ax^2 - bx)e^{-x} =$$
$$= (-ax^2 + (2a - b)x + b) \cdot e^{-x}$$

i) $f(1) = \frac{-1}{e} \Rightarrow (a+b) \cdot e^{-1} = \frac{-1}{e}$

$$\frac{a+b}{\cancel{e}} = \frac{-1}{\cancel{e}} \rightarrow a + b = -1$$

ii) $f'(3) = 0 \Rightarrow (-9a + 6a - 3b + b) \cdot e^{-3} = 0$

$$\frac{-3a - 2b}{e^3} = 0 \rightarrow -3a - 2b = 0$$

$$\begin{cases} a + b = -1 \\ -3a - 2b = 0 \end{cases} \xrightarrow{\cdot(3)} \begin{array}{r} \cancel{3a} + 3b = -3 \\ \cancel{-3a} - 2b = 0 \\ \hline \boxed{b = -3} \end{array}$$

$$a - 3 = -1 \Rightarrow \boxed{a = 2}$$

b) $f(x) = (2x^2 - 3x) \cdot e^{-x}$ $\quad f'(x) = (-2x^2 + 7x - 3) \cdot e^{-x}$

$t(x) - f(x_0) = f'(x_0)(x - x_0) \rightarrow$ RECTA TANGENTE

$t(x) - 0 = -3(x - 0)$

$$\boxed{t(x) = -3x}$$

$x_0 = 0$

$f(0) = 0$

$f'(0) = -3$