

Soluție

1.a) $l_s(1) = l_d(1) = f(1)$; $l_s(1) = 2$; $l_d(1) = \frac{2+a}{3}$ și $f(1) = 2 \Rightarrow 2 = \frac{2+a}{3} \Rightarrow a = 4$.

b) $\lim_{x \rightarrow -\infty} f(x) = 1 \Rightarrow y = 1$ asimptotă orizontală.

c) $m = f'(2) = 1$; $f'(x) = \frac{-2x^2 - 2ax + 4}{(x^2 + 2)^2}$; $f'(2) = \frac{-4 - 4a}{36}$; $\frac{-4 - 4a}{36} = 1 \Rightarrow a = -10$.

2.a) $f(\sqrt{x}) = e^x \Rightarrow \int_0^1 e^x dx = e^x \Big|_0^1 = e - 1$.

b) $\int_0^1 x e^{x^2} dx = \frac{1}{2} \int_0^1 2x e^{x^2} dx = \frac{1}{2} \int_0^1 e^t dt = \frac{1}{2}(e - 1)$.

c) $1 \leq e^{x^2} \leq e$ oricare ar fi $x \in [0, 1] \Rightarrow \int_0^1 1 dx \leq \int_0^1 e^{x^2} dx \leq \int_0^1 e dx$, c.c.t.d.