

**Soluții**

**1. a)**  $f'(x) = 2xe^x + (x^2 + 1)e^x = (x+1)^2 e^x$ , pentru orice  $x \in \mathbb{R}$ .

**b)** Ecuația tangentei  $y - f(0) = f'(0)(x - 0)$ , adică  $y = x$ .

**c)**  $\lim_{x \rightarrow -\infty} f(x) = -1 + \lim_{x \rightarrow -\infty} \frac{x^2 + 1}{e^{-x}} = -1 \Rightarrow y = -1$  este ecuația asimptotei orizontale la  $G_f$  spre  $-\infty$ .

**2. a)**  $\int f_1(x) \cdot \sqrt{x+1} dx = \int x dx = \frac{x^2}{2} + C$ .

**b)**  $V = \pi \int_0^1 \frac{x^2}{x+1} dx = \pi \left( \frac{x^2}{2} - x + \ln(x+1) \right) \Big|_0^1 = \frac{\pi(2 \ln 2 - 1)}{2}$ .

**c)**  $\int_0^1 \frac{x^{2009}}{\sqrt{x+1}} dx \leq \int_0^1 x^{2009} dx = \frac{1}{2010}$ .