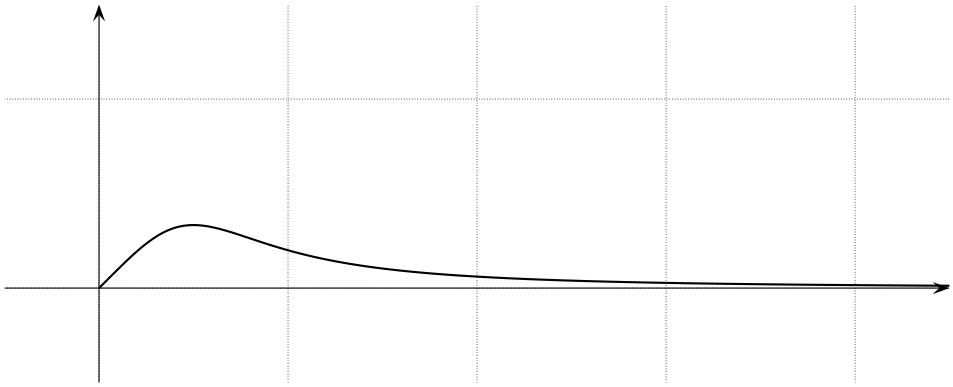
11.22 1)



2) $\pi \displaystyle\int_0^{+\infty} \left(\frac{x}{4\,x^3+1}\right)^2 dx = \pi \int_0^{+\infty} \frac{x^2}{(4\,x^3+1)^2}\,dx = \pi \lim_{t\to+\infty} \int_0^t \frac{x^2}{(4\,x^3+1)^2}\,dx$

$= \pi \lim_{t\to+\infty} \frac{1}{12} \displaystyle\int_0^t (4\,x^3+1)^{-2}\cdot 12\,x^2\,dx = \frac{\pi}{12} \lim_{t\to+\infty} \frac{1}{-1}\,(4\,x^3+1)^{-1}\Big|_0^t =$

$\frac{\pi}{12} \lim_{t\to+\infty} -\dfrac{1}{4\,x^3+1}\Big|_0^t = \frac{\pi}{12} \lim_{t\to+\infty} \Big(-\dfrac{1}{4\,t^3+1} + \dfrac{1}{4\cdot 0^3+1}\Big) =$

$\frac{\pi}{12} \lim_{t\to+\infty} \Big(-\dfrac{1}{4\,t^3+1} + 1\Big) = \frac{\pi}{12} \lim_{t\to+\infty} \Big(-\dfrac{1}{4\,t^3} + 1\Big) = \frac{\pi}{12}\,(-0+1) = \frac{\pi}{12}$