Soluții

1.a) $y=0$ este asimptota orizontală la ∞ şi la $-\infty$.
Dreptele $x=0,\ x=-1$ sunt asimptote verticale.

b) $f'(x)=\dfrac{-2\left(3x^2+3x+1\right)}{x^3\left(x+1\right)^3}\neq 0,\ \forall x\in\mathbb{R}\setminus\left\{-1,0\right\}$, de unde se obține concluzia.

c) $\sum\limits_{k=1}^{n} f(k)=\sum\limits_{k=1}^{n}\left(\dfrac{1}{k^2}-\dfrac{1}{(k+1)^2}\right)=1-\dfrac{1}{(n+1)^2}$. Limita cerută este $\dfrac{1}{e}$

2.a) $I_1=\int_1^2\left(1-\dfrac{1}{x+1}\right)dx=1-\ln\dfrac{3}{2}$.

b) $I_n=\int_1^2\dfrac{x^n}{1+x^n}dx\leq\int_1^2 dx=1$.

c) $I_n=\int_1^2\left(1-\dfrac{1}{1+x^n}\right)dx=1-\int_1^2\dfrac{1}{1+x^n}dx$, iar $0\leq J_n=\int_1^2\dfrac{1}{1+x^n}dx\leq\int_1^2\dfrac{1}{x^n}dx=\dfrac{1}{n-1}\left(1-\dfrac{1}{2^{n-1}}\right)\Rightarrow J_n\to 0$
$\Rightarrow I_n\to 0$.