ASINTOTI

2 nov 2020

Esercizi

p. 1495 n° 985

$$y = \frac{ax^3 + bx^2 + 4}{x^2 - 1} \qquad \bullet\ a, b \ \Big|\ y = 2x - 1 \quad A.O.$$

$$m = 2 = \lim_{x \to \infty} \frac{f(x)}{x} = \lim_{x \to \infty} \frac{ax^3 + bx^2 + 4}{x^3 - x} = a \Rightarrow \boxed{a = 2}$$

$$q = -1 = \lim_{x \to \infty} [f(x) - mx] = \lim_{x \to \infty} \left[\frac{ax^3 + bx^2 + 4}{x^2 - 1} - 2x\right] =$$

$$= \lim_{x \to \infty} \frac{\cancel{2x^3} + bx^2 + 4 - \cancel{2x^3} + 2x}{x^2 - 1} = b \qquad \boxed{b = -1}$$

p. 1495 n° 991

$$y = \frac{1}{\sqrt{ax + 1}} + bx$$

$$a, b \ \Big|\ \begin{array}{l} \bullet\ P\left(3; -\frac{11}{2}\right) \in y = f(x) \\ \bullet\bullet\ y = -2x \quad A.O. \end{array}$$

$$\begin{cases} \bullet\ -\frac{11}{2} = \frac{1}{\sqrt{3a + 1}} + 3b \\ \bullet\bullet\ \lim_{x \to \infty} \left(\underbrace{\frac{1}{x\sqrt{ax + 1}}}_{\to 0} + b\right) = -2 \end{cases} \Rightarrow \boxed{b = -1}$$

$$-\frac{11}{2}=\frac{1}{\sqrt{3a+1}}-6 \Rightarrow \frac{1}{\sqrt{3a+1}}=\frac{1}{2} \Rightarrow \sqrt{3a+1}=2$$

$$3a+1=4$$

$a=1$

pr. 1495 n. 994

$\mathcal{P}: y=ax^2+bx+c$? a, b, c

$O(0;0) \mid \mathcal{P}$

$$V_{\mathcal{P}}\begin{cases} \text{A.} & y=\ln(2x-1) \\ \text{A. obliquo} & y=-3x\cdot e \end{cases}$$

- cerco asintoti

$\because V \{$

$\therefore y-y_V=a(x-x_V)^2$

- ASINTOTO $y=\ln(2x-1)$

CE $2x-1>0 \Rightarrow x>\frac{1}{2}$ $x=\frac{1}{2}$ A.V.

ASINTOTO $y=-3x e^{1/x}$

$$m=\lim_{x\to\infty}\frac{-3\cancel{x}e^{1/x}}{\cancel{x}}=-3e^{\frac{1}{+\infty}}=-3$$

$$q=\lim_{x\to\infty}\left(-3xe^{1/x}+3x\right)=\lim_{x\to\infty}\left[3x\left(1-e^{1/x}\right)\right]=$$

$$=\lim_{x\to\infty}\left[-3\,\frac{e^{1/x}-1}{1/x}\right]=$$

pongo $\frac{1}{x}=u \Rightarrow \begin{matrix} x\to\infty \\ u\to 0\end{matrix}$

$$=\lim_{x\to\infty}\left[-3\,\underbrace{\frac{e^u-1}{u}}_{\to 1}\right]=-3$$

$y=-3x-3$ A. ob.

$$\because V\begin{cases} x=1/2 \\ y=-3x-3\end{cases} \Rightarrow V\left(\frac{1}{2}; -\frac{9}{2}\right)$$

$\therefore \quad y + \frac{9}{2} = a\left(x - \frac{1}{2}\right)^2 \rightsquigarrow$ fascio di parabole

$$O \in \mathcal{P} \Rightarrow 0 + \frac{9}{2} = a\left(0 - \frac{1}{2}\right)^2 \Rightarrow \boxed{a = 18}$$

$$\mathcal{P}: \; y = 18x^2 - 18x$$

Asintoti nelle funzioni

RIFLESSIONI

- funzione polinomiale $\longrightarrow$ NO ASINTOTI
- razionali

$$q(x) = \frac{f(x)}{g(x)}$$

i. A.V. $\Leftrightarrow$ C.E.

ii. A.O. $\Leftrightarrow$ $\deg f(x) \leq \deg g(x)$

iii. A. OB. $\Leftrightarrow$ $\deg f(x) = \deg g(x) + 1$

FUNZIONI IRRIDUCIBILI