

Esercizi 4.

29/10/2010

Esercizio 1

Sul piano cartesiano sia $A = (6, 0)$, sia $B = (3, 4)$, sia $\theta = \widehat{AOB}$ e sia P un punto del primo quadrante tale che $\overline{OP} = 6$ e $\widehat{AOP} = \frac{\pi}{6}$.

- (a) Calcolare la lunghezza di $\overline{OB}$
- (b) Calcolare $\sin(\theta)$
- (c) Calcolare $\cos(\theta)$
- (c) Calcolare le coordinate del punto P

Esercizio 2

Calcolare i seguenti limiti.

- (a) $\lim_{x \rightarrow 3} x^2 - 2x - 1$
- (b) $\lim_{x \rightarrow 0} \frac{\sqrt{x+5}}{1+x}$
- (c) $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sqrt{8}\sin(x) - 1}{2x}$
- (d) $\lim_{x \rightarrow -\frac{\pi}{3}} \frac{\cos(x) + 1}{\sqrt{3} + \sin(x)}$
- (e) $\lim_{x \rightarrow 0^+} \frac{1}{\sin(x)}$
- (f) $\lim_{x \rightarrow 0^-} \frac{1}{\sin(x)}$
- (g) $\lim_{x \rightarrow +\infty} \sin\left(\frac{1}{\log(x)}\right)$

Esercizio 3

- (a) $\lim_{x \rightarrow 3} \frac{x^2 - 3x}{x^2 - 2x - 3}$
- (b) $\lim_{x \rightarrow -1} \frac{x^2 - 1}{x^3 + 2x^2 + 3x + 2}$
- (c) $\lim_{x \rightarrow 1^+} \frac{x^2 - 6x + 5}{x^3 - 3x + 2}$
- (d) $\lim_{x \rightarrow 1^-} \frac{x^2 - 6x + 5}{x^3 - 3x + 2}$
- (e) $\lim_{x \rightarrow -2} \frac{x^4 + 5x^3 + 6x^2 - 4x - 8}{x^4 + 4x^3 + 4x^2}$

Esercizio 4

- (a) $\lim_{x \rightarrow \infty} \frac{5x^2 - 3x}{4x^2 + 2x + 3}$

$$\begin{aligned}
(b) \quad & \lim_{x \rightarrow \infty} \frac{x^2 - 8}{2x^3 - x + 9} \\
(c) \quad & \lim_{x \rightarrow -\infty} \frac{x^5 + 3x^3 + 7}{2x^3 - 2x + 4} \\
(d) \quad & \lim_{x \rightarrow -\infty} \frac{1 - x}{1 + x} \\
(e) \quad & \lim_{x \rightarrow 4} \frac{x + 4 + \frac{2x+3}{x-4}}{1 + x - \frac{x^2}{x-4}} \\
(f) \quad & \lim_{x \rightarrow 0} \frac{\frac{1}{x} + 1 + \frac{2}{x+1}}{1 + \frac{x+2}{x^2} - \frac{x}{x-5}}
\end{aligned}$$

Esercizio 5

$$\begin{aligned}
(a) \quad & \lim_{x \rightarrow -\infty} \frac{\sqrt{3x^2 - 5}}{\sqrt{12x^2 - x + 6}} \\
(b) \quad & \lim_{x \rightarrow \infty} \frac{\sqrt{x} + \sqrt[3]{x}}{\sqrt{x} - \sqrt[3]{x}} \\
(c) \quad & \lim_{x \rightarrow \infty} \frac{\sqrt{x} + 2\sqrt[3]{x^2}}{3\sqrt{x} - 4\sqrt[3]{x^5}} \\
(d) \quad & \lim_{x \rightarrow \infty} \frac{\sqrt{x^2 - 5} + \sqrt[3]{x^2 + 5}}{\sqrt{2x^2 - 7} - \sqrt[3]{3x^2 + x}}
\end{aligned}$$

Esercizio 6

$$\begin{aligned}
(a) \quad & \lim_{x \rightarrow \infty} \frac{1}{\sqrt{x-1} - \sqrt{x+1}} \\
(b) \quad & \lim_{x \rightarrow 0^-} \frac{1 - \sqrt{1-x}}{x^2} \\
(c) \quad & \lim_{x \rightarrow 1} \frac{2 - \sqrt{3x+1}}{x^2 - 1} \\
(d) \quad & \lim_{x \rightarrow 0} \frac{1 - \sqrt{x^2 + x + 1}}{x} \\
(e) \quad & \lim_{x \rightarrow -\infty} \sqrt{4x^2 + 1} - \sqrt{4x^2 + 2x - 1} \\
(f) \quad & \lim_{x \rightarrow \infty} \sqrt{x^2 + ax} - \sqrt{x^2 - ax}
\end{aligned}$$

SOLUZIONI

Esercizio 1 a) 5 b) $\frac{4}{5}$ c) $\frac{3}{5}$ d) $P = (3\sqrt{3}, 3)$

Esercizio 2 a) 2 b) $\sqrt{5}$ c) $\frac{2}{\pi}$ d) $\sqrt{3}$ e) $+\infty$ f) $-\infty$ g) 0

Esercizio 3 a) $\frac{3}{4}$ b) -1 c) $-\infty$ d) $+\infty$ e) 0

Esercizio 4 a) $\frac{5}{4}$ b) 0 c) $+\infty$ d) -1 e) $-\frac{11}{16}$ f) 0

Esercizio 5 a) $\frac{1}{2}$ b) 1 c) 0 d) $\frac{1}{\sqrt{2}}$

Esercizio 6 a) $-\infty$ b) $-\infty$ c) $-\frac{3}{8}$ d) $-\frac{1}{2}$ e) $\frac{1}{2}$ f) a