Limiti all'infinito

Periodo 3 - UdA 2

Trovare i seguenti limiti (senza specificare il segno se il limite è in infinito) svolgendo dettagliatamente i calcoli

[1] $\lim_{x\to\infty} 2x^2 - 3x + 9$

[2] $\lim_{x\to\infty} x^3 - 2x^2 - 8x + 5$

[3] $\lim_{x\to\infty} 4x^2 + 7x - 3$

[4] $\lim_{x\to\infty} x^3 - 3x^2 - 4x + 6$

[5] $\lim_{x\to\infty} 3x^2 - 4x - 5$

[6] $\lim_{x\to\infty} x^3 + 5x^2 + 4x - 2$

[7] $\lim_{x\to\infty} 6x^2 + 5x + 7$

[8] $\lim_{x\to\infty} 2x^3 + 5x^2 + 3x$

[9] $\lim_{x\to\infty} 8x^2 - 5x - 3$

[10] $\lim_{x\to\infty} 3x^3 + 4x^2 - 4$

[11] $\lim_{x\to\infty} 9x^2 - 4x - 8$

[12] $\lim_{x\to\infty} 5x^3 - 4x - 6$

SOLUZIONI

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1. $2x^2\left(\frac{2x^2}{2x^2}-\frac{3x}{2x^2}+\frac{9}{2x^2}\right)=2x^2\left(1-\frac{3}{2x}+\frac{9}{2x^2}\right)\longrightarrow 2\infty^2\left(1-\frac{3}{2\infty}+\frac{9}{2\infty^2}\right)=2\infty^2\left(1-0+0\right)=\infty\cdot 1=\infty$
2. $x^3\left(\frac{x^3}{x^3}-\frac{2x^2}{x^3}-\frac{8x}{x^3}+\frac{5}{x^3}\right)=x^3\left(1-\frac{2}{x}-\frac{8}{x^2}+\frac{5}{x^3}\right)\longrightarrow \infty^3\left(1-\frac{2}{\infty}-\frac{8}{\infty^2}+\frac{5}{\infty^3}\right)=\infty^3\left(1-0-0+0\right)=\infty\cdot 1=\infty$
3. $4x^2\left(\frac{4x^2}{4x^2}+\frac{7x}{4x^2}-\frac{3}{4x^2}\right)=4x^2\left(1+\frac{7}{4x}-\frac{3}{4x^2}\right)\longrightarrow 4\infty^2\left(1+\frac{7}{4\infty}-\frac{3}{4\infty^2}\right)=4\infty^2\left(1+0-0\right)=\infty\cdot 1=\infty$
4. $x^3\left(\frac{x^3}{x^3}-\frac{3x^2}{x^3}-\frac{4x}{x^3}+\frac{6}{x^3}\right)=x^3\left(1-\frac{3}{x}-\frac{4}{x^2}+\frac{6}{x^3}\right)\longrightarrow \infty^3\left(1-\frac{3}{\infty}-\frac{4}{\infty^2}+\frac{6}{\infty^3}\right)=\infty^3\left(1-0-0+0\right)=\infty\cdot 1=\infty$
5. $3x^2\left(\frac{3x^2}{3x^2}-\frac{4x}{3x^2}-\frac{5}{3x^2}\right)=3x^2\left(1-\frac{4}{3x}-\frac{5}{3x^2}\right)\longrightarrow 3\infty^2\left(1-\frac{4}{3\infty}-\frac{5}{3\infty^2}\right)=3\infty^2\left(1-0-0\right)=\infty\cdot 1=\infty$
6. $x^3\left(\frac{x^3}{x^3}+\frac{5x^2}{x^3}+\frac{4x}{x^3}-\frac{2}{x^3}\right)=x^3\left(1+\frac{5}{x}+\frac{4}{x^2}-\frac{2}{x^3}\right)\longrightarrow \infty^3\left(1+\frac{5}{\infty}+\frac{4}{\infty^2}-\frac{2}{\infty^3}\right)=\infty^3\left(1+0+0-0\right)=\infty\cdot 1=\infty$
7. $6x^2\left(\frac{6x^2}{6x^2}+\frac{5x}{6x^2}+\frac{7}{6x^2}\right)=6x^2\left(1+\frac{5}{6x}+\frac{7}{6x^2}\right)\longrightarrow 6\infty^2\left(1+\frac{5}{6\infty}+\frac{7}{6\infty^2}\right)=6\infty^2\left(1+0+0\right)=\infty\cdot 1=\infty$
8. $2x^3\left(\frac{2x^3}{2x^3}+\frac{5x^2}{2x^3}+\frac{3x}{2x^3}\right)=2x^3\left(1+\frac{5}{2x}+\frac{3}{2x^2}\right)\longrightarrow 2\infty^3\left(1+\frac{5}{2\infty}+\frac{3}{2\infty^2}\right)=2\infty^3\left(1+0+0\right)=\infty\cdot 1=\infty$
9. $8x^2\left(\frac{8x^2}{8x^2}-\frac{5x}{8x^2}-\frac{3}{8x^2}\right)=8x^2\left(1-\frac{5}{8x}-\frac{3}{8x^2}\right)\longrightarrow 8\infty^2\left(1-\frac{5}{8\infty}-\frac{3}{8\infty^2}\right)=8\infty^2\left(1-0-0\right)=\infty\cdot 1=\infty$
10. $3x^3\left(\frac{3x^3}{3x^3}+\frac{4x^2}{3x^3}-\frac{4}{3x^3}\right)=3x^3\left(1+\frac{4}{3x}-\frac{4}{3x^3}\right)\longrightarrow 3\infty^3\left(1+\frac{4}{3\infty}-\frac{4}{3\infty^3}\right)=3\infty^3\left(1+0-0\right)=\infty\cdot 1=\infty$
11. $9x^2\left(\frac{9x^2}{9x^2}-\frac{4x}{9x^2}-\frac{8}{9x^2}\right)=9x^2\left(1-\frac{4}{9x}-\frac{8}{9x^2}\right)\longrightarrow 9\infty^2\left(1-\frac{4}{9\infty}-\frac{8}{9\infty^2}\right)=9\infty^2\left(1-0-0\right)=\infty\cdot 1=\infty$
12. $5x^3\left(\frac{5x^3}{5x^3}-\frac{4x}{5x^3}-\frac{6}{5x^3}\right)=5x^3\left(1-\frac{4}{5x^2}-\frac{6}{5x^3}\right)\longrightarrow 5\infty^3\left(1-\frac{4}{5\infty^2}-\frac{6}{5\infty^3}\right)=5\infty^3\left(1-0-0\right)=\infty\cdot 1=\infty$