10/1/2019

15 $\lim_{x \to -\infty} \frac{x+2}{\sqrt{4x^2+1}} = \frac{-\infty}{+\infty}$ F.I.

$$\lim_{x \to -\infty} \frac{x+2}{\sqrt{4x^2+1}} = \lim_{x \to -\infty} \frac{x\left(1+\frac{2}{x}\right)}{\sqrt{x^2\left(4+\frac{1}{x^2}\right)}} = \lim_{x \to -\infty} \frac{x\left(1+\frac{2}{x}\right)}{|x|\sqrt{4+\frac{1}{x^2}}} =$$

$$= \lim_{x \to -\infty} \frac{\cancel{x}\left(1+\overset{\nearrow 0}{\frac{2}{x}}\right)}{-\cancel{x}\sqrt{4+\underset{\searrow 0}{\frac{1}{x^2}}}} = \frac{1}{-\sqrt{4}} = \boxed{-\frac{1}{2}}$$

16 $\lim_{x \to 2} \frac{x^3-x^2-2x}{x^3-6x^2+12x-8} = \frac{8-4-4}{8-24+24-8} = \frac{0}{0}$ F.I.

$$\lim_{x \to 2} \frac{x(x^2-x-2)}{(x-2)^3} = \lim_{x \to 2} \frac{x(x+1)\cancel{(x-2)}}{(x-2)^{\cancel{3}\,2}} = \frac{2 \cdot 3}{0^+} =$$

$$= \frac{6}{0^+} = \boxed{+\infty}$$

$$\boxed{(A-B)^3 = A^3 - 3A^2B + 3AB^2 - B^3}$$

612 $y = \frac{x-3}{2+x}$ $[x = -2, y = 1]$

ASINTOTI VERTICALI

DOMINIO $\Rightarrow$ $x \neq -2$ $D = (-\infty, -2) \cup (-2, +\infty)$

La retta $x = -2$ è ASINTOTO VERTICALE, infatti $\lim_{x \to -2} \frac{x-3}{2+x} = \infty$

$$\left[\lim_{x \to -2^-} \frac{x-3}{2+x} = \frac{-5}{0^-} = +\infty \right]$$

ASINTOTI OBLIQUI

Per $x \to +\infty$

$$\boxed{y = mx + q \text{ È ASINTOTO OBLIQUO} \iff m = \lim_{x \to +\infty} \frac{f(x)}{x} \quad q = \lim_{x \to +\infty} [f(x) - mx]}$$

$$\lim_{x \to +\infty} \frac{\frac{x-3}{2+x}}{x} = \lim_{x \to +\infty} \frac{x-3}{x(2+x)} = \lim_{x \to +\infty} \frac{x-3}{2x+x^2} = \lim_{x \to +\infty} \frac{\cancel{x}\left(1 - \frac{3}{x}\right)}{x^{\cancel{2}}\left(\frac{2}{x} + 1\right)} =$$

$$= \boxed{0 = m}$$

$$\lim_{x \to +\infty} \left[\frac{x-3}{2+x} - 0 \cdot x \right] = \lim_{x \to +\infty} \frac{x-3}{2+x} = \boxed{1 = q}$$

ASINTOTO OBLIQUO PER $x \to +\infty$ $y = 0 \cdot x + 1$,

CIOÈ $\boxed{y = 1}$ ASINTOTO ORIZZONTALE

Per $x \to -\infty$ SI HANNO GLI STESSI CALCOLI, QUINDI

$\boxed{y = 1}$ È ASINTOTO ORIZZONTALE (OBLIQUO) ANCHE PER $x \to -\infty$