LIMITES

a) $\lim\limits_{x\to 2}\dfrac{x^2+3x-10}{x^2-4x+4}=\dfrac{0}{0}=\lim\limits_{x\to 2}\dfrac{(x-2)(x+5)}{(x-2)^2}=\lim\limits_{x\to 2}\dfrac{x+5}{x-2}=\dfrac{7}{0}$

$$\left.\begin{array}{l}\lim\limits_{x\to 2^-}\dfrac{x+5}{x-2}=\dfrac{+}{-}=-\infty\\ \lim\limits_{x\to 2^+}\dfrac{x+5}{x-2}=\dfrac{+}{+}=+\infty\end{array}\right\}\nexists$$

b) $\lim\limits_{x\to -1}\dfrac{x+2}{x^2+2x+1}=\dfrac{1}{0}=\lim\limits_{x\to -1}\dfrac{x+2}{(x+1)^2}$

$$\left.\begin{array}{l}\lim\limits_{x\to -1^-}\dfrac{x+2}{(x+1)^2}=\dfrac{+}{+}=+\infty\\ \lim\limits_{x\to -1^+}\dfrac{x+2}{(x+1)^2}=\dfrac{+}{+}=+\infty\end{array}\right\}\lim\limits_{x\to -1}\dfrac{x+2}{x^2+2x+1}=+\infty$$

c) $\lim\limits_{x\to -\infty}\dfrac{-2x^2-5x+3}{x-2}=\dfrac{\infty}{\infty}=+\infty$ ya que el grado del numerador es mayor que el del denominador, y teniendo en cuenta los signos de los coeficientes líderes de los polinomios

d) $\lim\limits_{x\to -1}\left(\dfrac{x}{x^2-1}-\dfrac{x+5}{x^2-x-2}\right)=\infty-\infty=\lim\limits_{x\to -1}\left(\dfrac{x}{(x+1)(x-1)}-\dfrac{x+5}{(x+1)(x-2)}\right)=$

$$\lim\limits_{x\to -1}\frac{x(x-2)-(x+5)(x-1)}{(x+1)(x-1)(x-2)}=\lim\limits_{x\to -1}\frac{x^2-2x-x^2-4x+5}{(x+1)(x-1)(x-2)}=\lim\limits_{x\to -1}\frac{-6x+5}{(x+1)(x-1)(x-2)}=\frac{11}{0}$$

$$\left.\begin{array}{l}\lim\limits_{x\to -1^-}\dfrac{-6x+5}{(x+1)(x-1)(x-2)}=\dfrac{+}{-}=-\infty\\ \lim\limits_{x\to -1^+}\dfrac{-6x+5}{(x+1)(x-1)(x-2)}=\dfrac{+}{+}=+\infty\end{array}\right\}\nexists$$

e) $\lim\limits_{n\to\infty}\left(\sqrt{9n^2-1}-\sqrt{n^2+n}\right)=\infty-\infty=\lim\limits_{n\to\infty}\dfrac{\left(\sqrt{9n^2-1}-\sqrt{n^2+n}\right)\left(\sqrt{9n^2-1}+\sqrt{n^2+n}\right)}{\sqrt{9n^2-1}+\sqrt{n^2+n}}=$

$$=\lim\limits_{n\to\infty}\frac{9n^2-1-n^2-n}{\sqrt{9n^2-1}+\sqrt{n^2+n}}=\lim\limits_{n\to\infty}\frac{8n^2-n-1}{\sqrt{9n^2-1}+\sqrt{n^2+n}}=\infty$$