Deberes: 79 e) f) g) h) y 82 a) b)

**79** Determina el valor de los siguientes límites.

a) $\lim\limits_{x\to 4} \dfrac{x^2-16}{\sqrt{2x+1}-3}$

b) $\lim\limits_{x\to +\infty} \dfrac{5x+5}{8x-\sqrt{9x^2+1}}$

c) $\lim\limits_{x\to 4} \dfrac{1-\sqrt{x-3}}{x^2-16}$

d) $\lim\limits_{x\to -1} \dfrac{1-x^2}{\sqrt{x+1}}$

e) $\lim\limits_{x\to 0} \dfrac{\sqrt{1-x}-\sqrt{1+x}}{x}$

f) $\lim\limits_{x\to 2} \dfrac{\sqrt{x+2}-2}{\sqrt{2x+5}-3}$

g) $\lim\limits_{x\to -3} \dfrac{\sqrt{13-4x}-\sqrt{28+x}}{\sqrt{x+3}}$

h) $\lim\limits_{x\to 2} \left(\dfrac{1}{\sqrt{x-2}}\cdot\dfrac{\sqrt{x^2-4}}{x}\right)$

e) $$\lim_{x\to 0}\frac{\sqrt{1-x}-\sqrt{1+x}}{x}=\lim_{x\to 0}\frac{(\sqrt{1-x}-\sqrt{1+x})\cdot(\sqrt{1-x}+\sqrt{1+x})}{x\cdot(\sqrt{1-x}+\sqrt{1+x})}=\lim_{x\to 0}\frac{(\sqrt{1-x})^2-(\sqrt{1+x})^2}{x\cdot(\sqrt{1-x}+\sqrt{1+x})}=$$

$$\lim_{x\to 0}\frac{1-x-1-x}{x\cdot(\sqrt{1-x}+\sqrt{1+x})}=\lim_{x\to 0}\frac{-2x}{x\cdot(\sqrt{1-x}+\sqrt{1+x})}=\lim_{x\to 0}\frac{-2}{\sqrt{1-x}+\sqrt{1+x}}=\frac{-2}{\sqrt{1-0}+\sqrt{1+0}}=-1$$

f) $$\lim_{x\to 2}\frac{\sqrt{x+2}-2}{\sqrt{2x+5}-3}=\lim_{x\to 2}\frac{(\sqrt{x+2}-2)\cdot(\sqrt{x+2}+2)}{(\sqrt{2x+5}-3)\cdot(\sqrt{x+2}+2)}=\lim_{x\to 2}\frac{(\sqrt{x+2})^2-2^2}{(\sqrt{2x+5}-3)\cdot(\sqrt{x+2}+2)}=$$

$$\lim_{x\to 2}\frac{(x-2)}{(\sqrt{2x+5}-3)\cdot(\sqrt{x+2}+2)}=\frac{0}{0}$$

$$\lim_{x\to 2}\frac{(x-2)}{(\sqrt{2x+5}-3)\cdot(\sqrt{x+2}+2)}=\lim_{x\to 2}\frac{(x-2)\cdot(\sqrt{2x+5}+3)}{(\sqrt{2x+5}-3)\cdot(\sqrt{x+2}+2)\cdot(\sqrt{2x+5}+3)}=$$

$$\lim_{x\to 2}\frac{(x-2)\cdot(\sqrt{2x+5}+3)}{(2x-4)\cdot(\sqrt{x+2}+2)}=\lim_{x\to 2}\frac{(x-2)\cdot(\sqrt{2x+5}+3)}{2(x-2)\cdot(\sqrt{x+2}+2)}=\frac{\sqrt{2\cdot 2+5}+3}{2\cdot(\sqrt{2+2}+2)}=\frac{3+3}{2\cdot 4}=\frac{3}{4}$$

g) $$\lim_{x\to -3}\frac{\sqrt{13-4x}-\sqrt{28+x}}{\sqrt{x+3}}=$$

$$=\lim_{x\to -3}\frac{-5(x+3)}{\sqrt{x+3}(\sqrt{13-4x}+\sqrt{28+x})}=$$

$$=\lim_{x\to -3}\frac{-5(x+3)\sqrt{x+3}}{(x+3)(\sqrt{13-4x}+\sqrt{28+x})}=$$

$$=\lim_{x\to -3}\frac{-5\sqrt{x+3}}{\sqrt{13-4x}+\sqrt{28+x}}=0$$

h) $\lim_{x\to 2}\left(\frac{1}{\sqrt{x-2}}\cdot\frac{\sqrt{x^2-4}}{x}\right)=$

$= \lim_{x\to 2}\frac{\sqrt{x+2}\sqrt{x-2}}{x\sqrt{x-2}} = \qquad = \lim_{x\to 2}\left(\frac{\sqrt{x+2}}{x}\right) = 1$

**82** Obtén los resultados de estos límites.

a) $\lim_{x\to 0}\frac{\sqrt{x}}{\sqrt[3]{x}}$ c) $\lim_{x\to 2}\frac{\sqrt{x-2}}{\sqrt[3]{x^2-3x+2}}$ e) $\lim_{x\to 4}\frac{\sqrt{x}-2}{x-4}$

b) $\lim_{x\to 0}\frac{\sqrt[3]{x}}{\sqrt{x}}$ d) $\lim_{x\to 2}\frac{\sqrt{x}-2}{x-4}$ f) $\lim_{x\to 9}\frac{x-9}{\sqrt{x}-3}$

a) $\lim_{x\to 0}\frac{\sqrt{x}}{\sqrt[3]{x}} = \lim_{x\to 0}\sqrt[6]{x} = 0$

b) $\lim_{x\to 0}\frac{\sqrt[3]{x}}{\sqrt{x}} = \lim_{x\to 0}\frac{1}{\sqrt[6]{x}} = \frac{1}{0} = \infty \to$

$\to \left.\begin{array}{l}\lim_{x\to 0^-}\frac{1}{\sqrt[6]{x}} \to \text{No hay.}\\ \lim_{x\to 0^+}\frac{1}{\sqrt[6]{x}} = +\infty\end{array}\right\} \to \text{No existe } \lim_{x\to 0}\frac{1}{\sqrt[6]{x}}.$

c) $\lim_{x\to 2}\frac{\sqrt{x-2}}{\sqrt[3]{x^2-3x+2}} =$

$= \lim_{x\to 2}\frac{\sqrt{x-2}}{\sqrt[3]{(x-2)(x-1)}} =$

$= \lim_{x\to 2}\frac{\sqrt[6]{x-2}}{\sqrt[3]{x-1}} = 0$

d) $\lim_{x\to 2}\frac{\sqrt{x}-2}{x-4} = -\frac{\sqrt{2}-2}{2}$

e) $\lim_{x\to 4}\frac{\sqrt{x}-2}{x-4} = \lim_{x\to 4}\frac{x-4}{(x-4)(\sqrt{x}+2)} =$

$= \lim_{x\to 4}\frac{1}{\sqrt{x}+2} = \frac{1}{4}$