

**Problema 1** Calcular los siguientes límites:

$$1. \lim_{x \rightarrow -\infty} \frac{-3x^5 + 2x^2 - 1}{2x^3 - x - 1} = -\infty$$

$$2. \lim_{x \rightarrow \infty} (\sqrt{x^2 + 1} - \sqrt{x - 1}) = \infty$$

$$3. \lim_{x \rightarrow \infty} \left( \frac{2x - 1}{2x + 2} \right)^{\frac{3x-1}{2}} = e^{-9/4}$$

$$4. \lim_{x \rightarrow -\infty} \left( \frac{2x + 1}{x} \right)^{x^2-1} = +\infty$$

$$5. \lim_{x \rightarrow \infty} \left( \frac{5x + 6}{10x - 1} \right)^{\frac{x+1}{2}} = 0$$

$$6. \lim_{x \rightarrow 2} \frac{\sqrt{x-1} - \sqrt{x^2-3}}{x-2} = -\frac{3}{2}$$

$$7. \lim_{x \rightarrow 1} \frac{x^7 - 1}{x^5 - 1} = \frac{7}{5}$$

$$8. \lim_{x \rightarrow \infty} (\sqrt{x} - \sqrt{x-1}) = 0$$

$$9. \lim_{x \rightarrow 0} \frac{\ln \cos x}{\ln(1 + \sin x)} = 0$$

$$10. \lim_{x \rightarrow 1} \frac{\ln x^2}{\cos(\frac{\pi}{2}x)} = -\frac{4}{\pi}$$

$$11. \lim_{x \rightarrow \infty} \frac{e^{x-1}}{\ln x} = \infty$$

$$12. \lim_{x \rightarrow 0} \left( \frac{x}{x^2 - 1} - \frac{1}{x + 1} \right) = -1$$

$$13. \lim_{x \rightarrow 0} \frac{\ln(1 + \sin^2 x)}{\ln(1 + \tan x)} = 0$$

$$14. \lim_{x \rightarrow 0} \frac{e^{2x} - 1}{\sin x} = 2$$

$$15. \lim_{x \rightarrow \pi} \frac{\ln(2 + \cos x)}{\sin x} = 0$$

$$16. \lim_{x \rightarrow 5} \frac{\sqrt{2x-1} - 3}{\sqrt{3x+10} - x} = -\frac{10}{21}$$

$$17. \lim_{x \rightarrow 1} \frac{\tan(x^2 - 1)}{x - \sin\left(\frac{\pi}{2}x\right)} = 2$$

$$18. \lim_{x \rightarrow \infty} \frac{3x^2 + x - 1}{x^3 + 2} = 0$$

$$19. \lim_{x \rightarrow \infty} \left( \frac{3x^2 + x - 1}{2x^2 - 1} \right)^{3x} = \infty$$

$$20. \lim_{x \rightarrow \infty} \frac{e^{3x}}{1 + x^2} = \infty$$