

**Problema 1** Calcular los siguientes límites:

1.  $\lim_{x \rightarrow 0} (\cos 2x)^{1/x^2} = e^{-2}$
2.  $\lim_{x \rightarrow \infty} \frac{x - \arctan x}{x^2 + 1} = 0$
3.  $\lim_{x \rightarrow \infty} \left( \frac{x}{\sqrt{x^2 + 1}} - \frac{3x}{\sqrt{2x^2 + x - 1}} \right) = -\frac{1}{2}$
4.  $\lim_{x \rightarrow \infty} \left( \frac{3x + 1}{3x} \right)^{x+1} = e^{1/3}$
5.  $\lim_{x \rightarrow 1} \frac{\sqrt{2x-1} - \sqrt{x}}{2 - \sqrt{4x}} = -\frac{1}{2}$
6.  $\lim_{x \rightarrow 3} \frac{\sqrt{12-3x} - \sqrt{x}}{x-3} = -\frac{2\sqrt{3}}{3}$
7.  $\lim_{x \rightarrow 0} \frac{x \sin x}{\sin 2x} = 1$
8.  $\lim_{x \rightarrow \infty} \frac{\arctan x + x^2}{x^2 + 1} = 1$
9.  $\lim_{x \rightarrow 0} \left( \frac{1}{x} - \frac{1}{\sin x} \right) = 0$
10.  $\lim_{x \rightarrow \infty} \left( \sqrt{x+7} - \sqrt{x} \right) \sqrt{3x+5} = \frac{7\sqrt{3}}{2}$