

Calcular los siguientes límites:

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

2. $\lim_{x \rightarrow 1} \frac{\ln x^3}{x^2 - 1}$

3. $\lim_{x \rightarrow 0} \frac{e^x - e^{-x}}{5 \sin x}$

4. $\lim_{x \rightarrow 0} \left(\frac{1}{\ln(1+x)} - \frac{1}{x}\right)$

5. $\lim_{x \rightarrow 1} \frac{\sqrt{x} - \sqrt{2x-1}}{x-1}$

6. $\lim_{x \rightarrow 2} \frac{x^2 + 5x - 14}{x^2 + x - 6}$

7. $\lim_{x \rightarrow \infty} \left(\frac{4x-5}{4x-1}\right)^{2x+1}$

8. $\lim_{x \rightarrow \infty} \left(\sqrt{2x^2 - x + 1} - \sqrt{2x^2 + 3}\right)$

9. $\lim_{x \rightarrow 0} \frac{\sin(2x)}{2x - \sin x}$

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

Solución:

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

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

3. $\lim_{x \rightarrow 0} \frac{e^x - e^{-x}}{5 \sin x} = \frac{2}{5}$

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

5. $\lim_{x \rightarrow 1} \frac{\sqrt{x} - \sqrt{2x-1}}{x-1} = -\frac{1}{2}$
6. $\lim_{x \rightarrow 2} \frac{x^2 + 5x - 14}{x^2 + x - 6} = \frac{9}{5}$
7. $\lim_{x \rightarrow \infty} \left(\frac{4x-5}{4x-1} \right)^{2x+1} = e^{-2}$
8. $\lim_{x \rightarrow \infty} \left(\sqrt{2x^2 - x + 1} - \sqrt{2x^2 + 3} \right) = -\frac{\sqrt{2}}{4}$
9. $\lim_{x \rightarrow 0} \frac{\sin(2x)}{2x - \sin x} = 2$
10. $\lim_{x \rightarrow \infty} \frac{\sqrt{2x^2 + 5}}{3x - 2} = \frac{\sqrt{2}}{3}$