

Limites con determinación ($-\infty, -\infty$)

$$1) \lim_{x \rightarrow \infty} \frac{x^2}{x-3} - x$$

$$\frac{x^2 - x(x-3)}{(x-3)} = \frac{x^2 - x^2 + 3x}{x-3} =$$

$$\frac{3x}{x-3} = 3$$

$$2) \lim_{x \rightarrow \infty} \sqrt{x+2} - \sqrt{x-2}$$

$$\sqrt{x+2} - \sqrt{x-2} \cdot \frac{(\sqrt{x+2} + \sqrt{x-2})}{(\sqrt{x+2} + \sqrt{x-2})}$$

$$\frac{(\sqrt{x+2} - \sqrt{x-2})(\sqrt{x+2} + \sqrt{x-2})}{\sqrt{x+2} + \sqrt{x-2}}$$

$$\frac{(x+2) - (x-2)}{\sqrt{x+2} - \sqrt{x-2}} = \frac{x+2 - x+2}{\sqrt{x+2} + \sqrt{x-2}}$$

4

$$\frac{\sqrt{x+2} + \sqrt{x-2}}{\infty} = 0$$

$$3) \sqrt{x^2 - 2x + x}$$

$$\lim_{x \rightarrow \infty} \frac{(\sqrt{x^2 - 2x + x})}{(\sqrt{x^2 - 2x + x})}$$

$$\frac{(\sqrt{x^2 - 2x + x})^2 - x^2}{(\sqrt{x^2 - 2x + x})} = \frac{x^2 - 2x - x^2}{\sqrt{x^2 - 2x + x}}$$

$$\frac{-2x}{\sqrt{x^2 - 2x + x}}$$

$$\lim_{x \rightarrow \infty} \frac{-2x}{\sqrt{x^2 - 2x + x}} = \frac{-\infty}{\infty} = \frac{-2}{2} = -1$$

$$4) \frac{x^2 - 2x}{x + 1} - x \frac{x^2 - 2x}{x + 1} + \frac{(x + 1)(x)}{(x + 1)(x + 1)}$$

$$\frac{x^2 - 2x + (x + 1)(-x)}{x + 1}$$

$$\frac{x^2 - 2x - (x + 1)x}{x + 1} \quad \frac{x^2 - 2x - x^2 - x}{x + 1}$$

$$\frac{-2x - x}{x + 1} = \frac{-3}{x + 1} = \frac{-3}{1 + 1} = \frac{-3}{2} = -1.5$$

$$5) \lim_{x \rightarrow \infty} \sqrt{x^2 + x + 4} - \sqrt{x^2 - x}$$

$$(\sqrt{x^2 + x + 4} - \sqrt{x^2 - x}) \left(\frac{\sqrt{x^2 + x + 4} + \sqrt{x^2 - x}}{\sqrt{x^2 + x + 4} + \sqrt{x^2 - x}} \right)$$

$$\frac{(\sqrt{x^2 + x + 4})^2 - (\sqrt{x^2 - x})^2}{\sqrt{x^2 + x + 4} + \sqrt{x^2 - x}}$$

$$\frac{(x^2 + x + 4) - (x^2 - x)}{\sqrt{x^2 + x + 4} + \sqrt{x^2 - x}}$$

$$\frac{2x + 4}{\sqrt{x^2 + x + 4} + \sqrt{x^2 - x}} = \frac{-\infty}{\infty}$$

\downarrow \downarrow \downarrow
 x $x^{1/2}$ $x^{1/2}$

$$\frac{2}{\sqrt{1} + \sqrt{1}} = \frac{2}{2} = 1$$

$$6) \lim_{x \rightarrow \infty} \sqrt{2x^2+3x-2} - \sqrt{2x^2+1}$$

$$(\sqrt{2x^2+3x-2} - \sqrt{2x^2+1}) \cdot \left(\frac{\sqrt{2x^2+3x-2} + \sqrt{2x^2+1}}{\sqrt{2x^2+3x-2} + \sqrt{2x^2+1}} \right)$$

$$\lim_{x \rightarrow \infty} \sqrt{2x^2+3x-2} - \sqrt{2x^2+1}$$

$$\lim_{x \rightarrow \infty} \frac{\sqrt{2x^2+3x-2} - \sqrt{2x^2+1}}{\sqrt{2x^2+3x-2} + \sqrt{2x^2+1}}$$

$$\lim_{x \rightarrow \infty} \frac{3x-3}{\sqrt{2x^2+3x-2} + \sqrt{2x^2+1}}$$

$$\lim_{x \rightarrow \infty} \frac{3}{\sqrt{2} + \sqrt{2}} = \frac{3}{2}$$