

Problema 1 Calcular los siguientes límites:

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

$$2. \lim_{x \rightarrow 1} \frac{3x^3 - 2x - 1}{x^3 - 4x + 3}$$

$$3. \lim_{x \rightarrow 2} \frac{\sqrt{3x^2 + 4} - \sqrt{8x}}{x - 2}$$

$$4. \lim_{x \rightarrow \infty} \frac{e^{x^2 - 1}}{5x + 8}$$

$$5. \lim_{x \rightarrow \infty} \frac{e^{x+5} + 1}{e^{x+5} - 1}$$

$$6. \lim_{x \rightarrow 0} \frac{\sin^2 x + x}{x \cos x}$$

Solución:

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

$$2. \lim_{x \rightarrow 1} \frac{3x^3 - 2x - 1}{x^3 - 4x + 3} = -7$$

$$3. \lim_{x \rightarrow 2} \frac{\sqrt{3x^2 + 4} - \sqrt{8x}}{x - 2} = \frac{1}{2}$$

$$4. \lim_{x \rightarrow \infty} \frac{e^{x^2 - 1}}{5x + 8} = \infty$$

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

$$6. \lim_{x \rightarrow 0} \frac{\sin^2 x + x}{x \cos x} = 1$$

Solución:

Problema 2 Calcular las siguientes integrales:

$$1. \int x(x^2 + 8)^{10} dx$$

$$2. \int 5xe^{7x^2+1} dx$$

$$3. \int x^2 \ln(x+8) dx$$

$$4. \int (x+1)e^x dx$$

$$5. \int \frac{x^3-1}{x^2-x-6} dx$$

Solución:

$$1. \int x(x^2+8)^{10} dx = \frac{(x^2+8)^{11}}{11} + C$$

$$2. \int 5xe^{7x^2+1} dx = \frac{5}{14}e^{7x^2+1} + C$$

$$3. \int x^2 \ln(x+8) dx = \frac{3(x^3+512) \ln|x+8| - x^3 + 12x^2 - 192x}{9} + C$$

$$4. \int (x+1)e^x dx = xe^x + C$$

$$5. \int \frac{x^3-1}{x^2-x-6} dx = \frac{x^2}{2} + x + \frac{3}{5} \ln|x+2| + \frac{26}{5} \ln|x-3| + C$$