

**Problema 1** Calcular los siguientes límites:

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

**Solución:**

1.  $\lim_{x \rightarrow 0} (1 - 3x)^{2/(3x)} = e^{-2}$
2.  $\lim_{x \rightarrow \infty} \left( \frac{x^2 + 2x - 1}{x^2 + 3} \right)^{5x} = e^{10}$
3.  $\lim_{x \rightarrow \infty} (\sqrt{7x^2 - 5x + 2} - \sqrt{7x^2 + 2x - 1}) = -\frac{\sqrt{7}}{2}$
4.  $\lim_{x \rightarrow 9} \frac{\sqrt{x^2 - 2} - \sqrt{8x + 7}}{x - 9} = \frac{5\sqrt{79}}{79}$
5.  $\lim_{x \rightarrow 0} \frac{\cos 3x - e^{5x}}{xe^{3x}} = -5$

**Problema 2** Calcular las siguientes integrales:

1.  $\int (2x - 3)e^x dx$
2.  $\int 9xe^{2x^2+5} dx$
3.  $\int e^x \cos(3x) dx$
4.  $\int 5x^2(2x^3 - 3)^{12} dx$

$$5. \int \frac{6x}{7x^2 - 2} dx$$

**Solución:**

$$1. \int (2x - 3)e^x dx = e^x(2x - 5) + C$$

$$2. \int 9xe^{2x^2+5} dx = \frac{9}{4}e^{2x^2+5} + C$$

$$3. \int e^x \cos(3x) dx = e^x \left( \frac{\cos(3x) + 3 \sin(3x)}{10} \right) + C$$

$$4. \int 5x^2(2x^3 - 3)^{12} dx = \frac{5(2x^3 - 3)^{13}}{78} + C$$

$$5. \int \frac{6x}{7x^2 - 2} dx = \frac{3}{7} \ln |7x^2 - 2| + C$$

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