

Evaluación en Aula 4 (EA4)

Cálculo de una variable, 2025-1

Apellidos:

Nombres:

Sección:

Duración: **25 minutos**

Resolver las siguientes integrales:

1. (5.0 puntos)

$$\int x^2 (\sqrt{x} + 2) dx$$

$$\begin{aligned} \int x^2 (x^{1/2} + 2) dx &= \int x^{5/2} + 2x^2 dx = \frac{x^{7/2}}{7/2} + \frac{2x^3}{3} + C \\ &= \frac{2}{7} x^{7/2} + \frac{2}{3} x^3 + C \end{aligned}$$

2. (5.0 puntos)

$$\int (x^2 + 1) \sqrt{x^3 + 3x} dx$$

M. Sustitución :

$$\begin{aligned} x^3 + 3x &= u \\ (3x^2 + 3) dx &= du \\ 3(x^2 + 1) dx &= du \\ (x^2 + 1) dx &= \frac{du}{3} \end{aligned}$$

$$\begin{aligned} \hookrightarrow \int (x^2 + 1) \sqrt{x^3 + 3x} dx &= \int \sqrt{u} \frac{du}{3} = \frac{1}{3} \int u^{1/2} du = \frac{1}{3} \cdot \frac{2}{3} u^{3/2} + C \\ &= \frac{2}{9} (x^3 + 3x)^{3/2} + C \end{aligned}$$

3. (5.0 puntos)

$$\int (5x - 2) e^{2x} dx$$

M. por partes : $u = 5x - 2$ $e^{2x} dx = dv$
 $du = 5dx$ $\frac{e^{2x}}{2} = v$

$$\begin{aligned} \hookrightarrow \int (5x - 2) e^{2x} dx &= (5x - 2) \frac{e^{2x}}{2} - \int \frac{e^{2x}}{2} \cdot 5 dx \\ &= (5x - 2) \frac{e^{2x}}{2} - \frac{5}{2} \cdot \frac{e^{2x}}{2} + C \\ &= (5x - 2) \frac{e^{2x}}{2} - \frac{5}{4} e^{2x} + C = 5x \frac{e^{2x}}{2} - \frac{9}{4} e^{2x} + C \end{aligned}$$

4. (5.0 puntos)

$$\int \frac{2}{x^2 - 3x - 28} dx$$

$$\int \frac{2}{x^2 - 3x - 28} dx = \int \frac{2}{(x - 7)(x + 4)} dx$$

Expresamos en fracciones parciales:

$$\frac{2}{(x - 7)(x + 4)} = \frac{A}{x - 7} + \frac{B}{x + 4} = \frac{(x + 4)A + (x - 7)B}{(x - 7)(x + 4)}$$

$$\hookrightarrow 2 = (x + 4)A + (x - 7)B$$

Damos valores a x : $x = -4 \rightarrow 2 = -11B \rightarrow B = -2/11$

$$x = 7 \rightarrow 2 = 11A \rightarrow A = 2/11$$

$$\int \frac{2}{(x - 7)(x + 4)} dx = \frac{2}{11} \int \frac{1}{x - 7} dx - \frac{2}{11} \int \frac{1}{x + 4} dx = \frac{2}{11} \ln|x - 7| - \frac{2}{11} \ln|x + 4| + C$$