
3.2 Consideramos la función $f(x) = \frac{3x^2 + 4x + 2}{x^3 + 2x^2 + x}$.

(a) Resuelve la integral $\int f(x)dx$.

(b) Calcula la primitiva F de la función f que cumple la condición $F(1) = \ln 2$.

SOLUCIÓN:

$$(a) \frac{3x^2 + 4x + 2}{x^3 + 2x^2 + x} = \frac{2}{x} + \frac{1}{x+1} - \frac{1}{(x+1)^2}$$

$$\int \frac{3x^2 + 4x + 2}{x^3 + 2x^2 + x} dx = \int \frac{2}{x} dx + \int \frac{1}{x+1} dx - \int \frac{1}{(x+1)^2} dx = 2 \ln x + \ln(x+1) + \frac{1}{x+1} + K =$$

$$= \ln x^2(x+1) + \frac{1}{x+1} + K$$

$$(b) F(1) = \ln 2 + \frac{1}{2} + K = \ln 2 \implies K = -\frac{1}{2} \implies F(x) = \ln x^2(x+1) + \frac{1}{x+1} - \frac{1}{2}$$
