

Corrección Control 3ª Evaluación - Matemáticas I.  
1º Bachillerato Ciencias - 23-05-2018

$$1) \int \left( x^3 - \frac{3}{x} + \frac{2}{\cos^2 x} - e^x \right) dx = \frac{x^4}{4} - 3 \ln|x| + 2 \tan x - e^x + K$$

$$2) \int \left( \frac{\sqrt{x}}{\sqrt{x}} - \frac{2x^3}{\sqrt{x}} + \frac{x}{\sqrt{x}} \right) dx = \int (1 - 2x^{5/2} + x^{1/2}) dx = x - 2 \frac{x^{7/2}}{7/2} + \frac{x^{3/2}}{3/2} + K$$

$$= x - \frac{4x^3 \sqrt{x}}{7} + \frac{2x \sqrt{x}}{3} + K$$

$$3) \int \left( \frac{\sin x}{\cos x} - 3^{2x+1} + \sin(3x-1) \right) dx = -\ln|\cos x| - \frac{3^{2x+1}}{2 \ln 3} - \frac{\cos(3x-1)}{3} + K$$

$$4) \int 3x e^{x^2-2} dx = \int 3x e^{t} \frac{dt}{2x} = \frac{3}{2} \int e^t dt = \frac{3}{2} e^t + K = \frac{3}{2} e^{x^2-2} + K$$

$t = x^2 - 2$   
 $dt = 2x dx \rightarrow dx = \frac{dt}{2x}$

$$5) I = \int \cos x e^{2x} dx = \sin x e^{2x} - 2 \int e^{2x} \sin x dx$$

$u = e^{2x} \rightarrow du = 2e^{2x} dx \mid u = e^{2x} \rightarrow du = 2e^{2x} dx$   
 $dv = \cos x dx \rightarrow v = \sin x \mid dv = \sin x dx \rightarrow v = -\cos x$

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$$I = \sin x e^{2x} - 2[-\cos x e^{2x} + 2I] \rightarrow 5I = e^{2x}(\sin x + 2\cos x)$$

$$I = \frac{e^{2x}}{5} (\sin x + 2\cos x)$$

$$6) \int (x^2 + 3x - 1) \ln x dx = \left( \frac{x^3}{3} + \frac{3x^2}{2} - x \right) \ln x - \int \left( \frac{x^2}{3} + \frac{3x}{2} - 1 \right) dx$$

$u = \ln x \rightarrow du = \frac{1}{x} dx$   
 $dv = (x^2 + 3x - 1) dx \rightarrow v = \frac{x^3}{3} + \frac{3x^2}{2} - x$

$$I = \left( \frac{x^3}{3} + \frac{3x^2}{2} - x \right) \ln x - \left( \frac{x^3}{9} + \frac{3x^2}{4} - x \right) + K$$

$$\textcircled{7} \int (6x-3)\sqrt{2x^2-2x+3} dx = \int 3(2x-1) t \frac{tdt}{2x-1} = 3 \int t^2 dt = t^3 + K$$

$$t^2 = 2x^2 - 2x + 3$$

$$2t dt = (4x-2) dx \rightarrow dx = \frac{tdt}{2x-1}$$

$$= \left( \sqrt{2x^2 - 2x + 3} \right)^3 + K$$

$$\textcircled{8} \frac{3x^2 + 2x - 1}{-3x^2 + 3x} \cdot \frac{1}{3} \frac{x^2 - x}{3} \quad \int \frac{3x^2 + 2x - 1}{x^2 - x} dx = 3x + \int \frac{5x-1}{x(x-1)} dx$$

$$I = 3x + \int \left( \frac{A}{x} + \frac{B}{x-1} \right) dx = \boxed{3x + \ln|x| + 4\ln|x-1| + K}$$

$$5x-1 = A(x-1) + Bx$$

$$x=0 \rightarrow -1 = -A \rightarrow A=1$$

$$x=1 \rightarrow 4 = B$$

$$\textcircled{9} \int \frac{3x-5}{x^2+6x+10} = \frac{3}{2} \int \frac{\frac{2}{3}(3x-5)}{x^2+6x+10} dx = \frac{3}{2} \int \frac{2x+6 - \frac{10}{3} - 6}{x^2+6x+10} dx$$

$$= \frac{3}{2} \ln|x^2+6x+10| - \frac{3}{2} \left( \frac{-28}{3} \right) \int \frac{dx}{x^2+6x+10}$$

$$= \frac{3}{2} \ln|x^2+6x+10| + 14 \int \frac{dx}{1+(x+3)^2} = \boxed{\frac{3}{2} \ln|x^2+6x+10| + 14 \arctan(x+3) + K}$$

$$\textcircled{10} \int \frac{2(x-1)}{x(x-1)^2} dx = \int \frac{2}{x(x-1)} dx = \int \left( \frac{A}{x} + \frac{B}{x-1} \right) dx = \boxed{-2\ln|x| + 2\ln|x-1| + K}$$

$$2 = A(x-1) + Bx$$

$$x=1 \rightarrow 2 = B$$

$$x=0 \rightarrow 2 = -A$$