

Corrección control Integrales - 3º Evaluación - Matemáticas

U.55-1 1º Bach - Petras 22-05-2018

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

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

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

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

$$4) \int x e^{x^2-2} dx = \int x e^t \frac{dt}{2x} = \frac{1}{2} \int e^t dt = \frac{1}{2} e^t + k = \frac{1}{2} e^{x^2-2} + k$$

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

$$5) \int \frac{x}{2\sqrt{1+x^2}} dx = \int \frac{x}{2t} \frac{2t dt}{2x} = \int dt = 2t + k = 2\sqrt{1+x^2} + k$$

$t^2 = 1 + x^2$
 $2t dt = 2x dx \rightarrow dx = \frac{2t dt}{2x}$

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

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

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

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

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

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

$$= (\sqrt{2x^2-2x+3})^3 + k$$

$$\textcircled{8.} \int \frac{x}{x^2-1} dx = \frac{1}{2} \int \frac{2x}{x^2-1} dx = \frac{1}{2} \ln|x^2-1| + k$$

$$\textcircled{9.} \int \frac{2}{3x-1} dx = \frac{2}{3} \ln|3x-1| + k$$

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

$$\textcircled{11.} \begin{array}{r|rrr} 2 & 0 & -5 \\ -2 & -4 & 8 \\ \hline & 2 & -4 & 3 \end{array} \quad \int \frac{2x^2-5}{x+2} dx = x^2 - 4x + \int \frac{3}{x+2} dx = x^2 - 4x + 3 \ln|x+2| + k$$

Coeficiente = $2x-4$ resto 3

$$\textcircled{12.} \int \frac{x-1}{x(x-1)^2} dx = \int \frac{dx}{x(x-1)} = \int \left(\frac{A}{x} + \frac{B}{x-1} \right) dx = -\ln|x| + \ln|x-1| + k$$

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

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

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