# Correcció examen 5

- $\int 4x^3 - 2x^2 + 5x - 1 \; dx = x^4 - 2\frac{\mathrm{x}^3}{3} + 5\frac{x^2}{2} - x + C.$
- $\int (x^4 - \frac{3}{\mathrm{x}^5} + x - 8)$ dx=$\int(\mathrm{x}^4 - 3\mathrm{x}^{-5} + x - 8)$ dx= $\frac{\mathrm{x}^5}{5} - 3\frac{\mathrm{x}^{-4}}{-4} + \frac{x^2}{2} - 8x$+C= $\frac{\mathrm{x}^5}{5} + \frac{3}{4x^4} + \frac{x^2}{2} - 8x + C.$
- $\int (4x^3 + 8)^5 x^2 dx = \frac{1}{12} \int (4x^3 + 8)^5 12x^2 dx = \frac{(4x^3+8)^6}{72} + C.$
- $\int (2e^{\mathrm{x}} - 3)^{11} e^{\mathrm{x}} dx = \frac{1}{2} \int (2e^{\mathrm{x}} - 3)^{11} 2e^{\mathrm{x}} dx = \frac{(2\mathrm{e}^{\mathrm{x}}\text{-}3)^{12}}{24} + C.$
- $\int \frac{1}{\mathrm{x}\sqrt{(\mathrm{lnx}+4)}} dx = \int (\ln x + 4)^{-\frac{1}{2}} \frac{1}{\mathrm{x}} dx = \frac{(\ln x+4)^{-\frac{1}{2}}}{\frac{1}{2}} = 2\sqrt{\ln x + 4} + C.$
- $\int \frac{3\mathrm{sinx}}{8+2\cos x}$ dx=3$\int \frac{\mathrm{sinx}}{8+2\cos x} dx = 3(\frac{-1}{2}) \int \frac{-2\mathrm{sinx}}{8+2\cos x} dx = \frac{-3}{2} ln(8 + 2\cos x) + C.$
- $\int \frac{e^x}{7+5\mathrm{e}^x}$ dx=$\frac{1}{5} \int \frac{5e^x}{7+5\mathrm{e}^x}$ dx=$\frac{1}{5} ln(7 + 5e^x) + C.$
- $\int tag2xdx = \int \frac{\sin 2x}{\cos 2x} dx = -\frac{1}{2} \int \frac{-2\sin 2x}{\cos 2x} dx = -\frac{1}{2} \ln(\cos 2x) + C.$
- $\int e^{\cos^2 x} \sin x \cos x dx = \frac{-1}{2} \int e^{\cos^2 x} (-2) \sin x \cos x dx = \frac{-1}{2} e^{\cos^2 x} + C.$
- $\int e^{3\mathrm{x}\text{-}2} dx = \frac{1}{3} \int e^{3\mathrm{x}\text{-}2} \cdot 3dx = \frac{1}{3} \cdot e^{3\mathrm{x}\text{-}2} + C.$
- $\int \frac{3^x}{2^x} dx = \int (\frac{3}{2})^x dx = \frac{(\frac{3}{2})^x}{\ln(\frac{3}{2})} + C.$
- $\int \frac{4^{2tagx}}{\cos^2 x} dx = \frac{1}{2} \int \frac{4^{2tagx}}{\cos^2 x} \cdot 2dx = \frac{1}{2} \frac{4^{2tagx}}{\ln 4} + C.$
- $\int \sin(2{+}3\cos x)\cdot\mathrm{sinx}$ dx= $\frac{-1}{3} \int \sin(2{+}3\cos x)\cdot(\text{-}3)\mathrm{sinx}$ dx= $\frac{-1}{3} \cos(2{+}3\cos x) +$ $C.$
- $\int \frac{\cos(2\mathrm{lnx}+1)}{x}$ dx=$\frac{1}{2} \int 2\cdot\frac{\cos(2\mathrm{lnx}+1)}{x} \; dx = 2\sin(2lnx + 1) + C.$
- $\int \frac{x^2}{\cos^2(x^3+2)} dx = \frac{1}{3} \int \frac{3x^2}{\cos^2(x^3+2)} dx = \frac{1}{3} tag(x^3 + 2) + C.$
- $\int \frac{\mathrm{x \; dx}}{\sqrt{1\text{-}\mathrm{x}^4}} = \frac{1}{2} \int \frac{2\mathrm{x \; dx}}{\sqrt{1\text{-}(\mathrm{x}^2)^2}} = \frac{1}{2} \cdot arcsin(x^2) + C.$
- $\int \frac{1}{x(1+\ln^2 x)} dx = arctag(\ln x) + C$
- $\int \frac{2 \; \mathrm{dx}}{\sqrt{3\text{-}2\mathrm{x}^2}} = \frac{2}{\sqrt{3}} \int \frac{1 \; \mathrm{dx}}{\sqrt{1\text{-}(\sqrt{\frac{2}{3}}\mathrm{x})^2}} = \frac{2}{\sqrt{3}} \sqrt{\frac{3}{2}} \int \frac{\sqrt{\frac{2}{3}} 1 \; \mathrm{dx}}{\sqrt{1\text{-}(\sqrt{\frac{2}{3}}\mathrm{x})^2}} = \frac{2}{\sqrt{2}} \arcsin(\sqrt{\frac{2}{3}} x) + C$
- $\int \frac{5}{2+4\mathrm{x}^2}$dx=$5\cdot\frac{1}{2} \int \frac{1}{1+(\sqrt{2}\mathrm{x})^2}$dx=$\frac{1}{2\sqrt{2}} \cdot \int \frac{\sqrt{2}}{1+(\sqrt{2}\mathrm{x})^2}$dx=$\frac{1}{2\sqrt{2}} \cdot arctag(\sqrt{2}x) + C.$

2.- *Troba una funció $f(x)$ la derivada de la qual sigui f'(x)=$x^3$-1 i tal que f(1)=3.*

- f(x)=$\int$ $x^3$-1dx= $\frac{x^4}{4} - x$+C. Per tant totes les funcions del món tals que f'(x)=$x^3 - 1$ són de la forma f(x)=$\frac{x^4}{4} - x$+C i nosaltres en busquem una tal que f(1)=3. Per tant $\frac{1^4}{4} - 1$+C=3$\rightarrow$ c=3+$\frac{3}{4} = \frac{15}{4} \rightarrow$ f(x)=$\frac{x^4}{4} - x$+$\frac{15}{4}$.