Clase Auxiliar 9

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Ejercicios

P1 Calcule:

- $\displaystyle\int \frac{xdx}{\sqrt{x^2+1+(\sqrt{x^2+1})^3}}$
- $\displaystyle\int_0^4 \frac{dx}{\sqrt{2x^{\frac{3}{2}}-x^2}}$ *Indicación :* use el cambio de variable $x = u^2$

P2 Calcule:

- $\displaystyle J = \int_{-2a}^{2a} x\sqrt{4a^2-x^2}dx - \int_0^{2a} x\sqrt{a^2-(x-a)^2}dx$
- Demostrar que: $(m+1)I_{m,n} + nI_{m+1,n-1} = 2^n$ dado

$$I_{m,n} = \int_0^1 x^n(1+x)^m dx$$

P3 Calcular $\displaystyle I = \int \frac{a_1sen^2(x)+2b_1sen(x)cos(x)+c_1cos^2(x)}{asen(x)+bcos(x)}$ Para lo cual:

- Demostrar que

$$I = Asen(x)+Bcos(x)+C\int \frac{dx}{asen(x)+bcos(x)}$$

- Calcular $\displaystyle\int \frac{dx}{asen(x)+bcos(x)}$

P4

- Sea f integrable en $[a,b]$. Demostrar que $\exists x \in [a,b]$ tal que:

$$\int_a^x f(t)dt = \int_x^b f(t)dt$$

- Sea $\displaystyle G(x) = \int_0^x \frac{sen(t)}{t}dt$, demostrar:

$$1 + \int_0^{\pi/2} G(x)dx = \frac{\pi}{2}\int_0^{\pi/2} \frac{sen(t)}{t}dt$$

- $\forall \alpha \in (-\pi,\pi), \alpha \neq 0$ probar que
  - $\displaystyle I(\alpha) = \int_0^1 \frac{dx}{1+2xcos(\alpha)+x^2} = \frac{\alpha}{2sen(\alpha)}$