- **Clase 6** **3/11/2020**

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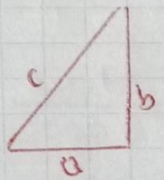
Plan

- Reposo
- Integrales trigonometricos
- Tarea.

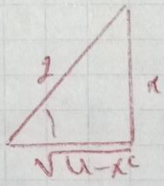
Integrales Trigonometricos

- No se desarrollan de manera directa
- No es un cambio de variable
- No es por partes



$c^2 = a^2 + b^2$

$\int \sqrt{4-x^2}\, dx$



$a = 2$
$b = x$

$c^2 = 4$
$b^2 = x^2$

$a = \sqrt{4-x^2}$

- Encontrando la relación entre c y A

$$\cos\theta = \frac{\sqrt{4-x^2}}{2}$$

$$2\cos\theta = \sqrt{4-x^2}$$

- Encontrando la relación entre c y b

$$\operatorname{sen}\theta = \frac{x}{2} \qquad dx = 2\cos\theta$$

$$2\operatorname{sen}\theta = x \qquad dx = 2\cos\theta\, d\theta$$

reemplazando queda.

$$\int 2\cos\theta\,[2\cos\theta]\, d\theta$$

$u\int \cos^2 \theta \, d\theta$ usando la identidad

$u \cos^2 \theta = \frac{1+\cos(2\theta)}{2}$

$u\int \frac{1+\cos(2\theta)}{2} d\theta \cdot 2\int 1+\cos(2\theta) d\theta$

$2\left(\theta + \frac{\text{sen } 2\theta}{2}\right)+c$

$2\left(\text{sen}^{-1}\left(\frac{x}{2}\right)+\text{sen}\frac{(2\theta)}{2}\right)+c$

$2\left(\text{sen}^{-1}\left(\frac{x}{2}\right)+2 \text{ sen}(\theta)\cos(\theta)\right]$

$2\left[\text{sen}^{-1}\left(\frac{x}{2}\right)+\frac{x}{2} \frac{\sqrt{u-x^{-1}}}{1}\right]+c$

$2\left[\text{sen}^{-1}\left(\frac{x}{2}\right) \frac{x\sqrt{u-x^{-5}}}{u}\right]+c$

$2\left[\text{sen}^{-1}\left[\frac{x}{2}\right]\left(1+\frac{1}{2}\sqrt{u-x^2}\right)\right]$ //

$\int \frac{\sqrt{9-x^2}}{x^2}$

$\cos\theta = \sqrt{u-x^2}$

$\cos\theta = \frac{\sqrt{u-x^2}}{3}$ $\quad \frac{dx}{d\theta} = 3\,\text{sen}\,\theta$

$\text{sen}\,\theta = \frac{x}{3}$ $\quad dx = 3\cos\theta \, d\theta$

$x = 3\,\text{sen}\,\theta$ $\quad x^2 = 9\,\text{sen}^2\theta$

$\int \frac{3\cos\theta}{x^2}[3\cos\theta \, d\theta]$

$\int \frac{u\cos^2\theta}{u\,\text{sen}^2\theta} d\theta \cdot c \int \cot^2\theta \, d\theta$

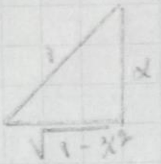
$\cot^2\theta = -1 = \csc^2(\theta)$ $\quad \cot = \frac{\sqrt{u-x^2}}{x}$

$\int^{-1} d_{0}' \int \csc^2(\theta)$ $\qquad \theta = \text{sen}^{-1}\left(\frac{x}{3}\right.$

$-\theta - \cot(\theta) + C \qquad \text{sen}^{-1}\left(\frac{x}{3}\right) + \frac{\sqrt{9-x^2}}{x}$

TAREA

$\int \frac{x^2}{\sqrt{1-x^2}}$



$A = x^5$

$b = \sqrt{1-x}$

$1 = 1$

$\sec\theta = 1 \qquad \frac{dx}{d\theta} = \cos\theta\ d$

$\cos\theta = \sqrt{1-x^2}$

$dx \cdot \cos\theta\, d\theta$

$\text{sen}\,\theta = x^2$

$\int \frac{\text{sen}^2\theta}{\cos\theta} \cdot \cos\theta\, d\theta$

$\int \text{sen}^2\theta\, d\theta = \text{sen}^2\theta = \frac{1-\cos(2\theta)}{2}$

$\int \frac{1}{2} \cos(0)\, d_0 = \frac{1}{2} \int 1 - \cos(2\theta)$

$\frac{1}{2}\left(9 - \sec(\theta)\right.$

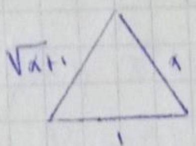
$\frac{1}{2}\left[\text{sen}^{-1}(x)\ \frac{1}{2}\,\text{sen}^{1}\ \text{sen}^{-1}(x)\right]$

17/11/2020

Plan

Ejercicios

1) $\int \frac{x}{\sqrt{x+1}}\,dx$



$c^2 = a^2 + b^2$

$z = x+1$

$z^2 = x+1$

$x = z^2 - 1$

$dx = 2z\,dz$

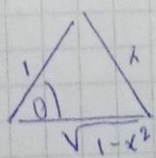
$\int \frac{z^2 - x}{\sqrt{z}}\, 2z\,dz$

$\int \frac{z^2 - 1}{\cancel{z}}\, 2\cancel{z}\,dz$

$2\int (z^2 - 1)\,dz$

$2\left(\frac{z^3}{3} - z\right) + c$

2) $\int x \cdot \sqrt{1 - x^2}\,dx$



$\cos(\theta) = \frac{\frac{1}{\sqrt{1-x^2}}}{1}$

$\cos(\theta) = \sqrt{1 - x^2}$

$sen(\theta) = x$

$\frac{dx}{d\theta} = \cos(\theta)$

$dx = \cos(\theta)$

$\int sen(\theta)\cos^2(\theta)\,d\theta$

$\int sen(\theta)\left(\frac{1 + \cos(2x)}{2}\right)$

$\int \frac{sen(\theta)}{2} + \frac{sen(\theta)\cos(2\theta)}{2}$

3) $\int x \cdot \sqrt{1-x^2}\, dx$

$z^2 = 1 - x^2$ 	$1 - z^2$

$x^2 = z - 1$ 	$dx = \frac{-2}{\sqrt{1-z^2}} dz$

$x^2 = 1 - z^2$

$x = \sqrt{1-z^2}$

$dx = \frac{2}{\sqrt{1-z^2}} dz$

$\frac{(\sqrt{1-z^2})^3}{3}$

TAREA

1) $\int \frac{e^x}{\sqrt{1-e^{2x}}} dx$ 	$e^x = u$ 	$e^{2x} = (e^x)^2 \cdot u(u)^2$

$du = e^x dx$

$\int \frac{u}{\sqrt{1-e^{2x}}}$ 	$dx = \frac{du}{e^x}$ 	$e^x = u$

$\int \frac{\cancel{u}}{\sqrt{1-u^2}} \cdot \frac{1}{u} du$

$\int \frac{1}{\sqrt{1-u^2}} du$ 	$\int \frac{1}{\sqrt{1-u^2}} du = \text{arc sen}(u)$

$\text{arc sen}(u) \cdot \text{arc sen}(u^x)$

2) $\int \frac{\cos(x)}{2 \cdot 3\,\text{sen}(x)} dx$ 	$2 - 3\,\text{sen}\,x = u$

$du = -3\cos(x)\, dx$

$\int \frac{\cos(x)}{u} - \frac{1}{3\cos u} du$ 	$dx = \frac{du}{-3\cos(x)}$

$\int -\frac{1}{3u} du$

$-\frac{1}{3}\int \frac{1}{u} du : \frac{1}{3} \ln(u) + u$

$-\frac{1}{3} \ln = -3\,\text{sen}(x) + 1$

3) $\int sen^3(x) \cos^4(x)\, dx$

$sen^3(x) = sen\, u \quad sen(x)$

$sen^3(x) = 1 - \cos(x)(sen\, u)$

$\int (1 - \cos^2(x))\, sen(1) \cdot \cos^4(x) \quad dx$

$\cos(x) = u \qquad du = -sen\, u\, dx \,.\; dx = \frac{du}{-sen\, x}$

$\int (1 - u^2)\, sen(\cdot u^2 \quad \frac{du}{-sen(x)}$

$\int (1 - u^2) \cdot u^4 \cdot -du$

$\int -u^4 \cdot (1 - 3^2)\, du \,.\; \int -u^4 + u^6\, du$

$\frac{-u^5}{9} + \frac{u^7}{7} + 1 \;:\; \frac{-(\cos(x))^5}{5} + \frac{(\cos(x))^7}{7} + C$