UNIVERSIDAD DEL BÍO-BÍO
FACULTAD DE CIENCIAS
DEPARTAMENTO DE MATEMÁTICA
Cálculo Integral - 220181
Semestre I, 2020

GUÍA 3: INTEGRACIÓN TRIGONOMÉTRICA

Calcule las siguientes integrales trigonométricas.

1. $\displaystyle\int \tan^5(x)\sec^2(x)dx$

2. $\displaystyle\int \operatorname{sen}^2(x)\cos^2(x)dx$

3. $\displaystyle\int \sec^2(x)\tan(x)dx$

4. $\displaystyle\int \operatorname{sen}^4(x)dx$

5. $\displaystyle\int \tan^2(x)dx$

6. $\displaystyle\int \cos^5(x)dx$

7. $\displaystyle\int \operatorname{sen}^3(x)\cos^2(x)dx$

8. $\displaystyle\int \operatorname{sen}^2(\pi x)\cos^5(\pi x)dx$

9. $\displaystyle\int \frac{\operatorname{sen}^3(\sqrt{x})}{\sqrt{x}}dx$

10. $\displaystyle\int \left(1+\cos^2(\theta)\right)^2 d\theta$

11. $\displaystyle\int \frac{\cos^5(\alpha)}{\sqrt{\operatorname{sen}(\alpha)}}d\alpha$

12. $\displaystyle\int \cos(\theta)\cos^5(\operatorname{sen}(\theta))d\theta$

Calcule las siguientes integrales usando la substitución trigonométrica sugerida.

1. $\displaystyle\int \frac{1}{x^2\sqrt{x^2-9}}\,dx, \quad x = 3\sec(\theta)$

2. $\displaystyle\int x^3\sqrt{9-x^2}\,dx, \quad x = 3\operatorname{sen}(\theta)$

3. $\displaystyle\int \frac{x^3}{\sqrt{x^2+9}}\,dx, \quad x = 3\tan(\theta)$

4. $\displaystyle\int \frac{1}{\sqrt{x^2-49}}\,dx, \quad x = 7\sec(\theta)$

Calcule las siguientes integrales usando la substitución más conveniente.

1. $\displaystyle\int \frac{1}{x^2\sqrt{25-x^2}}\,dx$
2. $\displaystyle\int \frac{1}{\sqrt{x^2+16}}\,dx$
3. $\displaystyle\int \sqrt{1-4x^2}\,dx$
4. $\displaystyle\int \frac{\sqrt{x^2-9}}{x^3}\,dx$
5. $\displaystyle\int \frac{x}{\sqrt{x^2-7}}\,dx$
6. $\displaystyle\int x\sqrt{x^2+4}\,dx$

Identidades trigonométricas útiles.

- $\operatorname{sen}^2(x)+\cos^2(x)=1$
- $\sec^2(x)=1+\tan^2(x)$
- $\operatorname{sen}^2(x)=\dfrac{1-\cos(2x)}{2}$
- $\cos^2(x)=\dfrac{1+\cos(2x)}{2}$
- $\dfrac{d}{dx}\sec(x)=\sec(x)\tan(x)$
- $\dfrac{d}{dx}\tan(x)=\sec^2(x)$
- $\displaystyle\int \tan(x)dx=\ln|\sec(x)|+C$
- $\displaystyle\int \sec(x)dx=\ln|\sec(x)+\tan(x)|+C$
- $\operatorname{sen}(x)\cos(y)=\frac{1}{2}\big(\operatorname{sen}(x-y)+\operatorname{sen}(x+y)\big)$
- $\operatorname{sen}(x)\operatorname{sen}(y)=\frac{1}{2}\big(\cos(x-y)-\cos(x+y)\big)$
- $\cos(x)\cos(y)=\frac{1}{2}\big(\cos(x-y)+\cos(x+y)\big)$

JES/MOP/RVA/rva
13 de mayo de 2020