Questao 3

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$$\int \frac{dx}{(5-4x-x^2)^{5/2}}$$

reescrever o $5-4x-x^2 \Rightarrow -(x^2+4x-5)$

$$-(x^2+4x+2^2-2^2-5)$$

$$-((x+2)^2-9)$$

$$-(x+2)^2+9 = 5-4x-x^2$$

$a^2+2ab+b^2$

$x^2+2.x.2+2^2$

$2=b$

$$\int \frac{dx}{(-(x+2)^2+9)^{5/2}} =$$

$2+x = v$

$2+x\,dx = dv$

$dx = 1\,dv$

$$\int \frac{dv}{(-v^2+9)^{5/2}} =$$

$$\int \frac{3\cdot\cos\theta\, d\theta}{(-(3\,\mathrm{sen}(\theta))^2+9)^{5/2}}$$

$a=3$ pois $3^2=9$

$b=1$

$\frac{\sqrt{u}}{v_u}.\,\mathrm{sen}(\theta)$

$v = a\,\mathrm{sen}(\theta) \Rightarrow$ $v = 3\,\mathrm{sen}(\theta)$

$dv = 3.\cos(\theta)$

$$\int \frac{3.\cos\theta}{(-(9.\mathrm{sen}^2\theta)+9)^{5/2}}\,d\theta$$

$$\int \frac{3.\cos\theta}{(-9\,\mathrm{sen}^2\theta+9)^{5/2}}\,d\theta =$$

$\mathrm{sen}^2\theta+\cos^2\theta = 1$

$\mathrm{sen}^2\theta = 1-\cos^2\theta$

$\mathrm{sen}^2\theta-1 = -\cos^2\theta$

$$\int \frac{3\cos\theta\, d\theta}{(-9(\mathrm{sen}^2\theta-1))^{5/2}} =$$

$$\int \frac{3\cos\theta\, d\theta}{(-9.-\cos^2\theta)^{5/2}} =$$

$$\int \frac{3 \cdot \cos\theta \, d\theta}{(3^2 \cos^2\theta)^{\frac{5}{2}}} =$$

$$\frac{5}{2} \cdot 2 = \frac{10}{2} = 5$$

$$\int \frac{3 \cdot \cos\theta \, d\theta}{3^5 \cdot \cos^5\theta} =$$

$$\int \frac{d\theta}{3^4 \cdot \cos^4\theta} =$$

$$\int \frac{1 \, d\theta}{81 \cdot \cos^4\theta} =$$

$$\frac{1}{81} \cdot \int \frac{d\theta}{\cos^4\theta} = \frac{1}{81} \int \sec^4\theta \, d\theta$$

$$\sec^2\theta = 1 + tg^2(\theta)$$

$$\frac{1}{81} \cdot \int \sec^2\theta \cdot \sec^2\theta \, d\theta$$

$$\frac{1}{81} \cdot \int (1 + tg^2\theta) \cdot \sec^2\theta \, d\theta =$$

$$a = tg\theta$$

$$da = \sec^2\theta \, d\theta$$

$$\frac{1}{81} \cdot \int 1 + a^2 \cdot da =$$

$$\frac{1}{81} \cdot \int 1 \, da + \frac{1}{81} \int a^2 \, da = \frac{1}{81} \cdot a + \frac{a^3}{3} \cdot \frac{1}{81} + c$$

$$\frac{1}{81} \left(a + \frac{a^3}{3} \right) + c = \frac{1}{3^4} \cdot \left(tg\theta + \frac{tg^3\theta}{3} \right) + c$$

$$\frac{1}{3^4} \cdot \left(\frac{x+2}{\sqrt{9-(x+2)^2}} + \frac{(x+2)^3}{3 \cdot \left(\sqrt{9-(x+2)^2}\right)^3} \right)$$

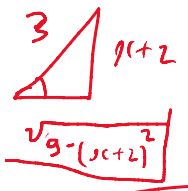
$$\left(\sqrt{x}\right)^3 = \left(x\right)^{\frac{1}{2}})^3 = x^{\frac{3}{2}}$$

$$\frac{1}{3^4}\cdot\left(\frac{x+2}{\sqrt{9-(x+2)^2}}+\frac{(x+2)^3}{3\left(9-(x+2)^2\right)^{3/2}}\right)+C$$

$\operatorname{sen}\theta=\frac{U}{3}$ & $U=x+2$

S = O/H C = A/H T = O/A

$\operatorname{sen}\theta=\frac{x+2}{3}$



$\operatorname{tg}\theta=\frac{x+2}{\sqrt{9-(x+2)^2}}$

Sabemos que

$9-(x+2)^2=5-4x-x^2$

$3^2=y^2+(x+2)^2$