S T Q Q S S D   __/__/__

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	a	b	c	d	e
1			X		
2				X	
3		X			

4) $\oint_C [F_1 + F_2]$, onde C é a curva $x^2 + y^2 = 1$, $z = 0$

-> Logo, Temos que $f(x,y,z) = (x,y,0)$

e $\vec{n} = (1,1,0)$

-> A fim de usar o Teorema de STOKES, o qual afirma que:

$$\oint_{\partial S} \vec{F} \cdot d\vec{r} = \iint_S \nabla \times \vec{F} \cdot \vec{n}_s \, dS$$

-> Aplicando este Teorema temos:

$$\oint_C [F_1 + F_2] = \oint_C F_1 + \oint_C F_2 = \iint_D rot\, F_1 \cdot \vec{n} + \iint_D rot\, F_2 \cdot \vec{n}$$

-> $rot\, F_1 = (0-0,\ 0-0,\ x-y) = (0,\ 0,\ x-y)$
$rot\, F_2 = (0-0,\ 0-0,\ z-z) = (0,\ 0,\ z-z)$

-> $rot\, F_1 \cdot \vec{n} = (0+0+0)$, Logo Temos: $0+0=0$
$rot\, F_2 \cdot \vec{n} = (0+0+0)$

-> $\oint [F_1 + F_2] = 0$ //

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5) $\iint_S F$

$\text{div}\, F = \nabla F$

$\text{div}\, F = \left(\frac{d}{dx}, \frac{d}{dy}, \frac{d}{dz}\right) \cdot (P, Q, R)$

→ Logo, temos que $\text{div}\, F = \left(\frac{dP}{dx} + \frac{dQ}{dy} + \frac{dR}{dz}\right)$

→ $F(x, y, z) = (e^{y^2+z^2}, x^2+y, z)$

(i) $e^{y^2+z^2}$, $(i)' = 0$ ⇝ derivada de constante

(ii) x^2+y, $(ii)' = 1$

(iii) z, $(iii) = 1$

→ Logo, $\text{div} = 0+1+1$, $\text{div} = 2$

→ $\iint_S F = \iiint_W \text{div}\, F = \iiint_W 2\, dx\, dy\, dz$

→ $\iiint_W 2r\, dr\, d\theta$

→ $z = -\sqrt{32 - x^2 - y^2}$, com $x = 4\cos(t)$ e $y = 4\sin(t)$

→ Logo, $z = -4$

5) Continuação

$$\Rightarrow \int_0^{2\pi}\int_0^{4}\int_4^{4} 2r \, dz \, dr \, d\theta = \int_0^{2\pi}\int_0^{4} 8r \, dr \, d\theta$$

$$\Rightarrow \int_0^{2\pi} 64 \, d\theta \Rightarrow 128\pi$$