Lesson 36 MAT201

Leader board

6)

$F = \langle -4x, y, 9z \rangle$

$\nabla \cdot F = 6.$

$\iint \nabla \cdot F =$ ~~Volume~~ $6 \left(\frac{4}{3} \pi (15^{1/2})^3 \right)$

$8\pi (15)^{3/2}$

7) ~~$\nabla F =$~~

$\nabla \cdot F = \langle 2+1, t, 1 \rangle = 4.$

$\therefore$

$\iint \nabla \cdot F = 4 \cdot \left(\frac{4}{3} \pi \right) = \frac{16\pi}{3}$

$216\pi^3$

8) $\nabla \cdot F = \langle -1, -1, 4 \rangle$

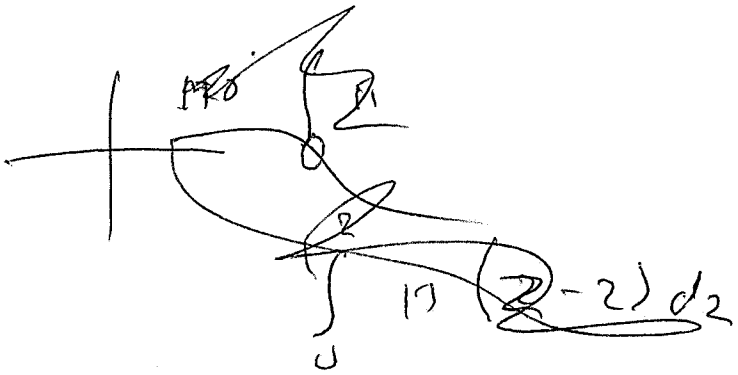
$-2 \cdot 216 = -432$

$\rightarrow -3 \cdot 216 = -648$

8) $\nabla \cdot F = \langle -4, 7, 0 \rangle = 5$

$\iint \nabla \cdot F = 5$

$5 \cdot \pi \cdot 1^2$



$\int_0^{2\pi} \pi (2-2)\, d2$

2π

$5 \int_0^{2\pi} \int_0^{\sqrt{2}} (2 - r^2)\, r\, dr\, d\theta$

$= \left(2r - \frac{r^3}{3}\right)_0^{\sqrt{2}} = \cos\left(2\sqrt{2} - \frac{2\sqrt{2}}{3}\right)$

$\cos\left(\frac{4\sqrt{2}}{3}\right) = \frac{\cos\sqrt{3}}{3}$

$V = \pi r^2 \quad r^2 = x^2 + y^2$

$= 2 - z^2$

$V = \int_0^2 \pi (2 - z)\, dz = \pi \int_0^2 (2 - z)\, dz = \pi \left[2z - \frac{z^2}{2}\right]_0^2$

$= \pi (4 - 2) = 2\pi$

$= \pi \left[\frac{z^2}{2} - 2z\right]_0^2$

$= \pi (2 - 4) = 2\pi$

$2\pi \times 5 = 10\pi$