	Aunt Debi 10 Homework #10
	Math 255 5/12/17 2/2 Excellent.
	5/12/17 Excellent!
	I I have the section of the Library of the transferred to the state of the section of the sectio
	5) F=(x-y, y-z, z-x) out of the unit sphere
	Sim (div F) dv
	PdivF=1+1+1=30 (0=200+0=4000 fore+0=2000 fore) 1 1 1 0 5=11
	SSSw 3 dv = 3SSw dv = 3.4T.R3 where R=1, the
	Tadius of unit sphere.
	ES Carlo Comment of the Comment of t
	7) F=(x, y, z) w/ the unit sphere.
	Saw F. ds = SSW (V. F) dv o) e 12 0 km b Drug a Talled =
	10 de la major So' So' (1+1+1) dV
	- Ca). (1). (1). (1) = 3 000 (10) - (10) = 3
	The take to the take the take to the take
	$ab)F=(y,z,xz), W: x^2+y^2 \le z \le 1, x \ge 0$
	Saw F. ds = SSW (dIVF) dv = SSW 0+0+ x dv
	$(x, y, z) \rightarrow (r\cos\theta, r\sin\theta, z)$ (cylindical)
	$= \int_{-T}^{2} \int_{0}^{2} \int_{r^{2}}^{r^{2}} cosO dz dr dO$
	= SI S' Zr2coso r2 drdo
	$=\int_{-\pi}^{\pi}\int_{0}^{\pi}\int_{r^{2}}^{r^{2}}\frac{r^{2}\cos\theta}{r^{2}}\frac{dr}{d\theta}$ $=\int_{-\pi}^{\pi}\int_{0}^{r^{2}}\frac{r^{2}\cos\theta}{r^{2}}\frac{dr}{d\theta}$ $=\int_{-\pi}^{\pi}\int_{0}^{r^{2}}\frac{zr^{2}\cos\theta}{r^{2}}\frac{dr}{d\theta}$
	= (5 coso (3-5)) do
	$=\int_{-T}^{2}\cos\phi\left(\frac{2}{15}\right)d\phi$
	= = = = COSODO
	La Crian = 2 SINO To La Company Company
	$= \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos \phi \left(\frac{r^{2}}{3} - \frac{r^{2}}{5}\right) _{0}^{2} d\phi$ $= \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos \phi \left(\frac{r^{2}}{3} - \frac{r^{2}}{5}\right) _{0}^{2} d\phi$ $= \frac{2}{15} \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos \phi d\phi _{0}^{\frac{\pi}{2}}$ $= \frac{2}{15} (1 - (-1)) = \frac{2}{15} \cdot 2 = \frac{4}{15}$
	Illudulette gotta life it a life de
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12) F= (3xy2, 3x2y, Z3), S is the surface of unit sphere
  Slaw F. ds = SSaw div F ds = SSaw 3y2+3x2+3z2dV
                 =3552w x2+y2+22dv
    (x, y, z) -> (psinocoso, psinosino, pcoso) (spherical)
=350 50 50 e2 [sin2 0 (cos20+sin20) + cos20] e2 sin $ ded do
   = 350 5 8 p2 (sin2 0 + cos2 0) p2 sin 0 dpd 0 do
   = 3 50 To 50 P2- P2 SIND dedddo
   =3 son son of pusing dedodo
   = 3 \int_{0}^{2\pi} \int_{0}^{\pi} \frac{1}{5} \sin \theta \int_{0}^{1} d\theta d\theta
= \frac{3}{5} \int_{0}^{2\pi} \int_{0}^{\pi} \sin \theta d\theta d\theta
= \frac{3}{5} \int_{0}^{2\pi} -\cos \theta \int_{0}^{\pi} d\theta
= \frac{3}{5} \int_{0}^{2\pi} -(-1) - (-1) d\theta
   = 6 52tt do = 6.2tt = 12T
(x, y, z) -> (rcoso, rsino, z) (cylindrical)
 SSW (x2+y2)2 dxdyd == 5050 50 (crcoso)2+(rsino)2)2. rdrdod =
         = \int_{0}^{1} \int_{0}^{2\pi} \int_{0}^{1} (r^{2})^{2} \cdot r dr do dz

= \int_{0}^{1} \int_{0}^{2\pi} \int_{0}^{1} r^{5} dr do dz

= \int_{0}^{1} \int_{0}^{2\pi} \frac{r^{6}}{6} \int_{0}^{1} do dz

= \int_{0}^{1} \int_{0}^{2\pi} \frac{r^{6}}{6} \int_{0}^{1} do dz
         = 6.2T.1 = T Obos
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17) Prove that SSWLRF). FAXdydz= SlawfF. nds-SSSwf V. Fdxdydz
    Vector identity: V. (fF) = Vf. F + fV. F
                        → Vf. F = V. (fF) - fV. F
  SSSw (Vf). Fdxdydz = SSSw V. (fF)dxdydz - SSw f V. Fdxdydz
                           JJW#(V.F)dxdydz
  ISIWLDF). Faxdydz= SSIWfF.nds-SSIWfV.Faxdydz
19) Show that ISSw (+2) dxdydz = Slaw (+2) ds, where
  r=(x,y, z). 2h(9xx)]] = n=v60))) = vh (9x)
   If F= \frac{r}{r^2}, then \(\nabla_F = \frac{1}{r^2}\). If (0,0,0) \(\psi_S \mathbb{Z}\), then follow
   Gauss's Theorem. If (0,0,0) & 52, compute the integral
   by deleting a small ball BE = {(x,y, 2) | (x2+y2+22)/2 < E}
  around the origin and letting E>0:

SSR r2 dv = 200 SSR r2 dv = E>0 So(2)
                                     = \frac{\lim_{\epsilon \to 0} \int_{\partial (\frac{R}{\epsilon})} \frac{r \cdot n}{r^2} dS}{\int_{\partial R} \frac{r \cdot n}{r^2} dS} = \frac{\lim_{\epsilon \to 0} \left( \iint_{\partial R} \frac{r \cdot n}{r^2} dS - \iint_{\partial R} \frac{r \cdot n}{r^2} dS \right)}{\int_{\partial R} \frac{r \cdot n}{r^2} dS}
21) a) Sow frg.nds= SSSw (fr2g+ Vf. Vg) dV
     Slaw frg. nds = SSSW frag)ds = SSSW r(frg)ds
    vector Identity: div (fF) = fdivF+F. Vf:
    IIIm V(+79) ds = IIIm (+7(79) +79.7+) dV
                   = [[[w (f 72g + vf. vg) dV
  b) [ Sow (frg-grf). nds = [ Sw (frg-gr2f) dv
   Sow (frg-grf).nds= SSSwdiv (frg-grf)ds
    vector Identity: V(frg-grf): fr2g-gr2f:
  SSSw div (frg-grf)ds = SSSw (fr2g-gr2f)ds
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24) Suppose F is tangent to the closed surface S= DW of a region w. Prove that SSSW (divF)dv=0

Gauss Theorem: SSSW (divF)dv = SSDW F·n ds

Since F is tangent to DW, F·n=0

: SSDW F·nds = SSW Ods = 0

28) SSS F·ds = SSW (V·F)dV

Let F = V×F: SISFAS = SIS(VXF)dS = SSSW (V·(VXF))dV Vector identity: V·(VXF)=0 SSS (V·V×F) dv=SSS Odv=O=SSS(V×F)ds Le Tad & Villar + vf. va + vf. va - vill well (a Dow (+ VO-9x+) ends= I [Judy (+ VO-9x+) ds Vector Lieuth Vefra-agt) = fva-agt :