$\iint_S F\cdot\vec{n}dS=\iint_R A(x,y)dxdy$ ，其中 $F=(F_x,F_y,F_z),\vec{n}=(-\frac{\partial f}{\partial x},-\frac{\partial f}{\partial y},1)$ ，

$A(x,y)=F\cdot\vec{n}=-F_x\cdot\frac{\partial f}{\partial x}-F_y\frac{\partial f}{\partial y}+F_z$

II–5 **In each of the following use Equation II–13 to evaluate the surface integral $\iint_s$ F · n dS.**

(a) $\mathbf{F}(x,y,z)=\mathbf{i}x-\mathbf{k}z$,
where S is the portion of the plane $x+y+2z=2$ in the first octant.

(b) $\mathbf{F}(x,y,z)=\mathbf{i}x+\mathbf{j}y+\mathbf{k}z$,
where S is the hemisphere $z=\sqrt{a^2-x^2-y^2}$

(c) $\mathbf{F}(x,y,z)=\mathbf{j}y+\mathbf{k}$,
where S is the portion of the paraboloid $z=1-x^2-y^2$ above the xy-plane.

(c) F=$(0,y,1),\vec{n}=(-\frac{\partial f}{\partial x},-\frac{\partial f}{\partial y},1)=(2x,2y,1)$

$\iint_S F\cdot\vec{n}dS=\iint_R (2y^2+1)dxdy$ ，let $x=r\cos\theta, y=r\sin\theta$ then

$=\int_0^{2\pi}\int_0^1(2r^2\sin^2\theta+1)rdrd\theta=\ldots=\frac{3\pi}{2}$