$\operatorname{div}\mathbf{F} = x + y + z$, so

$$\iiint_E \operatorname{div}\mathbf{F}\,dV = \int_0^{2\pi}\int_0^{8}\int_0^{4}(r\cos\theta + r\sin\theta + z)\,r\,dz\,dr\,d\theta$$
$$= \int_0^{2\pi}\int_0^{8} 4\left(r^2\cos\theta + r^2\sin\theta + \tfrac{4}{2}r\right)dr\,d\theta$$
$$= \int_0^{2\pi} 4\left(\tfrac{512}{3}\cos\theta + \tfrac{512}{3}\sin\theta + \tfrac{256}{4}\right)d\theta = \tfrac{1024}{4}(2\pi) = 512\pi$$

Let S_1 be the top of the cylinder, S_2 the bottom, and S_3 the vertical edge.

On S_1, $z = 4$, $\mathbf{n} = \mathbf{k}$, and $\mathbf{F} = xy\,\mathbf{i} + 4y\,\mathbf{j} + 4x\,\mathbf{k}$, so

$$\iint_{S_1}\mathbf{F}\cdot d\mathbf{S} = \iint_{S_1}\mathbf{F}\cdot\mathbf{n}\,dS = \iint_{S_1} 4x\,dS = \int_0^{2\pi}\int_0^{8} 4(r\cos\theta)\,r\,dr\,d\theta$$
$$= 4\left[\sin\theta\right]_0^{2\pi}\left[\tfrac{1}{3}r^3\right]_0^{8} = 0.$$

On S_2, $z = 0$, $\mathbf{n} = -\mathbf{k}$, and $\mathbf{F} = xy\,\mathbf{i}$ so $\iint_{S_2}\mathbf{F}\cdot d\mathbf{S} = \iint_{S_2} 0\,dS = 0$.

S_3 is given by $\mathbf{r}(\theta, z) = 8\cos\theta\,\mathbf{i} + 8\sin\theta\,\mathbf{j} + z\,\mathbf{k}$, $0 \le \theta \le 2\pi$, $0 \le z \le 4$.

Then $\mathbf{r}_\theta \times \mathbf{r}_z = 8\cos\theta\,\mathbf{i} + 8\sin\theta\,\mathbf{j}$ and

$$\iint_{S_3}\mathbf{F}\cdot d\mathbf{S} = \iint_D \mathbf{F}\cdot(\mathbf{r}_\theta\times\mathbf{r}_z)\,dA = \int_0^{2\pi}\int_0^{4}(64\cos^2\theta\sin\theta + 64z\sin^2\theta)\,dz\,d\theta$$
$$= \int_0^{2\pi}\left(512\cos^2\theta\sin\theta + \tfrac{1024}{2}\sin^2\theta\right)d\theta$$
$$= \left[-\tfrac{512}{3}\cos^3\theta + \tfrac{1024}{4}\left(\theta - \tfrac{1}{2}\sin 2\theta\right)\right]_0^{2\pi} = 512\pi$$

Thus $\iint_S \mathbf{F}\cdot d\mathbf{S} = 0 + 0 + 512\pi = 512\pi$.