$$\vec{F}=\left(18z+6y+cos^{2}\left(x^{2}\right)\right)\vec{i}+\left(sin^{2}\left(y\right)+5z\right)\vec{j}+(e^{z^{2}}+12y)\vec{k}$$

Let *C* be the circle of radius 7 in the plane *x* + *y* + *z* = 24, centered at (8, 8, 8) and oriented counterclockwise when viewed from the origin.

Find the exact value of *c* **·** *d*