수시퀴즈 4차

1. Let a surface S be defined by $F(x,y,z) = -9$ where $F(x,y,z) = x^4 + y^4 + z^4 - x^2y^2 - x^2z^2 - 2y^2z^2$. Note that $F(3,5,5) = -9$.

   Using the chain rule and the fact that $F(tx,ty,tz) = t^4 F(x,y,z)$, find the value of $3F_x(3,5,7) + 5F_y(3,5,7) + 7F_z(3,5,7)$.

2. Find the linear approximation of the function $f(x,y) = 1 - xy\cos\pi y$ at $(1,1)$ and use it to approximate $f(1.03,\, 0.98)$.