DIFFERENTIAL GEOMETRY 1, HOMEWORK 5 ADDENDUM

(1) Explicitly calculate the matrices of the first and second fundamental forms of the parametrized surface element $f(u,v) = (u, v, u^2 + v^2)$ (this parametrizes the *elliptic paraboloid* with equation $z = x^2 + y^2$).

(2) Prove that if the second fundamental form of a surface element $f \colon U \to \mathbb{R}^3$ is everywhere 0 then f maps into a (fixed) plane.

(3) For an oriented surface element f of class C^2 and an isometry A of $\mathbb{R}^3$, prove that f and $A \circ f$ have identical first and second fundamental forms.