MATH 101: GRADUATE LINEAR ALGEBRA
DAILY HOMEWORK #20

Problem 20.1. Let $R = \mathbb{R}[x, y, z]/(xy - z^2)$. Let $P = (\bar{x}, \bar{z})$ be the ideal generated by the images of x, z in R.

(a) Show that P is prime.

(b) Let R_P be the localization of R at P. Prove that $P^2 R_P \cap R = (\bar{x})$. Note that this ideal is *bigger* than P^2.