

HW4 , Math 531, Spring 2014

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QUESTION 1. YOU ARE ONLY ALLOWED TO USE ANYTHING from CLASS NOTES OR PREVIOUS HWs

Let I, J be ideals of a commutative ring R. SHOW

(a) $I + J$ is an ideal of R.

b. IJ and $I \cap J$ are ideals of R such that $IJ \subset I \cap J$.

c. Find two ideals I, J of a commutative ring R where $IJ \neq I \cap J$.

d. Suppose that $I \neq R$ and $|Z(R/I) \geq 2$. Show that I is not a prime ideal of R.

(ii) Let $R = Z[X]$. Show that $M = (5, x)$ is a maximal ideal of R. Let $A = R/M$. Find $|A|$ and $U(A)$.

(iii) Give me an example of a ring R and an ideal I of R such that I is contained in exactly 11 maximal ideals of R.

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