

MATH 440: Chapter 16 Write-Up Problems

Name:

Recall: When it's a disproof, you get an addition 2 bonus points for stating a true statement and proving it.

1. Prove or disprove: Let R be a ring with unity 1_R and S a nontrivial subring of R with unity 1_S . Prove or disprove that $1_R = 1_S$.
2. Prove or disprove: If $1_R = 0_R$ then $R = \{0\}$.
3. Consider the subring of matrices $R = \left\{ \begin{pmatrix} a & b \\ 2b & a \end{pmatrix} \mid a, b \in \mathbb{Z} \right\}$. Show that R is an integral domain. (You can assume that R is a ring with unity.)