

Assignment Twelve

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1 Section 6.3

1.1 Question One

$n = cd$ with some $1 < |c| < |n|$ and $1 < |d| < |n|$ since n is composite, so c and d are not multiples of n . Therefore as $cd \in (n)$ but $c \notin (n)$ and $d \notin (n)$ then (n) is not a prime ideal by definition.

1.2 Question Five

Both $\mathbb{Z}_6$ and $\mathbb{Z}_{12}$'s maximal ideals are (2) and (3)

1.3 Question Six

1.3.1 a

The only maximal ideal of $\mathbb{Z}_8$ is (2) since it is its prime divisor. Similarly, the only maximal ideal of $\mathbb{Z}_9$ is (3) .

1.3.2 b

In $\mathbb{Z}_{10}$ the maximal ideals are (2) and (5) , similarly for $\mathbb{Z}_{15}$: (3) and (5) .

1.4 Question Eight

Consider $(2) \cap (3)$ which generates (6) , and is not prime in $\mathbb{Z}$; $3 \cdot 2 \in (6)$ but $3 \notin (6)$ and $2 \notin (6)$.