1)Find all prime ideals. and maximall ideals of $Z_6, Z_2 \times Z_4$

2) Find all $c \in Z_3$ such that $Z_3[X] \,/\, \langle x^2 + c \rangle$ is a field .

3) show that N is a maximal ideal in a ring if and only if R/N is a simple ring .

4) let A and B be ideals of a commutative ring R . the quotient $A : B$ of A by B is defined by $A : B = \{r \in R : r\ b \in A\ for\ all\ b \in\ B\}$

show that $A : B$ is an ideal of R .

5) Find all *zero* divisors ,and a nonzero , idempotent and units , nilpotent element in $Z_3 \oplus Z_6$.

6) suppose that a and b belong to a commutitve ring . and ab is a *zero* divisor. Show that either a or$b$ is a *zero* divisor

7) Prove that $I = \langle 2 + 2i \rangle$ is not a prime ideal of $Z[i] \,/\, I$? what is the characteristic of $Z[i] \,/\, I$?

8) show that $Z_3[x] \,/\, \langle x^2 + x + 1 \rangle$ is not a field .

9) Prove that M is a maximal ideal in a ring R if and only if $\forall\ x \notin M\ \exists\ r \in R$ such $1 + r\ x \in M$.