Suppose that Z and W are two non-zero complex numbers. Can W·Z be zero?
Let Z=a+b***i*** and W=c+d***i*** Then ZW= ac-bd +(ad+bc) ***i*** .
Define: $|Z|=\sqrt{a^2+b^2}$ and note **|ZW| = |Z||W|**
which we prove as follows.

We use squares which saves us constantly writing radical signs. Then we just take square roots at the end.

$|ZW|^2 =$
$(ac-bd)^2 + (ad+bc)^2=$
$a^2c^2 - 2acbd + b^2d^2 +a^2d^2 + 2adbc + b^2c^2 =$
$a^2c^2 + b^2d^2 +a^2d^2 + b^2c^2 =$
$(a^2 + b^2) (c^2 + d^2) =$
$|Z|^2|W|^2$

Since the right hand side is positive, so is the left hand side.

The other item was to show that for integers a, b and c that if ab = a square and bc is a square then ac is a square. Proving this involves more work than I realized and I shouldn't have asked this question.