Use the method of proof by contradiction.

1. [4 points] Prove that $\sqrt{6}$ is irrational.
2. [4 points] If $a, b \in \mathbb{Z}$, then $a^2 - 4b - 2 \neq 0$.

3. [4 points] Suppose Suppose A≠ ∅. Since ∅ ⊆A×A, the set R= ∅ is a relation on A. Is R reflexive? Symmetric? Transitive? If a property does not hold, say why.

4. [4 points] Define a relation R on Z as xRy if and only if 4 | (x + 3y)

   Prove R is an equivalence relation.

   Describe its equivalence classes.