

Give a careful proof of the following statement. Use proof by contradiction.

PROPOSITION: For all $n \in \mathbb{Z}$, $n^2 + 2$ is not divisible by 4.

Some Suggestions:

1. At the beginning of proof you should say you are proving by contradiction. You should also provide a precise negation of the original proposition.
2. Conclude your proof by briefly explaining why the contradiction implies the original proposition is true.
3. Assume your audience is one of your classmates who has not done this assignment, but is familiar with the basic tools we have discussed in class. Leave out any details that will be obvious to them.
4. Reread your proof. Cross out anything which is not needed. (For example, omit any definitions which are not used.)
5. Make a final clean draft with a clear logical flow. Your final draft may be hand-written or typed.
6. Double space your final draft.