

## 5.2 Examples of Proof by Contradiction

Q: How to **prove**  $P \Rightarrow Q$  **by contradiction**?

A: We assume that  $P$  is true and  $Q$  is false for an arbitrary element in the set under consideration and attempt to show that, from these two assumptions, a contradiction is obtained.

Read Section 5.1.

R5.1 $\Rightarrow$  Ex5.2 Prove that there is no smallest positive irrational number.

$\langle Pf \rangle$ :

(5.2 cont.)

R5.2  $\Rightarrow$  Ex5.3 Prove that 199 cannot be written as the sum of an even integer and two odd integers.

*(Pf)*:

R5.3  $\Rightarrow$  Ex5.4 Use proof by contradiction to prove that if  $a$  and  $b$  are odd integers  $\Rightarrow 4 \nmid (a^2 + b^2)$ .

*(Pf)*: