

- 1 1. Show that the square of an even number is even using a direct proof.
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- 3 2. Prove or disprove that the product of two irrational numbers is irrational.
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- 5 3. Use a proof by contradiction to show there is no rational number r for which $r^3 + r + 1 = 0$.
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- 7 4. Use a proof by cases to show that $\min(a, \min(b, c)) = \min(\min(a, b), c)$ where $a, b,$
and c are real numbers.
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- 9 5. Write the numbers $1, 2, \dots, 2n$ on a blackboard, where n is an odd integer. Pick any
two numbers j and k , erase them, and write $|j-k|$ on the board. Continue this process
until only one integer remains on the board. Prove that this integer is odd.