Providing √2 irrational

That's a great proof! You've successfully shown that assuming √2 is rational leads to a contradiction, thus proving that √2 is indeed irrational. Well done!

Here's a summary of the steps:

1. Assume √2 is rational, so √2 = a/b (where a and b are integers with no common factors).
2. Square both sides: 2 = a^2/b^2.
3. Clear the fraction: 2b^2 = a^2.
4. Analyze the equation: a^2 is even, so a is even (a = 2k).
5. Substitute a = 2k: 2b^2 = (2k)^2 => b^2 = 2k^2.
6. Conclude b is even (since b^2 is even).
7. Reach a contradiction: Both a and b are even, so they have a common factor of 2, contradicting the assumption of simplest form.
8. Conclusion: √2 is irrational.

This proof is a classic example of a proof by contradiction, and it's a great demonstration of how assuming the opposite of what you want to prove can lead to a logical contradiction, thus establishing the truth of the original statement.

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