A case where we should contradict!

Theorem

$\sqrt{2}$ is irrational.

When we have been given almost nothing, let's go with contradiction, i.e.
Assume it's false and let 'er rip

Proof.

Let us assume that $\sqrt{2}$ is rational, then $\sqrt{2} = \frac{p}{q}$ for $p, q \in \mathbb{Z}$.
Assume that p, q have no common divisors (the fraction is in "reduced form").
By algebra, this gives $2q^2 = p^2$.
From this, we have p^2 is even (it is 2 * something).
From Corollary, this means p is even, or $p = 2k$ for some $k \in \mathbb{Z}$.
Plug back in, we get $2q^2 = 4k^2$ or $q^2 = 2k^2$.
Therefore q^2 is even and thus q is even.
Both p and q are even, but they cannot have a common divisor!
CONTRADICTION □