

## Exhaustive Proof

A proof by exhaustion is a proof by cases where every possibility (usually a small, finite number) is checked separately.

### Example

*Prove:* If the name of a month has 5 or more characters, then a 4-letter word can be formed using those characters.

*Proof:* All of the months of the year except May, June and July have 5 or more characters in their name. Looking at these one at a time we see that we can find a 4-letter word using the letters from each:

- |                    |      |
|--------------------|------|
| 1. January         | jury |
| 2. February        | ruby |
| 3. March           | harm |
| 4. April           | liar |
| <del>5. May</del>  |      |
| <del>6. June</del> |      |
| <del>7. July</del> |      |
| 8. August          | guts |
| 9. September       | best |
| 10. October        | root |
| 11. November       | robe |
| 12. December       | beer |