



Q: What is the minimum # of colors needed to "paint the globe" so that neighboring countries/regions don't have the same color.



Q What is a proof / why do we need proofs?

- evidence that sufficiently shows something to be true / untrue
- \* in this class: write to convince your classmates
- Starts w/ what is known / conditions of the stmt & work w/ definitions, known theorems & arrive at a new result.
- logical deduction from universal truths
- appeals to intuition, yet is complete.
- reads in sentence form

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[bitbucket.org/msu-cs](http://bitbucket.org/msu-cs)



# Notation

$\mathbb{Z}$  = the integers

$\mathbb{R}$  = the real numbers

$\mathbb{Q}$  = the rational #s =  $\left\{ \frac{a}{b} \mid a \in \mathbb{Z}, b \in \mathbb{Z}, b \neq 0 \right\}$

*Annotations:*  
"such that" (pointing to  $\mid$ )  
"is an elt. of" (pointing to  $\in$ )  
"the set of" (pointing to  $\{$ )

A set is an unordered collection of distinct objects / elements.

e.g.,  
the even numbers:  $\{x \in \mathbb{Z} \mid \exists k \in \mathbb{Z} \text{ s.t. } x = 2k\}$

*Annotation:* "there exists" (pointing to  $\exists$ )

↳ note: alt, we can say

even #s =  $\{x \in \mathbb{Z} \mid x \% 2 = 0\}$

*Annotations:*  
"mod" (pointing to  $\%$ )  
"these 2 def'ns are equiv." (pointing to both definitions)