1. (0 points but please DO IT) What is your name?

2. (15 points)

   (a) (8 points) Assume Alice and Bob are both students in Ramsey Theory. Assume that all of the students in Ramsey Theory obey the following rule:

   IF you're happy AND you know it THEN clap your hands.

   Alice IS clapping her hands. Bob IS NOT clapping his hands.

   What can you conclude about Alice? (If there is NOTHING you can conclude then state that.)

   What can you conclude about Bob? (If there is NOTHING you can conclude then state that.)

(b) (7 points) Fill in the BLANK so that the following is true:

In order for Carol to DISPROVE the statement:

All the cool kids know Python.

Carol needs to find a person who BLANK.

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3. (20 points) Let $k \equiv 4 \pmod 9$. Show that there is NO $x, y, z \in \mathbb{Z}$ such that

$$x^3 + y^3 + z^3 = k$$

(HINT: Look at the equation mod 9)

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4. (15 points) Let

$$A = \{(x, x^2) \colon x \in \mathsf{N}\}.$$

(So A has in it $\{(1, 1), (2, 4), (3, 9), (4, 16), \ldots\}$.)

Show that the following set is uncountable
The set of functions with domain N and co-domain A