Worksheet on Proof
Dr. Sarah's MAT 3610: Introduction to Geometry

goals:

- Proof Considerations
  I can write rigorous proofs in geometry, identify underlying assumptions, and understand limitations and applications.

- Geometric Perspectives
  I can compare and contrast multiple geometric perspectives.

Welcoming Environment: Keep it a safe place to express meaningful ideas and opinions. Actively listen to others and encourage everyone to participate. Part of the welcoming environment is to keep an open mind as you engage in our class activities, explore consensus and employ collective thinking across barriers. Maintain a professional tone, show respect and courtesy, and make your contributions matter.

1. **Building Community**: What are the preferred first names of those sitting near you? If you weren't able to be there write N/A or give reference to anyone you had help from.

2. We are familiar with positive integer solutions to $a^2 + b^2 = c^2$, such as $(3, 4, 5)$, which satisfies the equation. In fact, given any whole number n, to see that $(3n, 4n, 5n)$ is an integer solution to $a^2 + b^2 = c^2$, ie that $(3n)^2 + (4n)^2 = (5n)^2$, notice that $(3n)^2 + (4n)^2 = 3^2n^2 + 4^2n^2 = 9n^2 + 16n^2 = (25)n^2 = 5^2n^2 = (5n)^2$. Given this proof, how many integer solutions does the equation $a^2 + b^2 = c^2$ have? (Hint: Think about how many different solutions you can obtain by using different values of n.)
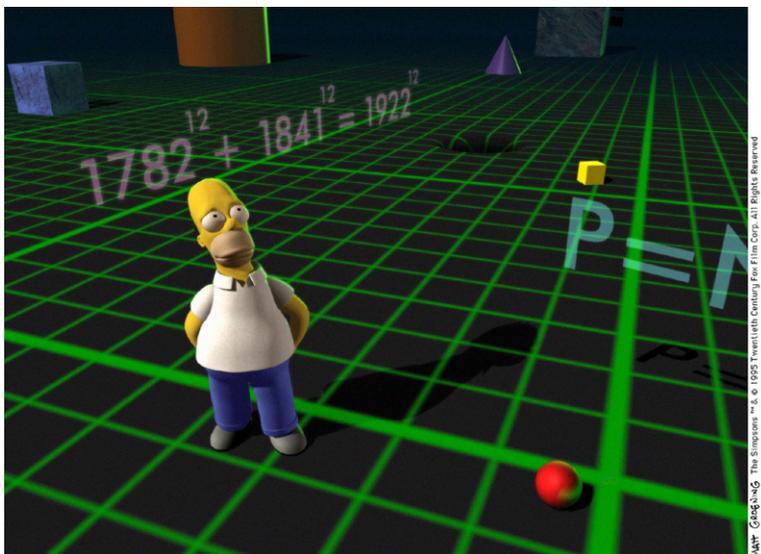
3. Find as many connections to proof and geometry as you can in the video (bullet points are fine):

   - proof

   - geometry

4. Discuss your responses to the video in your group and add to them above.

   Then, discuss what are two reasons that the equation $1782^{12} + 1841^{12} = 1922^{12}$ is false? Explain.

Treehouse of Horror VI, $Homer^3$
The Simpsons[TM] and © Twentieth Century Fox Film Corporation. Related content is not specifically authorized by Fox.

5. On a TI-83 or TI-84, I type (1782^12 + 1841^12) ^(1/12) ENTER and obtain 1922. Resolve the apparent conflict.

6. **Help each other and PDF responses to ASULearn**: If you are finished with the worksheet before I bring us back together, first ensure that your entire group is finished too, and if not, help each other. If your entire group is finished, then split up and pull up chairs so that you can discuss your responses with other groups. Collate your handwritten responses, preferably on this handout, into one full size multipage PDF for submission in the ASULearn assignment. I recommend you turn it in sometime today, but you have until the next class.