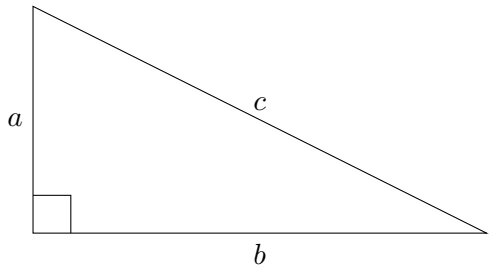
In lecture today, we are going to write three proofs.

1. If n is odd, then n^2 is odd.

2. Prove the Pythagorean Theorem:



3. A triple of natural numbers a, b, and c are called a *primitive Pythagorean triple* if a, b, and c have no common factors (other than 1) and satisfy $a^2 + b^2 = c^2$.

   Here are some primitive Pythagorean triples (this is not an exhaustive list):

   $(3, 4, 5)$ $(5, 12, 13)$ $(8, 15, 17)$
   $(7, 24, 25)$ $(20, 21, 29)$ $(9, 40, 41)$

   Note that $(6, 8, 10)$ is **not** a primitive Pythagorean triple.

   Prove that a and b cannot both be odd in a primitive Pythagorean triple.
   For partial credit, prove that a and b cannot both be even in a primitive Pythagorean triple.