Why do we do proofs?
2008-9

Handout available from front.

Problem 1

p a prime number.

When can $p+1$ be a perfect square (i.e. when is $p+1 = n^2$ for some integer $n \geq 0$?)

Example $p = 3$, $p+1 = 4 = 2^2$.

Claim: no other p will do.

For if $p+1 = n^2$ as above,

then $p = n^2 - 1 = (n+1)(n-1)$.

Since p is prime, $(n+1)$ or $(n-1)$ must be ± 1. None of these work (check) except for $n = 2$, $p = 3$.

Two hospitals

	A	B
Males cured (a/b)	1/1	49/50
Females cured (a/b)	3/10	1/10
Patients cured (a/b)	3/11	50/60
	27%	83%

This phenomenon is called "Simpson's Paradox".

Problem 4.

Most believe squares are rectangles.

Problem 5.

Most believe equilateral triangles are isosceles.

Problem 6.

(a) 2 is prime : everyone agrees (?).

(b) Most believe 1 is not a prime number.

(c) Most believe -3 is not a prime number.