

$$X^p + Y^p = Z^p, \text{ for } p \text{ an odd prime.}$$

Consider mod $\theta = 2Np+1$ an auxiliary prime ($3 \nmid N$)

Letter to Gauss (1819)

FLT (Man. A)

"Large size" of solutions (Man. A)

Exponents $2(8n \pm 3)$
(Man. B)
(Case 1 and Case 2)

∞ -many
 θ

some
 θ

single
 θ

Sophie Germain's Thm.
(Case 1)

NC

(no consecutive
 p -th powers
mod θ)

PNP

(p not a
 p -th power
mod θ)

$$N = 2^a p^b \text{ for}$$

$$(a+1, p) = 1$$

(Wendt, 1894)

(Dickson, 1908)

(Vandiver, 1926)

$$2Np$$

(2 not a
 p -th power
mod θ)

$$N = 1, 2, 4, 5$$

$$N = 7, 8, 10, \dots$$

Permutations,
cross-ratio group
(Dickson, 1908)

Induction on N
(Ford-Jha, 1993)

A few excepted p
for some N
(Wendt, 1894)