HOMEWORK 5 - NINA CHALGERI

③ $a = 2mn \quad b = m^2 - n^2 \quad c = m^2 + n^2$ where $a = mn = 120$

$a^2 + b^2 = c^2 \Rightarrow a^2 = c^2 - b^2$

$m > n > 0$

$a = 2mn$

$120 = 2mn$

$60 = mn$

$120^2 = (m^2 + n^2) - (m^2 - n^2)$

$120^2 = m^2 + n^2 - m^2 + n^2$

$120 = 2n^2$

$14400 = 2n^2$

$7200 = n^2$

$n = \sqrt{7200}$

$a = 2mn$

$120 = 2m\sqrt{7200}$

$\frac{60}{\sqrt{7200}} = m$

120, 50, 130

3 on next page

③ 120, 50, 130 ⇒ NOT PRIMATIVE

④ There are infinite positive triples.

Proof.

- The first set of pythagorean triples are 3-4-5
- We know that there are an infinite number of positive integer triples because we can keep taking multiples of these numbers.
- We know it is infinite because we can multiply 3-4-5 by any natural number, and the set of natural numbers, N, is infinite.

⑤ Fermat

⑥ Andrew Wiles

⑦ Fermat

⑧ Andrew Wiles

③ $a = 120 = 2mn$

$120 = 2mn$

$60 = mn$

factors of 60 : 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60

m	n
1	60
2	30
3	20
4	15
5	12
6	10

where $m, n > 0, m < n$

$a = 120$

a	b	c	
120	$1^2 - 60^2$	$1^2 + 60^2$	$\Rightarrow (120, -3599, 3601)$
120	$2^2 - 30^2$	$2^2 + 30^2$	$(120, -896, 904)$
120	$3^2 - 20^2$	$3^2 + 20^2$	$(120, -391, 409)$
120	$4^2 - 15^2$	$4^2 + 15^2$	$(120, -209, 241)$
120	$5^2 - 12^2$	$5^2 + 12^2$	$(120, -119, 169)$
120	$6^2 - 10^2$	$6^2 + 10^2$	$(120, -64, 136)$