Quin Buob
HW5

3) $a = 2mn$, $b = |m^2 - n^2|$ $c = m^2 + n^2$ find all the pythagorean triplets st $a = 120$

$2mn = 120$

$mn = 60$ Find the factos of 60

$[m,n] = [1,60], [2,30], [3,20], [4,15], [5,12], [6,10]$

$[a,b,c] =$ *[120, 3599, 3601]*, [120, 896, 904], *[120, 391, 409]*, *[120, 209, 241]*, *[120, 119, 169]*
[120, 64, 136]

* primitive Triplets *

4) m, n are positive integers

We know pythagorean triplets take the form of

$a = 2mn$, $b = |m^2 - n^2|$, $c = m^2 + n^2$

We also know that the sum and product of integers is also an integer

We need to show that

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

$$(2mn)^2 + (m^2 - n^2)^2 - (m^2 + n^2)^2 = 0$$

$(2mn)^2 = 4m^2n^2$

$(m^2 - n^2) = m^4 - 2m^2n^2 + n^4$

$(m^2 + n^2) = m^4 + 2m^2n^2 + n^4$

$\Rightarrow 4m^2n^2 + m^4 - 2m^2n^2 + n^4 - (m^4 + 2m^2n^2 + n^4) = 0$

$\Rightarrow 4m^2n^2 + m^4 - 2m^2n^2 + n^4 - m^4 - 2m^2n^2 - n^4 = 0$

$\Rightarrow \cancel{4m^2n^2} + \cancel{m^4} - \cancel{4m^2n^2} + \cancel{n^4} - \cancel{m^4} - \cancel{n^4} = 0$

$\Rightarrow 0 = 0$

QED

5) Adrew Wiles

6) Fermat

7) Fermat

8) Andrew Wiles