Jacob McCrone
9/26/21

P5

1.

2.

(3.) $a=2mn,\ b=m^2-n^2,\ c=m^2+n^2,\ a=120$

$2mn=120 \Rightarrow mn=60$

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

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

$(a,b,c)=(mn, m^2-n^2, m^2+n^2) \rightarrow (2m, m^2-1, m^2+1)$

$\therefore =(60, 3599, 3601),\ (3,4,5),\ (5,12,13),\ (24,21,25)$

They are all primitive

(4.) If n is any integer $n>1$. Then $3n, 4n, 5n$ are a set of pythagorean triples.

n	$(3n, 4n, 5n)$
2	$(6,8,10)$
3	$(9,12,15)$
⋮	
	$(3n, 4n, 5n) \rightarrow 9n^2+16n^2=25n^2$ ✓

(5.) Fermat first proved that there are no positive integer solutions to $a^4+b^4=c^4$.

(6.) Fermat also

(7.) Fermat yet again!

(8.) Andrew Wiles of Princeton!