Sarah Cabric (Ok to post) Homework 5 9/26/2021

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

$a^2 + b^2 = c^2$

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

$14400 + m^4 - 2m^2n^2 + n^4 = m^4 + 2m^2n^2 + n^4$

$14400 = 4m^2n^2$ $m^2n^2 = 3600$

$mn = 60$

Let $m = 20$, $n = 3$: $a = 120$, $b = 391$, $c = 409$

$m = 10$, $n = 6$: $a = 120$, $b = 64$, $c = 136$

$m = 60$, $n = 1$: $a = 120$, $b = 3599$, $3601 = c$

$m = 15$, $n = 4$: $a = 120$, $b = 209$, $241 = c$

$m = 30$, $n = 2$: $a = 120$, $b = 896$, $904 = c$

$m = 12$, $n = 5$: $a = 120$, $b = 119$, $c = 169$

The primitive triples are: (120, 119, 169), (120, 391, 409), (120, 3599, 3601), (120, 209, 241)

4. $a^2 + b^2 = c^2$ Let a, b, c be integers.
Since a, b, c are all integers, a^2 and b^2 would be integers. Also, since a^2 and b^2 are integers, their sum $a^2 + b^2$ is an integer. Similarly, since c is an integer, c^2 would be an integer. So, there must be infinitely many integers such that $c^2 = a^2 + b^2$

5. Pierre de Fermat

6. Leonhard Euler

7. Pierre de Fermat

8. Andrew Wiles