Example 6.4. *Sums of two squares have a remarkable multiplicative property. Consider the following table.*

2	1^2+1^2	26	1^2+5^2	68	2^2+8^2	100	6^2+8^2
4	0^2+2^2	29	2^2+5^2	72	6^2+6^2	104	2^2+10^2
5	1^2+2^2	34	3^2+5^2	74	5^2+7^2	106	5^2+9^2
8	2^2+2^2	40	2^2+6^2	80	4^2+8^2	116	4^2+10^2
9	0^2+3^2	45	3^2+6^2	81	0^2+9^2	117	6^2+9^2
10	1^2+3^2	50	5^2+5^2	82	1^2+9^2	122	1^2+11^2
13	2^2+3^2	52	4^2+6^2	85	2^2+9^2	125	5^2+10^2
20	2^2+4^2	58	3^2+7^2	90	3^2+9^2	128	8^2+8^2
25	0^2+5^2	65	1^2+8^2	98	7^2+7^2	130	3^2+11^2

This looks as though, if a number n has a factorisation ab with both a and b being sums of two squares, then n is also the sum of two squares.

For example $130 = 2 \times 4 \times 13$ and both 2, 5 and 13 are sums of two squares.