

ACTIVITY 13. PYTHAGOREAN TRIPLES

A **Pythagorean triple** (a, b, c) is a set of three integers satisfying the equation $a^2 + b^2 = c^2$. Everyone knows that $(3, 4, 5)$ is a Pythagorean triple. So is $(6, 8, 10)$, but we are not interested in it, since it is trivially obtained from the more basic triple $(3, 4, 5)$. If a , b , and c have no factor in common, then we say the triple is **primitive**. Here is a list of all primitive Pythagorean triples (a, b, c) where a ranges from 1 to 100 and $a < b$.

What patterns do you observe in this list?

a	b	c		a	b	c		a	b	c
3	4	5		41	840	841		72	1295	1297
5	12	13		43	924	925		73	2664	2665
7	24	25		44	117	125		75	308	317
8	15	17		44	483	485		75	2812	2813
9	40	41		45	1012	1013		76	357	365
11	60	61		47	1104	1105		76	1443	1445
12	35	37		48	55	73		77	2964	2965
13	84	85		48	575	577		79	3120	3121
15	112	113		49	1200	1201		80	1599	1601
16	63	65		51	140	149		81	3280	3281
17	144	145		51	1300	1301		83	3444	3445
19	180	181		52	165	173		84	187	205
20	21	29		52	675	677		84	437	445
20	99	101		53	1404	1405		84	1763	1765
21	220	221		55	1512	1513		85	132	157
23	264	265		56	783	785		85	3612	3613
24	143	145		57	176	185		87	416	425
25	312	313		57	1624	1625		87	3784	3785
27	364	365		59	1740	1741		88	105	137
28	45	53		60	91	109		88	1935	1937
28	195	197		60	221	229		89	3960	3961
29	420	421		60	899	901		91	4140	4141
31	480	481		61	1860	1861		92	525	533
32	255	257		63	1984	1985		92	2115	2117
33	56	65		64	1023	1025		93	476	485
33	544	545		65	72	97		93	4324	4325
35	612	613		65	2112	2113		95	168	193
36	77	85		67	2244	2245		95	4512	4513
36	323	325		68	285	293		96	247	265
37	684	685		68	1155	1157		96	2303	2305
39	80	89		69	260	269		97	4704	4705
39	760	761		69	2380	2381		99	4900	4901
40	399	401		71	2520	2521		100	621	629
								100	2499	2501