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Squared prime numbers

Methods giving all prime numbers endless

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Abstract;

The prime numbers are the building numbers of the number series. They are dividable only with themselves and 1. These prime numbers build all numbers in the number series. The number 89 is a prime while 87 is a composite number containing the primes 3 and 29. The number 87 therefore is not a prime number because it contains two primes. The prime numbers occur quite close in the number series even if they eventually slightly thin. Euclid, though, proved 300th BC that there is an infinite number of primes. The highest prime number known right now is $2^{82\ 589\ 933} - 1$. I have discovered a formula giving all prime numbers endless. This as a result from other prime constructions I newly found showing how different prime constellations refer to each other in one or several squares. Finally, I have discovered another method giving all prime numbers endless, also explaining why they occur as they do.

Nomenclature

The word *prime square*, *origin square* or, for example, *11-square*, *17-square* (or any prime) denote a square created from a certain prime number, the so-called *origin prime*.

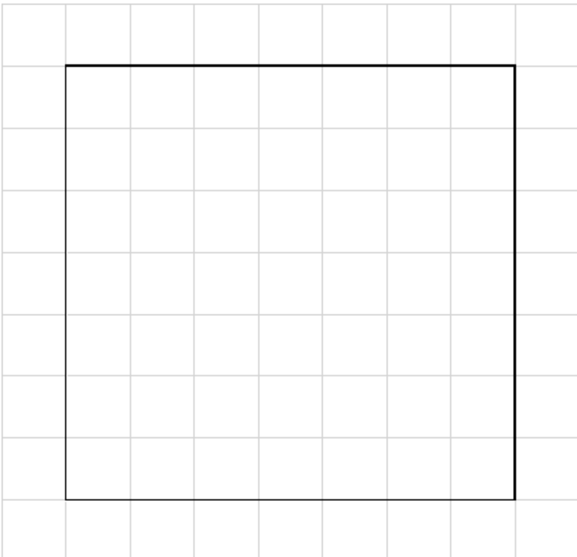
The *origin rectangle* is the rectangle formed when the right vertical line of the prime square is left out.

The word *corner square* is the largest possible square drawn from each corner without overlapping each other.

The word *starting prime* refer to the prime numbers 5, 7, 11, 13, 17 and 19 when used to find all primes endless.

Construction

Let us start with constructing a square with as many boxes, squared of course, as the prime number you start with. The Microsoft Excel should be suitable to use. If we use the origin prime number 7, the empty square looks like this:



We then continue to go through the number series line by line. As soon as a prime number turns up, we note that number in the box. After having gone through all 49 boxes in the square the primes are placed like this:

		2	3		5		7	
				11		13		
			17		19			
		23						
	29		31					
		37				41		
	43				47			

We continue to survey the square, box by box, starting on the upper left box. Every new prime number is noted in the same way. During the third survey a collision with an occupied box appears. The prime number 101 should have been noted in a box already occupied by 3. We then have to create a new square and place 101 in that very same box in this second square (or just leave the number, if we intend to use just the first square). Thereafter we continue to note the primes in the first square until another collision appears.

Even in the second square collisions may appear, which in turn demand a third square. But after that we go on with the first square until this one is filled with prime numbers. Some gaps then remain in the second square and we continue according to the same principles until the three first squares derived from the origin prime 7 are filled. These three squares, noted A, B and C, look like this:

Square 1

A									: 7 =
	197	2	3	53	5	251	7	511	73
	449	107	59	11	61	13		700	100
	113	163	17	67	19	167		546	78
	71	23	73	613	173	223		1176	168
	29	79	31	179	131	83		532	76
	281	37	283	137	89	41		868	124
	43	191	241	193	47	97		812	116
	1183	602	707	1253	525	875			
: 7 =	169	86	101	179	75	125			
	$\sum$	5145	:	7^2	=	105			

Square 2

B									: 7 =
	491	149	101	151	103	349	7	1344	192
	547	401	157	109	257	307		1778	254
	211	359	311	263	313	461		1918	274
	659	317	269	809	271	419		2744	392
	127	373	227	277	229	181		1414	202
	379	233	479	431	383	139		2044	292
	239	877	829	389	439	293		3066	438
	2653	2709	2373	2429	1995	2149			
: 7 =	379	387	339	347	285	307			
	∑	14308	:	7^2	=	292			

Square 3

C									: 7 =
	883	443	199	347	397	643	7	2912	416
	743	499	353	599	1237	503		3934	562
	701	457	409	557	509	853		3486	498
	463	709	367	907	467	811		3724	532
	421	569	521	571	523	769		3374	482
	673	331	577	823	677	433		3514	502
	337	1171	1123	487	733	587		4438	634
	4221	4179	3549	4291	4543	4599			
: 7 =	603	597	507	613	649	657			
	∑	25382	:	7^2	=	518			

It should be emphasized that the right vertical line, starting with the origin prime (7 in this case) does not participate in the investigation more than filling up the square with prime numbers.

The sum of the primes, line by line, horizontal as well as vertical, is divisible with the origin prime itself (7 in this case). This is shown by the figures alongside or underneath every line in the upper example. The total sum of the square´s numbers is shown at the bottom after the sum sign ∑. This total sum always is evenly divisible with the origin prime squared (7^2 in this case).

Below I present the results regarding the two first squares (A and B) concerning the origin prime 11, and the first square (A) concerning the origin prime 17. The quotients after the sum of every line are left out in the 17-square.

A													:11=
	727	2	3	367	5	127	7	613	251	131	11	2233	203
	617	13	619	257	137	17	139	19	383	263		2464	224
	23	1597	509	389	269	149	29	151	31	1847		4994	454
	397	277	157	37	401	281	887	41	163	43		2684	244
	1013	167	47	653	2711	1381	293	173	53	659		7150	650
	419	541	179	59	181	61	1151	547	911	307		4356	396
	67	431	311	191	71	193	73	1163	317	197		3014	274
	199	79	443	1049	929	83	1657	569	449	571		6028	548
	89	211	1301	1181	577	457	337	701	97	461		5412	492
	463	101	223	103	467	347	227	107	229	109		2376	216
	353	233	113	719	599	479	359	239	1087	241		4422	402
	4367	3652	3905	5005	6347	3575	5159	4323	3971	4829			
:11=	397	332	355	455	577	325	469	393	361	439			
	$\sum$	45133	:	11^2	=	373							

B													:11=
	1453	607	487	1093	1699	853	491	1097	977	373	11	9130	830
	859	739	1103	499	379	743	2801	503	1109	1231		9966	906
	991	2081	751	631	1237	1117	271	877	757	2089		10802	982
	881	761	641	521	643	523	1129	283	647	769		6798	618
	2707	409	773	1621	2953	2591	1019	1867	1021	1627		16588	1508
	661	1993	421	1511	907	787	1877	1031	1153	1033		11374	1034
	1277	673	1279	433	313	677	557	1889	2011	439		9548	868
	683	563	2137	1291	1171	809	2141	811	691	1297		11594	1054
	331	937	1543	1423	1061	941	821	1427	823	1187		10494	954
	947	827	1433	587	709	2767	953	349	1439	593		10604	964
	1321	1201	839	2897	1567	1447	601	1933	1571	967		14344	1304
	12111	10791	11407	12507	12639	13255	12661	12067	12199	11605			
:11=	1101	981	1037	1137	1149	1205	1151	1097	1109	1055			
	$\sum$	121242	:	11^2	=	1002							

A	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	
1	3469	2	3	293	5	1451	7	1453	587	877	11	3191	13	881	593	883	17	13719
2	307	19	887	599	311	23	313	1181	1471	2339	317	29	2053	31	2633	4079		16592
3	613	1481	37	1483	617	907	41	331	43	911	1201	2069	47	337	1783	3229		15130
4	919	53	1499	1789	2657	1213	347	59	349	61	929	641	353	643	1511	67		13090
5	647	359	71	3251	73	941	653	2099	1811	367	79	947	659	2683	83	373		15096
6	953	2399	2111	89	379	3559	2693	1249	383	673	3853	97	1543	677	389	101		21148
7	103	971	683	2129	107	397	109	977	2423	401	113	1559	3583	983	5897	2141		22576
8	409	1277	1567	701	991	2437	1571	127	2729	2441	419	131	421	1289	1579	1291		19380
9	137	1583	139	2741	719	431	1877	433	1301	1013	1303	2749	149	439	151	1019		16184
10	443	733	1601	157	4493	3049	449	739	1607	163	1031	743	1033	167	457	3637		20502
11	1327	461	173	463	3643	1621	3067	467	179	2203	181	1049	761	1051	4231	3943		24820
12	2789	3079	479	191	1637	193	1061	773	1063	197	487	199	2801	5981	491	3671		25092
13	1361	5119	4253	6277	787	499	211	1657	4259	503	1949	2239	1373	1663	797	509		33456
14	1667	223	1091	1381	1093	227	2251	229	1097	809	521	233	523	5437	1103	2549		20434
15	239	5153	241	1109	821	2267	823	2269	3137	1693	827	1117	251	541	1409	1699		23596
16	1123	257	547	1993	2861	839	1129	263	1709	1999	5179	1423	557	269	2293	271		22712
17	1429	563	853	1721	277	1723	857	569	281	571	283	1151	863	1153	6067	577		18938
	17935	23732	16235	26367	21471	21777	17459	14875	24429	17221	18683	19567	16983	24225	31467	30039		
	∑	342465	:	17^2	=	1185												

Reflections

The corner squares are noted a, b, c, and d clockwise. The upper left corner (a) and lower right corner (c) in the origin square (or upper right and lower left) do reflect each other. The reflections come clear when you find that the sum is evenly divisible with the origin prime squared. This also goes for two different reflections (a, c and b, d), and even if added with reflections in the middle horizontal line. Three examples are showed below. The 7-square`s third square (C), the 11-square´s second square (B) and the 17-square´s first square (A). The corner square´s denotations are used.

a	A	B	C	D	E	F	b
1	883	443	199	347	397	643	7
2	743	499	353	599	1237	503	
3	701	457	409	557	509	853	
4	463	709	367	907	467	811	
5	421	569	521	571	523	769	
6	673	331	577	823	677	433	
7	337	1171	1123	487	733	587	
d							c

The three reflection´s sum (a, c and b, d as well as the middle horizontal line) is 5096 which divided with 7^2 gives 104.

a	A	B	C	D	E	F	G	H	I	J	b
1	1453	607	487	1093	1699	853	491	1097	977	373	11
2	859	739	1103	499	379	743	2801	503	1109	1231	
3	991	2081	751	631	1237	1117	271	877	757	2089	
4	881	761	641	521	643	523	1129	283	647	769	
5	2707	409	773	1621	2953	2591	1019	1867	1021	1627	
6	661	1993	421	1511	907	787	1877	1031	1153	1033	
7	1277	673	1279	433	313	677	557	1889	2011	439	
8	683	563	2137	1291	1171	809	2141	811	691	1297	
9	331	937	1543	1423	1061	941	821	1427	823	1187	
10	947	827	1433	587	709	2767	953	349	1439	593	
11	1321	1201	839	2897	1567	1447	601	1933	1571	967	
d											c

The three reflection´s sum (a, c and b, d as well as the middle horizontal line) is 12584 which divided with 11^2 gives 104.

a	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	b
1	3469	2	3	293	5	1451	7	1453	587	877	11	3191	13	881	593	883	17
2	307	19	887	599	311	23	313	1181	1471	2339	317	29	2053	31	2633	4079	
3	613	1481	37	1483	617	907	41	331	43	911	1201	2069	47	337	1783	3229	
4	919	53	1499	1789	2657	1213	347	59	349	61	929	641	353	643	1511	67	
5	647	359	71	3251	73	941	653	2099	1811	367	79	947	659	2683	83	373	
6	953	2399	2111	89	379	3559	2693	1249	383	673	3853	97	1543	677	389	101	
7	103	971	683	2129	107	397	109	977	2423	401	113	1559	3583	983	5897	2141	
8	409	1277	1567	701	991	2437	1571	127	2729	2441	419	131	421	1289	1579	1291	
9	137	1583	139	2741	719	431	1877	433	1301	1013	1303	2749	149	439	151	1019	
10	443	733	1601	157	4493	3049	449	739	1607	163	1031	743	1033	167	457	3637	
11	1327	461	173	463	3643	1621	3067	467	179	2203	181	1049	761	1051	4231	3943	
12	2789	3079	479	191	1637	193	1061	773	1063	197	487	199	2801	5981	491	3671	
13	1361	5119	4253	6277	787	499	211	1657	4259	503	1949	2239	1373	1663	797	509	
14	1667	223	1091	1381	1093	227	2251	229	1097	809	521	233	523	5437	1103	2549	
15	239	5153	241	1109	821	2267	823	2269	3137	1693	827	1117	251	541	1409	1699	
16	1123	257	547	1993	2861	839	1129	263	1709	1999	5179	1423	557	269	2293	271	
17	1429	563	853	1721	277	1723	857	569	281	571	283	1151	863	1153	6067	577	
d																	c

The two reflection´s sum (a, c and b, d) is 24276 which divided with 17^2 gives 84.

These reflections also bring that the circumferences, from start box to start box, are evenly divisible with the origin prime squared. The 17-square below clarify this by showing the different circumferences in different colors. Their sums, as well as the quotients after division with 17^2, are presented beneath.

A	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P					
1	3469	2	3	293	5	1451	7	1453	587	877	11	3191	13	881	593	883	17		74273	$:17^2$	257
2	307	19	887	599	311	23	313	1181	1471	2339	317	29	2053	31	2633	4079					
3	613	1481	37	1483	617	907	41	331	43	911	1201	2069	47	337	1783	3229			76296	$:17^2$	264
4	919	53	1499	1789	2657	1213	347	59	349	61	929	641	353	643	1511	67					
5	647	359	71	3251	73	941	653	2099	1811	367	79	947	659	2683	83	373			57800	$:17^2$	200
6	953	2399	2111	89	379	3559	2693	1249	383	673	3853	97	1543	677	389	101					
7	103	971	683	2129	107	397	109	977	2423	401	113	1559	3583	983	5897	2141			45084	$:17^2$	156
8	409	1277	1567	701	991	2437	1571	127	2729	2441	419	131	421	1289	1579	1291					
9	137	1583	139	2741	719	431	1877	433	1301	1013	1303	2749	149	439	151	1019			37570	$:17^2$	130
10	443	733	1601	157	4493	3049	449	739	1607	163	1031	743	1033	167	457	3637					
11	1327	461	173	463	3643	1621	3067	467	179	2203	181	1049	761	1051	4231	3943			27166	$:17^2$	94
12	2789	3079	479	191	1637	193	1061	773	1063	197	487	199	2801	5981	491	3671					
13	1361	5119	4253	6277	787	499	211	1657	4259	503	1949	2239	1373	1663	797	509			17340	$:17^2$	60
14	1667	223	1091	1381	1093	227	2251	229	1097	809	521	233	523	5437	1103	2549					
15	239	5153	241	1109	821	2267	823	2269	3137	1693	827	1117	251	541	1409	1699			6936	$:17^2$	24
16	1123	257	547	1993	2861	839	1129	263	1709	1999	5179	1423	557	269	2293	271					
17	1429	563	853	1721	277	1723	857	569	281	571	283	1151	863	1153	6067	577					

You may summarize the presentation above concerning the reflections inside a prime square in the following way.

You start with a square out of an optional prime number. I have above showed squares derived from the primes 7, 11 and 17.

You count de boxes in the first square (A) starting on the first box. Every time a prime number appears you right it down in that box. When a box is occupied by a former prime you either leave it out or transfer it to the same box in a second square (B).

When a square is filled with primes you subdivide it into four corner squares, as big as possible, denoted a, b, c and d clockwise. You also get a center line between the left and right vertical sides.

Irrespective of what kind of constellation you activate this is what you find:

1. Every constellation in the corner square a and/or d added to a corresponding constellation in the corner square b and/or c is **evenly divisible with the origin prime**.

2. Every constellation in the corner square a and/or b added to a corresponding constellation in the corner square d and/or c is ***not* evenly divisible with the origin prime**.

3. Every reflecting constellation inside two of the opposed diagonal corner squares, possibly summarized with any optional reflecting constellation inside the two other diagonal corner squares, is **evenly divisible with the origin prime squared**. You may even add a reflection inside the center line and get this result.

This explains, among other things, why every circumference in the colored example above (origin square 17) is evenly divisible with 17^2. Every half line is reflecting the opposite diagonal side, as well as you may reckon with the reflection inside the center line.

In this way the prime numbers in the origin square are reflecting each other in different ways. The term "reflection" indicate that the sum is divisible with the origin prime, either plain or squared.

The prime numbers cooperating in different ways are identic with the prime series up to when the collisions are turning up, and thereafter the primes do not follow any particular pattern. The primes in the 7-square are spread out as below (number 7 is not marked).

2	3	5	7	11	13	17	19	23	29
31	37	41	43	47	53	59	61	67	71
73	79	83	89	97	101	103	107	109	113
127	131	137	139	149	151	157	163	167	173
179	181	191	193	197	199	211	223	227	229
233	239	241	251	257	263	269	271	277	281
283	293	307	311	313	317	331	337	347	349
353	359	367	373	379	383	389	397	401	409
419	421	431	433	439	443	449	457	461	463
467	479	487	491	499	503	509	521	523	541
547	557	563	569	571	577	587	593	599	601
607	613	617	619	631	641	643	647	653	659
661	673	677	683	691	701	709	719	727	733
739	743	751	757	761	769	773	787	797	809
811	821	823	827	829	839	853	857	859	863

A formula giving every prime number without end

How, then, is the relationship between the first prime square (A) and the second one (B)? In the second square the prime numbers are mostly higher than in the first one, and if you compare a specific box the prime in the second square is always higher than in the first square. The box number one in the 7-square is 197 while in the second square it is 491. The difference between 491 and 197 is 294. The interesting thing is that 294 is evenly divisible with $7^2 \times 2 = 98$ which gives 298/98 = 3. Every prime in the second square has got a similar relation to its corresponding number in the first square. For instance, 439 – 47 = 392 which give us 392/98 = 4. In this way every prime number in the second 7-square is related to the corresponding prime number in the first square by adding a few number of $7^2 \times 2$ to the prime number in the first square. My conjecture is that this is valid concerning all prime squares.

Now let us start with the lowest applicable prime number 3 and its square 3^2. Double it and you get 18. We add it to the six next starting prime numbers 5, 7, 11, 13, 17 and 19. Let us start with the number 5. After a few adds you get a prime, and after another few adds you get another higher one. In this way you continue as long as you want to. Thereafter you go further with the other numbers (7, 11, 13, 17 and 19) in the same way. Every starting prime in the examples below has got its own color, facilitating to follow the procedure. In this way every prime number is detected, and the prime series is complete as far as we choose to go on.

A formula giving all prime numbers is:

$5+18\times n, +18\times n, +18\times n$ ... without end

$7+18\times n, +18\times n, +18\times n$ ... without end

$11+18\times n, +18\times n, +18\times n$ ... without end

$13+18\times n, +18\times n, +18\times n$ ... without end

$17+18\times n, +18\times n, +18\times n$ ... without end

$19+18\times n, +18\times n, +18\times n$ ... without end

The letter *n* in the formula stands for how many 18-adds you have to do before the next prime is found.

I will now illustrate this in three examples. The first one begins with the starting primes in the formula (5, 7, 11, 13, 17, 19) up to the prime number 1889. The second example starts from the prime number 95783. The color marks are shown in the first example and show the connection to the starting prime. The third illustration is fetched from a quite high section in the prime number series starting from the prime 888 888 888 888 811. Even in this case all the detected primes are drawn from the starting primes. Wherever you start in the prime series there is a connection to the starting primes. My investigations, so far, show the same unequivocal result, which strengthens the evidence of this formula.

2	3	5	7	11	13	17	19	23	29
31	37	41	43	47	53	59	61	67	71
73	79	83	89	97	101	103	107	109	113
127	131	137	139	149	151	157	163	167	173
179	181	191	193	197	199	211	223	227	229
233	239	241	251	257	263	269	271	277	281
283	293	307	311	313	317	331	337	347	349
353	359	367	373	379	383	389	397	401	409
419	421	431	433	439	443	449	457	461	463
467	479	487	491	499	503	509	521	523	541
547	557	563	569	571	577	587	593	599	601
607	613	617	619	631	641	643	647	653	659
661	673	677	683	691	701	709	719	727	733
739	743	751	757	761	769	773	787	797	809
811	821	823	827	829	839	853	857	859	863
877	881	883	887	907	911	919	929	937	941
947	953	967	971	977	983	991	997	1009	1013
1019	1021	1031	1033	1039	1049	1051	1061	1063	1069
1087	1091	1093	1097	1103	1109	1117	1123	1129	1151
1153	1163	1171	1181	1187	1193	1201	1213	1217	1223
1229	1231	1237	1249	1259	1277	1279	1283	1289	1291
1297	1301	1303	1307	1319	1321	1327	1361	1367	1373
1381	1399	1409	1423	1427	1429	1433	1439	1447	1451
1453	1459	1471	1481	1483	1487	1489	1493	1499	1511
1523	1531	1543	1549	1553	1559	1567	1571	1579	1583
1597	1601	1607	1609	1613	1619	1621	1627	1637	1657
1663	1667	1669	1693	1697	1699	1709	1721	1723	1733
1741	1747	1753	1759	1777	1783	1787	1789	1801	1811
1823	1831	1847	1861	1867	1871	1873	1877	1879	1889

95783	95789	95791	95801	95803	95813	95819	95857	95869	95873
95881	95891	95911	95917	95923	95929	95947	95957	95959	95971
95987	95989	96001	96013	96017	96043	96053	96059	96079	96097
96137	96149	96157	96167	96179	96181	96199	96211	96221	96223
96233	96259	96263	96269	96281	96289	96293	96323	96329	96331
96337	96353	96377	96401	96419	96431	96443	96451	96457	96461
96469	96479	96487	96493	96497	96517	96527	96553	96557	96581
96587	96589	96601	96643	96661	96667	96671	96697	96703	96731
96737	96739	96749	96757	96763	96769	96779	96787	96797	96799
96821	96823	96827	96847	96851	96857	96893	96907	96911	96931
96953	96959	96973	96979	96989	96997	97001	97003	97007	97021
97039	97073	97081	97103	97117	97127	97151	97157	97159	97169
97171	97177	97187	97213	97231	97241	97259	97283	97301	97303
97327	97367	97369	97373	97379	97381	97387	97397	97423	97429
97441	97453	97459	97463	97499	97501	97511	97523	97547	97549
97553	97561	97571	97577	97579	97583	97607	97609	97613	97649
97651	97673	97687	97711	97729	97771	97777	97787	97789	97813
97829	97841	97843	97847	97849	97859	97861	97871	97879	97883
97919	97927	97931	97943	97961	97967	97973	97987	98009	98011
98017	98041	98047	98057	98081	98101	98123	98129	98143	98179
98207	98213	98221	98227	98251	98257	98269	98297	98299	98317
98321	98323	98327	98347	98369	98377	98387	98389	98407	98411
98419	98429	98443	98453	98459	98467	98473	98479	98491	98507
98519	98533	98543	98561	98563	98573	98597	98621	98627	98639
98641	98663	98669	98689	98711	98713	98717	98729	98731	98737
98773	98779	98801	98807	98809	98837	98849	98867	98869	98873
98887	98893	98897	98899	98909	98911	98927	98929	98939	98947
98953	98963	98981	98993	98999	99013	99017	99023	99041	99053
99079	99083	99089	99103	99109	99119	99131	99133	99137	99139
99149	99173	99181	99191	99223	99233	99241	99251	99257	99259
99277	99289	99317	99347	99349	99367	99371	99377	99391	99397
99401	99409	99431	99439	99469	99487	99497	99523	99527	99529
99551	99559	99563	99571	99577	99581	99607	99611	99623	99643
99661	99667	99679	99689	99707	99709	99713	99719	99721	99733
99761	99767	99787	99793	99809	99817	99823	99829	99833	99839
99859	99871	99877	99881	99901	99907	99923	99929	99961	99971
99989	99991	100003	100019	100043	100049	100057	100069	100103	100109

888 888 888 888 811	888 888 888 888 859	888 888 888 888 883	888 888 888 888 907	888 888 888 888 953
888 888 888 888 961	888 888 888 888 983	888 888 888 888 997	888 888 888 889 049	888 888 888 889 051
888 888 888 889 087	888 888 888 889 091	888 888 888 889 097	888 888 888 889 187	888 888 888 889 189
888 888 888 889 193	888 888 888 889 213	888 888 888 889 217	888 888 888 889 327	888 888 888 889 387
888 888 888 889 471	888 888 888 889 499	888 888 888 889 537	888 888 888 889 559	888 888 888 889 583
888 888 888 889 607	888 888 888 889 633	888 888 888 889 691	888 888 888 889 693	888 888 888 889 723
888 888 888 889 751	888 888 888 889 871	888 888 888 889 873	888 888 888 889 879	888 888 888 889 891
888 888 888 889 909	888 888 888 889 933	888 888 888 889 993	888 888 888 890 071	888 888 888 890 087
888 888 888 890 147	888 888 888 890 209	888 888 888 890 473	888 888 888 890 521	888 888 888 890 537
888 888 888 890 557	888 888 888 890 591	888 888 888 890 659	888 888 888 890 663	888 888 888 890 747

My conjecture is that this method gives you all prime numbers without end.

<u>A method giving every prime number without end</u>

The formula above is a convenient way to find all the primes because you do not use so many operations. Even when you go from 888 888 888 889 723 to the next prime number 888 888 888 889 993 you just need fifteen 18-adds. A minor problem is that you cannot follow one prime number to the next. But this is possible with the method I will now present.

This method also proceeds from the prime numbers 5, 7, 11, 13, 17 and 19. Every prime number ends with the figures 1, 3, 7 or 9. A number ending with 5 can never be a prime (except from 5). But every number ending with 5, and derived from the primes 5, 7, 11, 13, 17 and 19, contains all prime numbers in relevant order, one by one, if you divide the original 5-number with 5. This does not occur every time, but quite often.

This is how the first 5-numbers according to above are formed.

7	17	19	11	13	5
25	35	55	65	85	95

Let us look at the number 13 as an example. 13+18+18+18+18=85 which divided with 5 gives the prime number 17, while for instance 175 divided with 5 gives the composite number 35 (5×7). This shows that every division with 5 does not give a prime. You should even notice that a 5-number not connected with the starting primes always starts with both 3 and 5 which make them more complicated to work with. We therefore build a 5-series derived from the starting primes and then find that these 5-numbers appear when 10 and 20 alternately are added to the previous 5-number. Beneath the 48 first 5-numbers are presented stack-wise.

25	115	205	295	385	475	565	655
35	125	215	305	395	485	575	665
55	145	235	325	415	505	595	685
65	155	245	335	425	515	605	695
85	175	265	355	445	535	625	715
95	185	275	365	455	545	635	725

To find every prime number, using a division with number 5, you need to sort out all composite quotients. The numbers starting with the prime number 5 show themselves in a quite simple pattern and therefor are easy to find. The next composite number (after the 5-division) starting with, or containing, the prime number 7 starts with 7 squared, that is 5×7^2. In this way you get the exact position in the 5-series where the 7-s start, and this goes for all the following primes. Observe, though, that every analysis concerning every single 5-number using this method starts with a 5-division.

You find that the pattern in which the 5-s, the 7-s, the 11-s and so on consists of one short and one long sequence. The short sequence is the investigated prime multiplied with 10 and the long sequence the prime multiplied with 20. It depends on the development of the 5-series if the investigated prime series starts with a short or a long sequence. The pattern in figures is shown beneath. The number beneath every prime is where to find the starting point, that is the prime number squared multiplied with 5. The two numbers on the right show the short and the long sequence.

5	50	100
125		
7	70	140
245		
11	110	220
605		
13	130	260
845		
17	170	340
1445		
19	190	380
1805		
23	230	460
2645		
29	290	580
4205		
31	310	620
4805		

When the 5-series is built and then every composite number is sorted out several gaps remain. These gaps, divided with 5, give every prime number in order. Then you find, for instance, *why* certain primes are twin primes and why there is a larger gap between certain prime numbers. The way the prime numbers show up is determined by *how* the composite 5-s are positioned. The entire procedure is shown below. The prime numbers are yellow marked, and the starting position for every new prime (this prime squared×5) is blue marked. The horizontal lines show the six starting primes 7, 17, 19, 11, 13 and 5.

25	5	445	89	865	173	1285	257	1705	11×31
35	7	455	7×13	875	5×5×7	1295	7×37	1715	7×7×7
55	11	475	5×19	895	179	1315	263	1735	347
65	13	485	97	905	181	1325	5×53	1745	349
85	17	505	101	925	5×37	1345	269	1765	353
95	19	515	103	935	11×17	1355	271	1775	5×71
115	23	535	107	955	191	1375	5×5×11	1795	359
125	5×5	545	109	965	193	1385	277	1805	19×19
145	29	565	113	985	197	1405	281	1825	5×73
155	31	575	5×23	995	199	1415	283	1835	367
175	5×7	595	7×17	1015	7×29	1435	7×41	1855	7×53
185	37	605	11×11	1025	5×41	1445	17×17	1865	373
205	41	625	5×5×5	1045	11×19	1465	293	1885	13×29
215	43	635	127	1055	211	1475	5×59	1895	379
235	47	655	131	1075	5×43	1495	13×23	1915	383
245	7×7	665	7×19	1085	7×31	1505	7×43	1925	5×7×11
265	53	685	137	1105	13×17	1525	5×61	1945	389
275	5×11	695	139	1115	223	1535	307	1955	17×23
295	59	715	11×13	1135	227	1555	311	1975	5×79
305	61	725	5×29	1145	229	1565	313	1985	397
325	5×13	745	149	1165	233	1585	317	2005	401
335	67	755	151	1175	5×47	1595	11×29	2015	13×31
355	71	775	5×23	1195	239	1615	17×19	2035	11×37
365	73	785	157	1205	241	1625	5×5×13	2045	409
385	7×11	805	7×23	1225	5×7×7	1645	7×47	2065	7×59
395	79	815	163	1235	13×19	1655	331	2075	5×83
415	83	835	167	1255	251	1675	567	2095	419
425	5×17	845	13×13	1265	11×23	1685	337	2105	421

2125	5×5×17	2545	509	2965	593	3385	677	3805	761
2135	7×61	2555	7×73	2975	5×7×17	3395	7×97	3815	7×109
2155	431	2575	5×103	2995	599	3415	683	3835	13×59
2165	433	2585	11×47	3005	601	3425	5×137	3845	769
2185	19×23	2605	521	3025	5×11×11	3445	13×53	3865	773
2195	439	2615	523	3035	607	3455	691	3875	5×5×31
2215	443	2635	17×31	3055	13×47	3475	5×139	3895	19×41
2225	5×89	2645	23×23	3065	613	3485	17×41	3905	11×71
2245	449	2665	13×41	3085	617	3505	701	3925	5×157
2255	11×41	2675	5×107	3095	619	3515	19×37	3935	787
2275	5×7×13	2695	7×7×11	3115	7×89	3535	7×101	3955	7×113
2285	457	2705	541	3125	5×5×5×5	3545	709	3965	13×61
2305	461	2725	5×109	3145	17×37	3565	23×31	3985	797
2315	463	2735	547	3155	631	3575	5×11×13	3995	17×47
2335	467	2755	19×29	3175	5×127	3595	719	4015	11×73
2345	7×67	2765	7×79	3185	7×7×13	3605	7×103	4025	5×7×23
2365	11×43	2785	557	3205	641	3625	5×5×29	4045	809
2375	5×5×19	2795	13×43	3215	643	3635	727	4055	811
2395	479	2815	563	3235	647	3655	17×43	4075	5×163
2405	13×37	2825	5×113	3245	11×59	3665	733	4085	19×43
2425	5×97	2845	569	3265	653	3685	11×67	4105	821
2435	487	2855	571	3275	5×131	3695	739	4115	823
2455	491	2875	5×5×23	3295	659	3715	743	4135	827
2465	17×29	2885	577	3305	661	3725	5×149	4145	829
2485	7×71	2905	7×83	3325	5×7×19	3745	7×107	4165	7×7×17
2495	499	2915	11×53	3335	23×29	3755	751	4175	5×167
2515	503	2935	587	3355	11×61	3775	5×151	4195	839
2525	5×101	2945	19×31	3365	673	3785	757	4205	29×29

4225	5×13×13	4645	929	5065	1013	5485	1097	5905	1181
4235	7×11×11	4655	7×7×19	5075	5×7×29	5495	7×157	5915	7×13×13
4255	23×37	4675	5×11×17	5095	1019	5515	1103	5935	1187
4265	853	4685	937	5105	1021	5525	5×13×17	5945	29×41
4285	857	4705	941	5125	5×5×41	5545	1109	5965	1193
4295	859	4715	23×41	5135	13×79	5555	11×101	5975	5×239
4315	863	4735	947	5155	1031	5575	5×223	5995	11×109
4325	5×173	4745	13×73	5165	1033	5585	1117	6005	1201
4345	11×79	4765	953	5185	17×61	5605	19×59	6025	5×241
4355	13×67	4775	5×191	5195	1039	5615	1123	6035	17×71
4375	5×5×5×7	4795	7×137	5215	7×149	5635	7×7×23	6055	7×173
4385	877	4805	31×31	5225	5×11×19	5645	1129	6065	1213
4405	881	4825	5×193	5245	1049	5665	11×103	6085	1217
4415	883	4835	967	5255	1051	5675	5×227	6095	23×53
4435	887	4855	971	5275	5×211	5695	17×67	6115	1223
4445	7×127	4865	7×139	5285	7×151	5705	7×163	6125	5×5×7×7
4465	19×47	4885	977	5305	1061	5725	5×229	6145	1229
4475	5×179	4895	11×89	5315	1063	5735	31×37	6155	1231
4495	29×31	4915	983	5335	11×97	5755	1151	6175	5×13×19
4505	17×53	4925	5×197	5345	1069	5765	1153	6185	1237
4525	5×181	4945	23×43	5365	29×37	5785	13×89	6205	17×73
4535	907	4955	991	5375	5×5×43	5795	19×61	6215	11×113
4555	911	4975	5×199	5395	13×83	5815	1163	6235	29×43
4565	11×83	4985	997	5405	23×47	5825	5×233	6245	1249
4585	7×131	5005	7×11×13	5425	5×7×31	5845	7×167	6265	7×179
4595	919	5015	17×59	5435	1087	5855	1171	6275	5×251
4615	13×71	5035	19×53	5455	1091	5875	5×5×47	6295	1259
4625	5×5×37	5045	1009	5465	1093	5885	11×107	6305	13×97

The survey above shows *how* and *why* the prime numbers appear the way they do. You may even notice that the composite numbers, after the 5-division, show a pattern where the prime number series appear in many different variations. My conjecture is that this method gives you all prime numbers without end.

Summary

My investigation shows that there is a regularity even by the prime numbers. This structure is obvious when a prime square is created. The squared prime numbers.

1. Connections in a prime square

A *prime square* (or origin square) is defined as a square consisting of as many boxes as the origin prime squared. This prime settle every side of the square. So, for example, the origin square 17 has got four sides with 17 boxes along every side. The prime numbers in each of the 289 boxes are filled with primes when a prime number occur in the number series (1,2,3,4,5,6,7,8,9 and so on) and then is noted in that very box.

If a box is occupied in the origin square A this prime number could be transferred to the corresponding box in a second square B, and thereafter the counting and noting continue in the first square A. Eventually we get two filled prime squares. Analyzing these squares, you leave out the right vertical line, representing only the origin prime number.

When a square is filled with primes you subdivide it into four corner squares, as big as possible, denoted a, b, c and d clockwise. You also get a center line between the left and right vertical sides.

Irrespective of what kind of constellation you activate this is what you find:

1. Every constellation in the corner square a and/or d added to a corresponding constellation in the corner square b and/or c is **evenly divisible with the origin prime**.

2. Every constellation in the corner square a and/or b added to a corresponding constellation in the corner square d and/or c is ***not* evenly divisible with the origin prime**.

3. Every reflecting constellation inside two of the opposed diagonal corner squares, possibly summarized with any optional reflecting constellation inside the two other diagonal corner squares, is **evenly divisible with the origin prime squared**. You may even add a reflection inside the center line and get this result.

My **Conjecture 1** is that this applies to every prime square without end.

2. A formula giving all prime numbers endless

In the second prime square the prime numbers are always higher than in the first square if you compare a specific box. There is a mathematic connection between the prime numbers in the first and second square. This connection appears when you square and double the origin prime and thereafter add this number to the prime you investigate. A new higher prime is found after *n* additions.

You start with the lowest applicable prime number 3 and its square 3^2. Double it and you get 18. We add 18 to the six next prime numbers 5, 7, 11, 13, 17 and 19 in any order. After a few adds you get a prime and after another few adds you get another higher one. In this way you continue as long as you want to. The primes are creating themselves.

A formula giving all prime numbers is:

5+18×n, +18×n, +18×n ... without end

7+18×n, +18×n, +18×n ... without end

11+18×n, +18×n, +18×n ... without end

13+18×n, +18×n, +18×n ... without end

17+18×n, +18×n, +18×n ... without end

19+18×n, +18×n, +18×n ... without end

The letter *n* in the formula stands for how many 18-adds you must do until the next prime is found.

My **Conjecture 2** is that you find every prime number by adding 18 to the primes 5, 7, 11, 13, 17 and 19 one by one endless.

3. A method giving all prime numbers endless

There is still a possibility to even more precise get all prime numbers. You start a 5-number series derived from the start primes 7, 17, 19, 11, 13 and 5 in that very order. Factorized these number always begin with number 5. When each of these numbers are divided with 5 the quotient is either a prime number or a composite number containing two or some more prime numbers in the nearby. By sorting out all the composite quotients you get all the prime numbers endless and in order.

Every composite quotient starts with a prime from 5 and up, squared. Thereafter the quotients starting with that prime show up periodically according to a pattern of short and long sequences. The position for each new prime beginning the composite quotient is this prime squared and multiplied with 5. Thereafter the short sequence is this prime multiplied with 10, while the long sequence is this prime multiplied with 20.

When all the composite quotients are deleted there are left several 5-numbers which divided with 5 give all prime numbers, and you even see clearly the distance between the prime numbers which for instance explain why the prime twins occur as they do.

My **Conjecture 3** is that this is an exact method giving all prime numbers endless and in order.