in the neighborhood of

The final sort ; as we move to the right with the sub-keys ; there is a limit that we can stop looking for factors. We only need to test to 1/7 or 0.142859. Since seven (7) is our starting point in the search with *fam07. We only need to test for 'just another thirty away' until 1/7 of PS.

The limit will need to be adjusted for integer math vs decimal math. The formula is *ratio = [int(PS * 1/7) + 1] or *ratio = [int(PS * 0.142859) + 1]. In the next set of pages will show the groundwork to pick 1/7 as the limit.

In order to determine in the traditional manner if a number is prime we test all values from one (1) all the way to the PS (Prime Suspect).

Example: 7 test from 1 to 7 (1 , 2 , 3 , 4 , 5 , 6 , 7).

Example: 21 test from 1 to 21 (1 , 2 , 3 , 4 , 5 , 6 , 7 , . . . , 20 , 21).

Factors are hilted in blue.

The red line is the limit of the test for factors. Test until all numbers are exhausted. The yellow cells with a zero (0) are where the MOD() shows a factor. Think of a multiplication table but it is the opposite it is an integer-division table with the remainder value in the cell. With the MOD() function highlighting the locations of factors. It is a simple 'line of sight' to analyze the data.

											1	1	1	1	1	1	1	1	1	2	2	2	2
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1																							
2	0	0																					
3	0	1	0																				
4	0	0	1	0																			
5	0	1	2	1	0																		
6	0	0	0	2	1	0																	
7	0	1	1	3	2	1	0																
8	0	0	2	0	3	2	1	0															
9	0	1	0	1	4	3	2	1	0														
10	0	0	1	2	0	4	3	2	1	0													
11	0	1	2	3	1	5	4	3	2	1	0												
12	0	0	0	0	2	0	5	4	3	2	1	0											
13	0	1	1	1	3	1	6	5	4	3	2	1	0										
14	0	0	2	2	4	2	0	6	5	4	3	2	1	0									
15	0	1	0	3	0	3	1	7	6	5	4	3	2	1	0								
16	0	0	1	0	1	4	2	0	7	6	5	4	3	2	1	0							
17	0	1	2	1	2	5	3	1	8	7	6	5	4	3	2	1	0						
18	0	0	0	2	3	0	4	2	0	8	7	6	5	4	3	2	1	0					
19	0	1	1	3	4	1	5	3	1	9	8	7	6	5	4	3	2	1	0				
20	0	0	2	0	0	2	6	4	2	0	9	8	7	6	5	4	3	2	1	0			
21	0	1	0	1	1	3	0	5	3	1	10	9	8	7	6	5	4	3	2	1	0		
22	0	0	1	2	2	4	1	6	4	2	0	10	9	8	7	6	5	4	3	2	1	0	
23	0	1	2	3	3	5	2	7	5	3	1	11	10	9	8	7	6	5	4	3	2	1	0

With seven (7) the ends one (1) and seven (7) are both with a zero (0) and yellow color. All the other columns have a numeric value greater than zero (0) and are light gray. Look at twenty-one (21) ; the columns for three (3) and seven (7) are zero (0) and yellow color. This is a visual presentation of the data to tune your thinking and eyesight as we move forward.

Overlaying the above MOD() table is the opposite , a multiplication table. Looking at the green cell diagonally down the middle is the square of the PS (Prime Suspect).

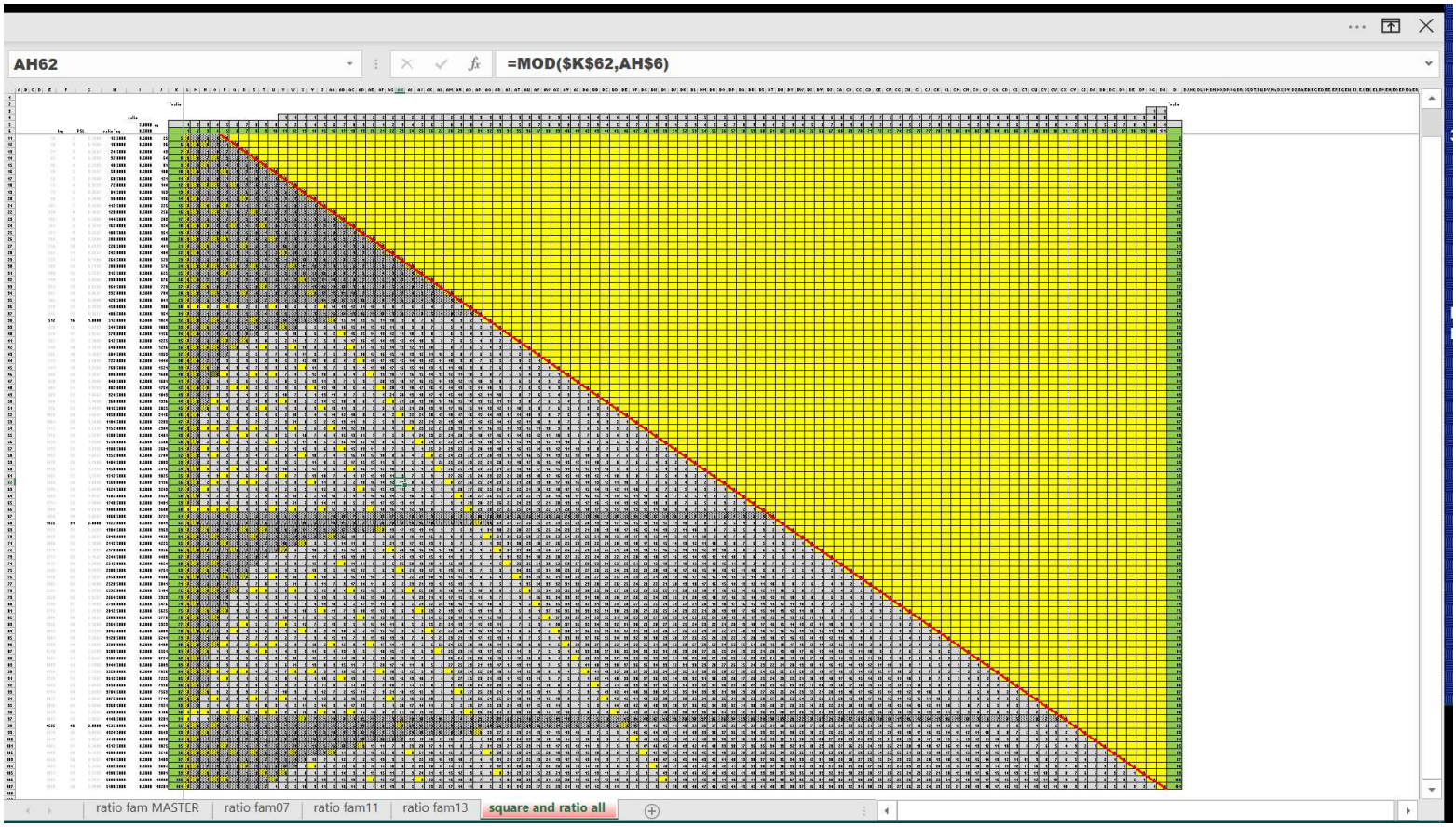
7 * 7 = 49 ; 21 * 21 = 441.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58
3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81	84	87
4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	88	92	96	100	104	108	112	116
5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145
6	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126	132	138	144	150	156	162	168	174
7	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147	154	161	168	175	182	189	196	203
8	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200	208	216	224	232
9	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180	189	198	207	216	225	234	243	252	261
10	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290
11	11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	187	198	209	220	231	242	253	264	275	286	297	308	319
12	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348
13	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351	364	377
14	14	28	42	56	70	84	98	112	126	140	154	168	182	196	210	224	238	252	266	280	294	308	322	336	350	364	378	392	406
15	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	375	390	405	420	435
16	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288	304	320	336	352	368	384	400	416	432	448	464
17	17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340	357	374	391	408	425	442	459	476	493
18	18	36	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306	324	342	360	378	396	414	432	450	468	486	504	522
19	19	38	57	76	95	114	133	152	171	190	209	228	247	266	285	304	323	342	361	380	399	418	437	456	475	494	513	532	551
20	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580
21	21	42	63	84	105	126	147	168	189	210	231	252	273	294	315	336	357	378	399	420	441	462	483	504	525	546	567	588	609
22	22	44	66	88	110	132	154	176	198	220	242	264	286	308	330	352	374	396	418	440	462	484	506	528	550	572	594	616	638
23	23	46	69	92	115	138	161	184	207	230	253	276	299	322	345	368	391	414	437	460	483	506	529	552	575	598	621	644	667
24	24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432	456	480	504	528	552	576	600	624	648	672	696
25	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650	675	700	725
26	26	52	78	104	130	156	182	208	234	260	286	312	338	364	390	416	442	468	494	520	546	572	598	624	650	676	702	728	754
27	27	54	81	108	135	162	189	216	243	270	297	324	351	378	405	432	459	486	513	540	567	594	621	648	675	702	729	756	783
28	28	56	84	112	140	168	196	224	252	280	308	336	364	392	420	448	476	504	532	560	588	616	644	672	700	728	756	784	812
29	29	58	87	116	145	174	203	232	261	290	319	348	377	406	435	464	493	522	551	580	609	638	667	696	725	754	783	812	841

This is the square and a ratio – how did I get here ? Maybe not needed !!!!!!!!!

This chart shows all numbers and – when the PSL is equal to an integer ; take and square PS then multiply by the ratio (1/PS) . Divide that number (ratio * sq) by PS to get an integer value 'try'. Paint the row with fill of 25%.

Got me nothing – but a pretty graph based on the weight of the numbers. No solid answer. Not enough time left.



	try	PSL	ratio * sq	ratio	sq
				7.0000	
				0.1429	
7	1	0.0000	7.0000	0.1429	49
185	5	1.0000	195.5714	0.1429	1369
603	9	2.0000	641.2857	0.1429	4489

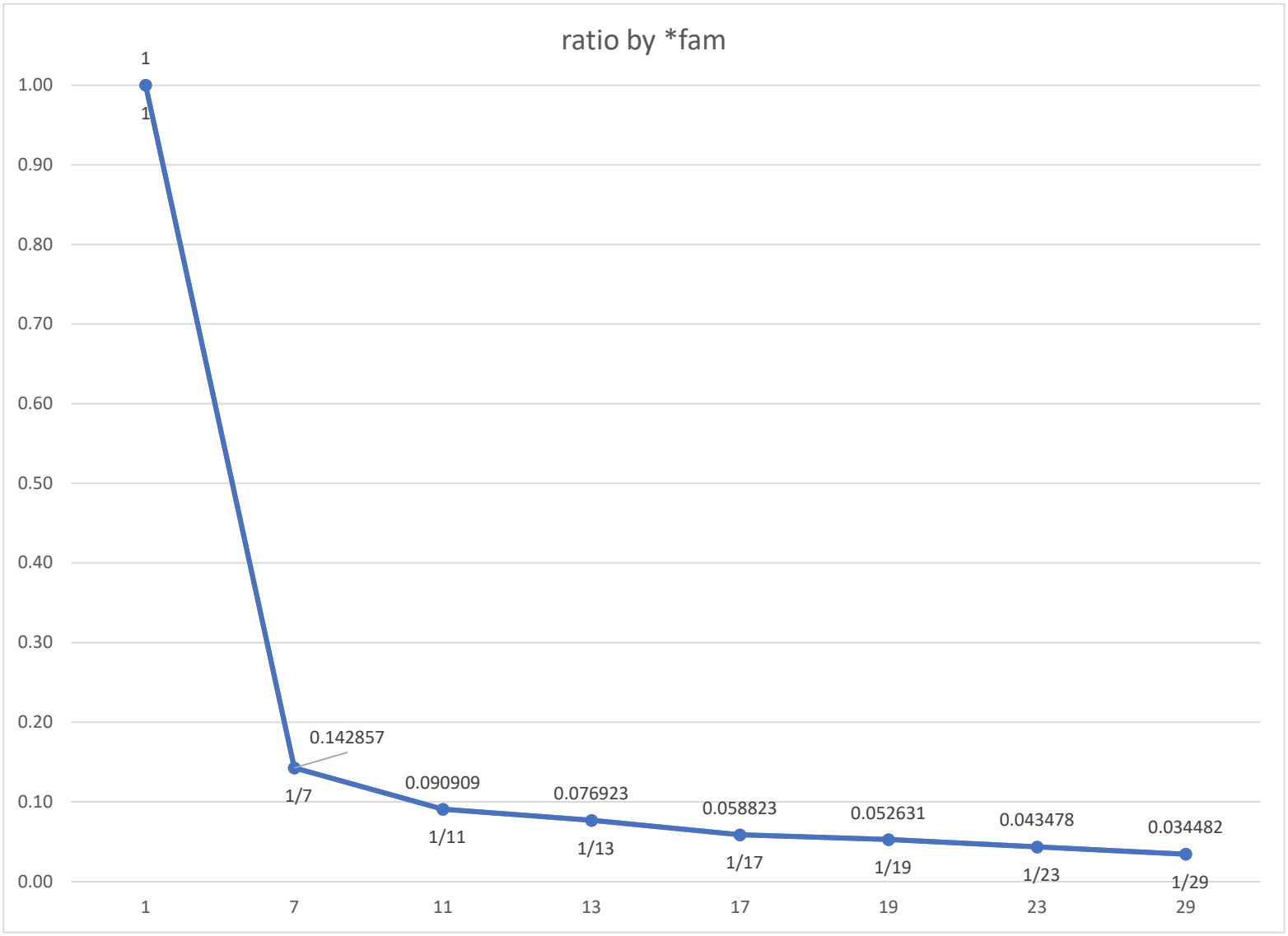
	try	PSL	ratio * sq	ratio	sq
				11.0000	
				0.0909	
11	1	0.0000	11.0000	0.0909	121
123	3	1.0000	152.8182	0.0909	1681
426	6	2.0000	458.2727	0.0909	5041

	try	PSL	ratio * sq	ratio	sq
				22.0000	
				0.0455	
22	1	0.0000	22.0000	0.0455	484
104	2	1.0000	122.9091	0.0455	2704
246	3	2.0000	305.6364	0.0455	6724

This is the inverse of the *fam for the eight equations.

Generated by “1 seventh 0b.xlsx”

Use tab “ratio look up” to test data.

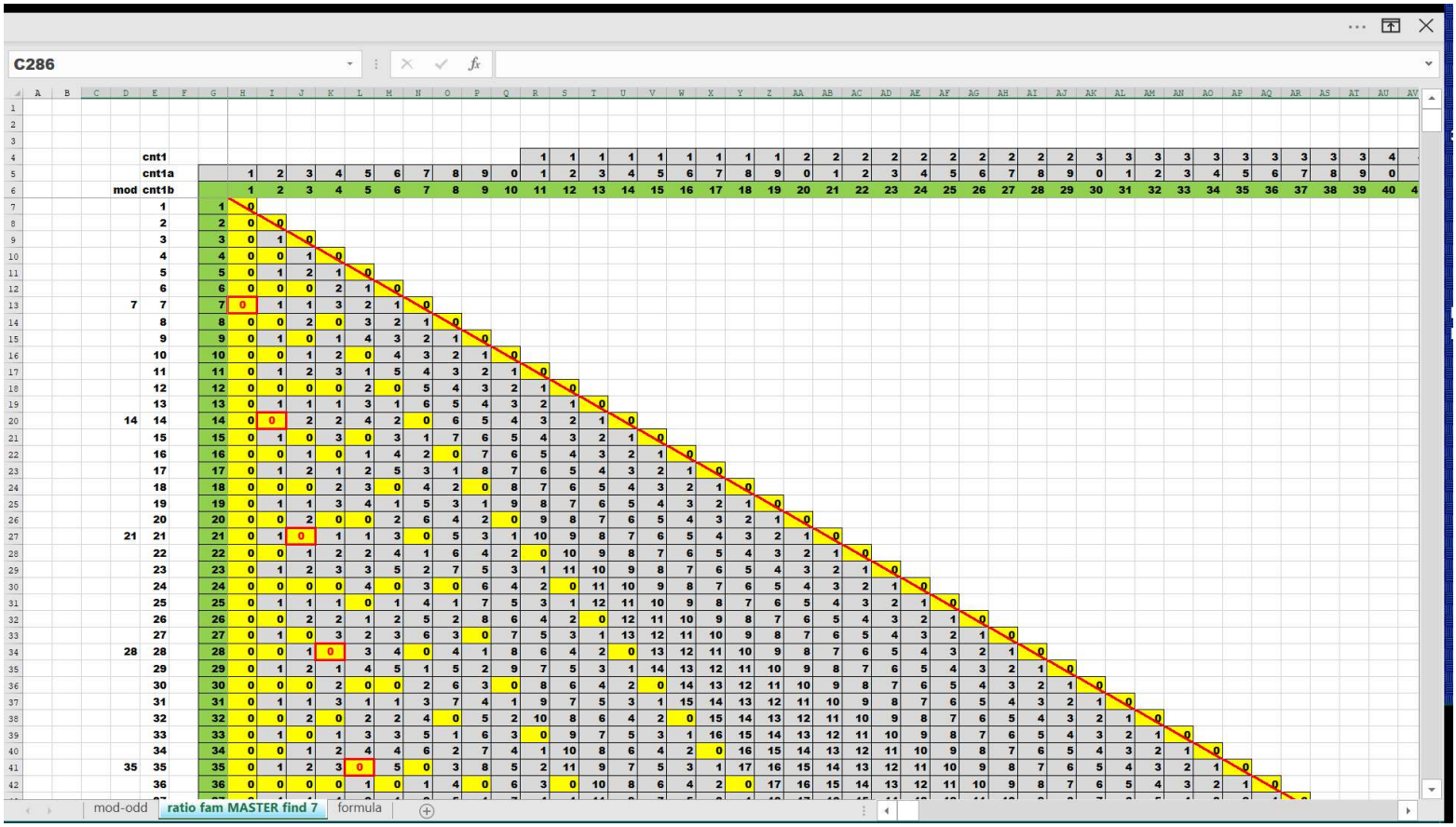


On to the next search . . .

The far-right red slash is the corner away from the PS. It is the column of PS.

The red boxes and red numbers inside are the value of seven (7) and its MOD()=0.

This is 1/7 (0.142859) of the total for the row.



All other *fam are less than 1/7.

***fam01 = 1/1 = 1 (highest probability of prime)**

***fam07 = 1/7 = 0.124859**

***fam11 = 1/11 = 0.090909**

***fam13 = 1/13 = 0.076923**

***fam17 = 1/17 = 0.058823**

***fam19 = 1/19 = 0.052631**

***fam23 = 1/23 = 0.043478**

***fam29 = 1/29 = 0.034482 (lowest probability of prime)**

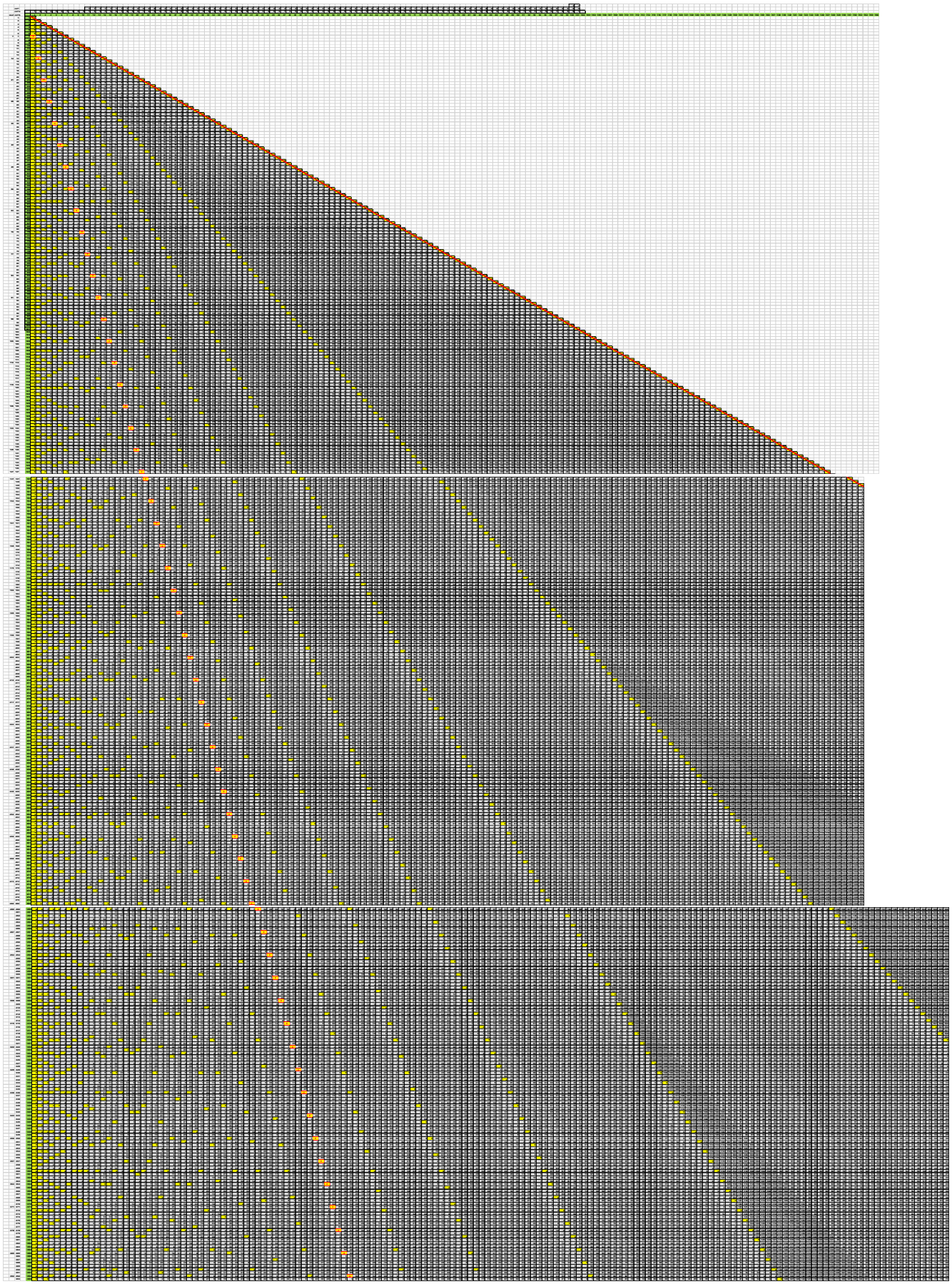
The last sort – start here

Everything to the left of the red 7 boxes is where to look up to after making the right turn. It is the limit of the search using the sub-keys.

The three below screen prints are contiguous segments showing *fam07 and 1/7 and 0.142859.

Note the curve formed by the weight of the numbers. The numbers by themselves present a graph. Follow the seven line. The sets of lines to the right of *fam07 are *fam01 , *fam02 , *fam03 , . . . , *fam06. Which have been discarded using prior sorts.

Take note in the 2nd and 3rd slides of the wave to the left of *fam07. More latter some other day. These appear to be of a mammatus formation.



The groundwork has been laid on to 'in the neighborhood of' . . .

try = int(PS / 7) + 1

PS	23	Comments
ratio of 1/7	0.142859	1/7 = 0.142859
'try decmial' PS (23) * ratio (0.1429)	3.285714	
int(try decimal)	3.000000	
plus 1	1	round up +1 - account for decimal
try	4	try 4 times ; if no MOD() = zero , then prime
limit	92	(try times PS) = limit = (4 times 23) = 92

if it is not going to happen in the first 1/7
then it is a prime

look 'in the neighborhood of' related try's
all the neighbors have at least one MOD() = 0

"within reason . . ."

					Prime																											
			ratio													1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
			0.0000	sq		1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8
limit	try	ratio * sq	0.1429			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
84	4	63.0000	0.1429	441	21	0	1	0	1	1	3	0	5	3	1	10	9	8	7	6	5	4	3	2	1	0							
88	4	69.1429	0.1429	484	22	0	0	1	2	2	4	1	6	4	2	0	10	9	8	7	6	5	4	3	2	1	0						
92	4	75.5714	0.1429	529	23	0	1	2	3	3	5	2	7	5	3	1	11	10	9	8	7	6	5	4	3	2	1	0					
96	4	82.2857	0.1429	576	24	0	0	0	0	4	0	3	0	6	4	2	0	11	10	9	8	7	6	5	4	3	2	1	0				
100	4	89.2857	0.1429	625	25	0	1	1	1	0	1	4	1	7	5	3	1	12	11	10	9	8	7	6	5	4	3	2	1	0			
104	4	96.5714	0.1429	676	26	0	0	2	2	1	2	5	2	8	6	4	2	0	12	11	10	9	8	7	6	5	4	3	2	1	0		
108	4	104.1429	0.1429	729	27	0	1	0	3	2	3	6	3	0	7	5	3	1	13	12	11	10	9	8	7	6	5	4	3	2	1	0	

Look at 23 – prime ; look at all of his neighbors. There is at least one 0 yellow zero within the number of tries four (4).

Looking at 59 and 61 , both fall in the ‘try’ of nine (9).

PS	**59**	**Comments**
ratio of 1/7	**0.142859**	**1/7 = 0.142859**
'try decmial' PS (59) * ratio (0.1429)	**8.428571**	
int(try decimal)	**8.000000**	
plus 1	**1**	**round up +1 - account for decimal**
try	**9**	**try 9 times ; if no MOD() = zero , then prime**
limit	**531**	**(try times PS) = limit = (9 times 59) = 531**
		if it is not going to happen in the first 1/7 **then it is a prime**
		look 'in the neighborhood of' related try's **all the neighbors have at least one MOD() = 0** **"within reason . . ."**

PS	**61**	**Comments**
ratio of 1/7	**0.142859**	**1/7 = 0.142859**
'try decmial' PS (61) * ratio (0.1429)	**8.714286**	
int(try decimal)	**8.000000**	
plus 1	**1**	**round up +1 - account for decimal**
try	**9**	**try 9 times ; if no MOD() = zero , then prime**
limit	**549**	**(try times PS) = limit = (9 times 61) = 549**
		if it is not going to happen in the first 1/7 **then it is a prime**
		look 'in the neighborhood of' related try's **all the neighbors have at least one MOD() = 0** **"within reason . . ."**

					Prime																				
			ratio												1	1	1	1	1	1	1	1	1	1	2
			0.0000	sq		1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
limit	try	ratio * sq	0.1429			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
504	9	448.0000	0.1429	3136	56	0	0	2	0	1	2	0	0	2	6	1	8	4	0	11	8	5	2	18	16
513	9	464.1429	0.1429	3249	57	0	1	0	1	2	3	1	1	3	7	2	9	5	1	12	9	6	3	0	17
522	9	480.5714	0.1429	3364	58	0	0	1	2	3	4	2	2	4	8	3	10	6	2	13	10	7	4	1	18
531	9	497.2857	0.1429	3481	59	0	1	2	3	4	5	3	3	5	9	4	11	7	3	14	11	8	5	2	19
540	9	514.2857	0.1429	3600	60	0	0	0	0	0	0	4	4	6	0	5	0	8	4	0	12	9	6	3	0
549	9	531.5714	0.1429	3721	61	0	1	1	1	1	1	5	5	7	1	6	1	9	5	1	13	10	7	4	1
558	9	549.1429	0.1429	3844	62	0	0	2	2	2	2	6	6	8	2	7	2	10	6	2	14	11	8	5	2

	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
limit	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
504	14	12	10	8	6	4	2	0	27	26	25	24	23	22	21	20	19	18	17	16	15
513	15	13	11	9	7	5	3	1	28	27	26	25	24	23	22	21	20	19	18	17	16
522	16	14	12	10	8	6	4	2	0	28	27	26	25	24	23	22	21	20	19	18	17
531	17	15	13	11	9	7	5	3	1	29	28	27	26	25	24	23	22	21	20	19	18
540	18	16	14	12	10	8	6	4	2	0	29	28	27	26	25	24	23	22	21	20	19
549	19	17	15	13	11	9	7	5	3	1	30	29	28	27	26	25	24	23	22	21	20
558	20	18	16	14	12	10	8	6	4	2	0	30	29	28	27	26	25	24	23	22	21

	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	6	6	6
	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2
limit	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
504	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0						
513	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0					
522	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0				
531	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
540	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
549	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
558	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

The nine column is the max number of tries. The other values ‘in the neighborhood’ have at least one 0 yellow zero within the number of tries nine (9).

If it has not happened within nine (9) tries it is not going to happen. Must be prime.

Looking at 79 and 83 , both fall in the 'try' of twelve (12).

PS	79	Comments
ratio of 1/7	0.142859	1/7 = 0.142859
'try decmial' PS (79) * ratio (0.1429)	11.285714	
int(try decimal)	11.000000	
plus 1	1	round up +1 - account for decimal
try	12	try 12 times ; if no MOD() = zero , then prime
limit	948	(try times PS) = limit = (12 times 79) = 948

if it is not going to happen in the first 1/7
then it is a prime

look 'in the neighborhood of' related try's
all the neighbors have at least one MOD() = 0

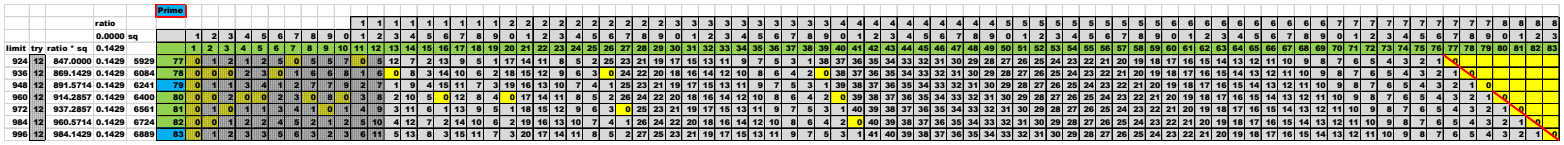
"within reason . . ."

PS	83	Comments
ratio of 1/7	0.142859	1/7 = 0.142859
'try decmial' PS (83) * ratio (0.1429)	11.857143	
int(try decimal)	11.000000	
plus 1	1	round up +1 - account for decimal
try	12	try 12 times ; if no MOD() = zero , then prime
limit	996	(try times PS) = limit = (12 times 83) = 996

if it is not going to happen in the first 1/7
then it is a prime

look 'in the neighborhood of' related try's
all the neighbors have at least one MOD() = 0

"within reason . . ."



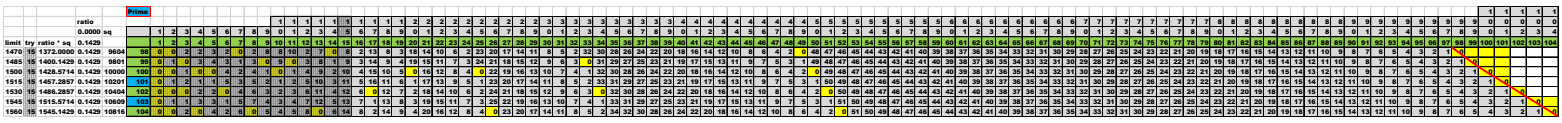
The twelve column is the max number of tries. The other values 'in the neighborhood' have at least one 0 yellow zero within the number of tries twelve.

If it has not happened within twelve (12) tries it is not going to happen. Must be prime.

Looking at 101 and 103 , both fall in the ‘try’ of fifteen (15).

PS	101	Comments
ratio of 1/7	0.142859	1/7 = 0.142859
'try decmial' PS (101) * ratio (0.1429)	14.428571	
int(try decimal)	14.000000	
plus 1	1	round up +1 - account for decimal
try	15	try 15 times ; if no MOD() = zero , then prime
limit	1515	(try times PS) = limit = (15 times 101) = 1515
		if it is not going to happen in the first 1/7 then it is a prime
		look 'in the neighborhood of' related try's all the neighbors have at least one MOD() = 0 "within reason . . ."

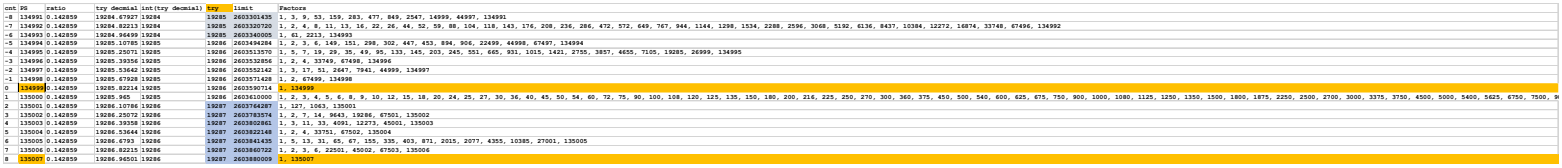
PS	103	Comments
ratio of 1/7	0.142859	1/7 = 0.142859
'try decmial' PS (103) * ratio (0.1429)	14.714286	
int(try decimal)	14.000000	
plus 1	1	round up +1 - account for decimal
try	15	try 15 times ; if no MOD() = zero , then prime
limit	1545	(try times PS) = limit = (15 times 103) = 1545
		if it is not going to happen in the first 1/7 then it is a prime
		look 'in the neighborhood of' related try's all the neighbors have at least one MOD() = 0 "within reason . . ."



The fifteen column is the max number of tries. The other values ‘in the neighborhood’ have at least one 0 yellow zero within the number of tries fifteen.

If it has not happened within fifteen (15) tries it is not going to happen. Must be prime.

Here is an image of a range surrounding two primes (134999 and 135007) and their “in the neighborhood’ numbers.



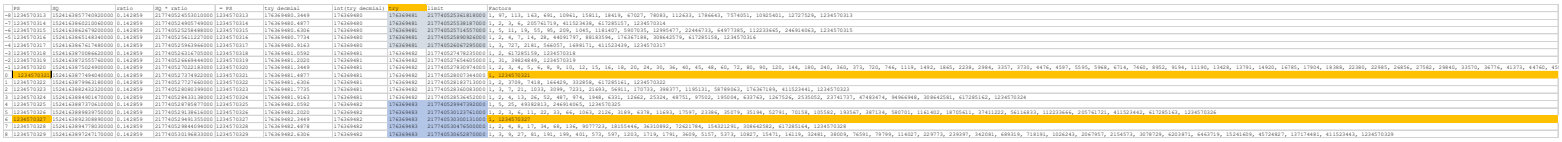
Bigger view.

cnt	PS	ratio	try decmial	int(try decmial)	try	limit	a few factors
-8	134991	0.142859	19284.67927	19284	19285	2603301435	1, 3, 9, 5
-7	134992	0.142859	19284.82213	19284	19285	2603320720	1, 2, 4, 8
-6	134993	0.142859	19284.96499	19284	19285	2603340005	1, 61, 221
-5	134994	0.142859	19285.10785	19285	19286	2603494284	1, 2, 3, 6
-4	134995	0.142859	19285.25071	19285	19286	2603513570	1, 5, 7, 1
-3	134996	0.142859	19285.39356	19285	19286	2603532856	1, 2, 4, 3
-2	134997	0.142859	19285.53642	19285	19286	2603552142	1, 3, 17,
-1	134998	0.142859	19285.67928	19285	19286	2603571428	1, 2, 6749
0	134999	0.142859	19285.82214	19285	19286	2603590714	1, 134999
1	135000	0.142859	19285.965	19285	19286	2603610000	1, 2, 3, 4
2	135001	0.142859	19286.10786	19286	19287	2603764287	1, 127, 10
3	135002	0.142859	19286.25072	19286	19287	2603783574	1, 2, 7, 1
4	135003	0.142859	19286.39358	19286	19287	2603802861	1, 3, 11,
5	135004	0.142859	19286.53644	19286	19287	2603822148	1, 2, 4, 3
6	135005	0.142859	19286.6793	19286	19287	2603841435	1, 5, 13,
7	135006	0.142859	19286.82215	19286	19287	2603860722	1, 2, 3, 6
8	135007	0.142859	19286.96501	19286	19287	2603880009	1, 135007

Test up to try = 19,286 for prime 134,999

Test up to try = 19,287 for prime 135,007

Here is an image of a range surrounding two primes (1234570321 and 1234570327) and their “in the neighborhood’ numbers.



Bigger view.

cnt	PS	ratio	try decmial	int(try decmial)	try	limit	a few factors
-8	1234570313	0.142859	176369480.3	176369480	176369481	217740525361818000	1, 97, 113
-7	1234570314	0.142859	176369480.5	176369480	176369481	217740525538187000	1, 2, 3, 6
-6	1234570315	0.142859	176369480.6	176369480	176369481	217740525714557000	1, 5, 11,
-5	1234570316	0.142859	176369480.8	176369480	176369481	217740525890926000	1, 2, 4, 7
-4	1234570317	0.142859	176369480.9	176369480	176369481	217740526067295000	1, 3, 727,
-3	1234570318	0.142859	176369481.1	176369481	176369482	217740527478235000	1, 2, 6172
-2	1234570319	0.142859	176369481.2	176369481	176369482	217740527654605000	1, 31, 398
-1	1234570320	0.142859	176369481.3	176369481	176369482	217740527830974000	1, 2, 3, 4
0	1234570321	0.142859	176369481.5	176369481	176369482	217740528007344000	1, 1234570
1	1234570322	0.142859	176369481.6	176369481	176369482	217740528183713000	1, 2, 3709
2	1234570323	0.142859	176369481.8	176369481	176369482	217740528360083000	1, 3, 7, 2
3	1234570324	0.142859	176369481.9	176369481	176369482	217740528536452000	1, 2, 4, 1
4	1234570325	0.142859	176369482.1	176369482	176369483	217740529947392000	1, 5, 25,
5	1234570326	0.142859	176369482.2	176369482	176369483	217740530123761000	1, 2, 3, 6
6	1234570327	0.142859	176369482.3	176369482	176369483	217740530300131000	1, 1234570
7	1234570328	0.142859	176369482.5	176369482	176369483	217740530476500000	1, 2, 4, 8
8	1234570329	0.142859	176369482.6	176369482	176369483	217740530652870000	1, 3, 9, 2

Test up to try = 176,369,482 for prime 1,234,570,321

Test up to try = 176,369,483 for prime 1,234,570,327

By setting a limit to ‘try’ to equal to 1/7 we have eliminated 6/7’s of the numbers to test.

Sorted off 6/7’s.