





A Prime Number is a number greater than I that has no other factors except itself and I. (A factor is a number that divides evenly into another number)



Examples of Prime Numbers are: 7 (7 x l); 11 (11 x l); 17 (17 x l); 41 (41 x l)





## Number I is not considered prime as it has only one factor – I.The first Prime Number is

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2.





## If a number is not a Prime Number, it is said to be **Composite**.





## Examples of **Composite** Numbers are: 9 (9 x I and 3 x 3); $12(12 \times 1 \text{ and } 4 \times 3 \text{ and } 6 \times 2);$ $20 (20 \times 1 \text{ and } 10 \times 2 \text{ and } 4 \times 5)$





#### Sieve of Eratosthenes

Eratosthenes (275-194 BC, Greece) devised a "sieve" to discover Prime Numbers. Eratosthenes's sieve gets rid of the Composite Numbers and leaves you with the Prime Numbers.





Use your 100 Square to find out how many Prime Numbers there are between I and 100, using Eratosthenes's sieve:

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	30	
31	32	33	34	35	36	37	38	39	40	
41	42	43	44	45	46	47	48	49	50	
51	52	53	54	55	56	57	58	59	60	
61	62	63	64	65	66	67	68	69	70	
71	72	73	74	75	76	77	78	79	80	
81	82	83	84	85	86	87	88	89	90	
91	92	93	94	95	96	97	98	99	100	
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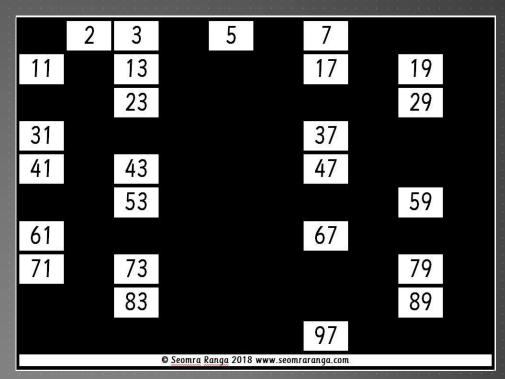


- Cross out I as it's not prime
- Circle 2 and then cross out every multiple of 2 (ie every second number)
- Circle 3 and then cross out every multiple of 3 (ie every third number)
- Circle 5 and then cross out every multiple of 5
- Continue doing this until all the numbers have either been circled or crossed out.
  - You should now have circled all the prime numbers from 1 to 100



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You should have found 25 Prime Numbers between I and 100



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Use your completed 100 Square to find out:

What is the 8<sup>th</sup> Prime Number
What is the 13<sup>th</sup> Prime Number
What is the 24<sup>th</sup> Prime Number



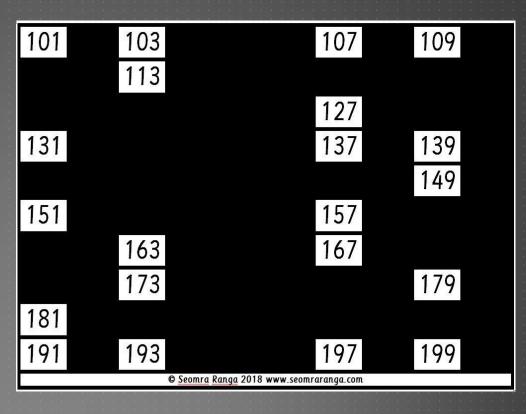


Now use your 200 Square to find out how many Prime Numbers there are between 101 and 200, using Eratosthenes's sieve:

101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200
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You should have found 21 Prime Numbers between 101 and 200







#### **Prime Twins**

This is where (P, P + 2) are both prime numbers. Eg. (3, 5); (5, 7); (11, 13) Can you find any more Twin Primes?





#### **Prime Triplets** This is where (P, P + 2, P + 6) or (P, P + 2, P + 6)P + 4, P + 6) are all prime numbers. Eg. (5, 7, 11); (7, 11, 13) Can you find any more Prime **Triplets**?



Prime Quadruplets This is where (P, P + 2, P + 6, P + 8)are all prime numbers. Eg. (5, 7, 11, 13); (11, 13, 17, 19) Can you find any more Prime Quadruplets?





**Cousin Primes** This is where (P, P + 4) are both prime numbers. Eg. (3, 7); (7, 11); (13, 17)Can you find any more Cousin **Primes**?





#### **Additive Primes**

These are prime numbers whose sum of digits is also prime. Eg. 11, 23, 29, 41 Can you find any more Additive Primes?





# These are where P and (P – I) ÷ 2 are both prime numbers. Eg. 5, 7, II, 23 Can you find any more Safe Primes?





#### **Can you find out:** What is the 50<sup>th</sup> Prime Number? What is the 100<sup>th</sup> Prime Number What is the 1000<sup>th</sup> Prime Number How many Prime Numbers are there?





#### Did you know: The largest known Prime Number was discovered in December 2017. It is: 277,232,917

