

Sieve of Eratosthenes

This is how you work out what prime numbers are.

First you write down all the positive whole numbers in the world.

Then you take away all the numbers that are multiples of 2.

Then you take away all the numbers that are multiples of 3.

Then you take away all the numbers that are multiples of 4 and 5 and 6 and 7 and so on. The numbers that are left are the prime numbers.

— *The Curious Incident of the Dog in the Night-Time* by Mark Haddon

Since we cannot write down all the positive whole numbers in the world, we will just look at the numbers up to 250. The first prime number is 2, so we circle 2 and cross out the multiples of 2. Then the next number left is 3, so we circle 3 and cross out the multiples of 3. Continue until all that is left are the prime numbers. You will have done this when you have circled the numbers up to at most $\lfloor \sqrt{250} \rfloor = 15$ (why?).

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
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
201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250

Sieve of Eratosthenes — Completed

1	<u>2</u>	<u>3</u>	4	<u>5</u>	6	<u>7</u>	8	9	10
<u>11</u>	12	<u>13</u>	14	15	16	<u>17</u>	18	<u>19</u>	20
21	22	<u>23</u>	24	25	26	27	28	<u>29</u>	30
<u>31</u>	32	33	34	35	36	<u>37</u>	38	39	40
<u>41</u>	42	<u>43</u>	44	45	46	<u>47</u>	48	49	50
51	52	<u>53</u>	54	55	56	57	58	<u>59</u>	60
<u>61</u>	62	63	64	65	66	<u>67</u>	68	69	70
<u>71</u>	72	<u>73</u>	74	75	76	77	78	<u>79</u>	80
81	82	<u>83</u>	84	85	86	87	88	<u>89</u>	90
91	92	93	94	95	96	<u>97</u>	98	99	100
<u>101</u>	102	<u>103</u>	104	105	106	<u>107</u>	108	<u>109</u>	110
111	112	<u>113</u>	114	115	116	117	118	119	120
121	122	123	124	125	126	<u>127</u>	128	129	130
<u>131</u>	132	133	134	135	136	<u>137</u>	138	<u>139</u>	140
141	142	143	144	145	146	147	148	<u>149</u>	150
<u>151</u>	152	153	154	155	156	<u>157</u>	158	159	160
161	162	<u>163</u>	164	165	166	<u>167</u>	168	169	170
171	172	<u>173</u>	174	175	176	177	178	<u>179</u>	180
<u>181</u>	182	183	184	185	186	187	188	189	190
<u>191</u>	192	<u>193</u>	194	195	196	<u>197</u>	198	<u>199</u>	200
201	202	203	204	205	206	207	208	209	210
<u>211</u>	212	213	214	215	216	217	218	219	220
221	222	<u>223</u>	224	225	226	<u>227</u>	228	<u>229</u>	230
231	232	<u>233</u>	234	235	236	237	238	<u>239</u>	240
<u>241</u>	242	243	244	245	246	247	248	249	250