

Number of circles n	Radius of largest circle fitting into unit square (Data from Erich Specht)	Minimum area of square needed to cover n circles of diameter 1	Excess area needed beyond n
1	0.500000000000	1	0
2	0.292893218813	2.914213562	0.914213562
3	0.254333095030	3.864864354	0.864864354
4	0.250000000000	4	0
5	0.207106781187	5.828427125	0.828427125
6	0.187680601147	7.097431947	1.097431947
7	0.174457630187	8.214101615	1.214101615
8	0.170550688701	8.594746142	0.594746142
9	0.166666666667	9	7.19425E-13
10	0.148204322565	11.38199178	1.381991777
11	0.142399237696	12.32890993	1.328909931
12	0.139958844038	12.76260461	0.762604613
13	0.133993513499	13.92427072	0.924270724
14	0.129331793710	14.94615242	0.946152423
15	0.127166547515	15.45945742	0.459457418
16	0.125000000000	16	0
17	0.117196742783	18.20157315	1.201573151
18	0.115521432464	18.73332543	0.733325432
19	0.112265437571	19.8357151	0.835715097
20	0.111382347512	20.15149517	0.151495173
21	0.106860212352	21.89313439	0.893134388
22	0.105665296757	22.39109098	0.391090976
23	0.102802323380	23.65560984	0.655609841
24	0.101381800432	24.32316072	0.323160723
25	0.100000000000	25	0
26	0.096362339010	26.92311724	0.923117243
27	0.095420001748	27.45751113	0.45751113
28	0.093672804982	28.49134545	0.491345445
29	0.092463144040	29.24170525	0.241705249
30	0.091671057986	29.74921576	-0.250784243
31	0.089338333351	31.32306965	0.323069651
32	0.087858157088	32.38738099	0.387380989
33	0.087230014136	32.85550319	-0.144496806
34	0.085270344351	34.38301645	0.383016451
35	0.084290712122	35.18686403	0.186864028
36	0.083333333333	36	2.8777E-12
37	0.082089766099	37.09898025	0.098980253
38	0.081709678164	37.44492878	-0.555071225
39	0.081367527041	37.76050335	-1.239496651
40	0.079186751327	39.86896452	-0.13103548
41	0.078450202078	40.62111831	-0.378881693
42	0.077801502898	41.30132988	-0.69867012
43	0.076339806611	42.89808425	-0.101915751
44	0.075781955896	43.53197676	-0.468023241
45	0.074727343687	44.76936342	-0.230636584
46	0.074272199909	45.31974246	-0.680257537
47	0.073113151271	46.76802205	-0.231977952
48	0.072432291280	47.65138866	-0.348611339
49	0.071692681704	48.6396406	-0.360359401
50	0.071377103865	49.07068989	-0.929310109
51	0.071043138115	49.53312579	-1.466874212
52	0.070957693073	49.6524901	-2.347509896

53	0.069947248447	51.09739248	-1.902607518
54	0.068645540105	53.05366073	-0.946339266
55	0.068055360559	53.97781869	-1.022181309
56	0.067532596322	54.81672879	-1.18327121
57	0.067004873106	55.68359044	-1.316409556
58	0.066232983746	56.98904357	-1.010956428
59	0.065807107680	57.72904884	-1.270951159
60	0.065030412648	59.11626524	-0.88373476
61	0.064666268906	59.78392176	-1.216078237
62	0.064252183294	60.55698291	-1.443017093
63	0.064011528205	61.01317388	-1.986826116
64	0.063458986813	62.08029056	-1.919709438
65	0.063203957072	62.58229275	-2.417707251
66	0.062862155717	63.26470226	-2.735297739
67	0.062587429542	63.82131931	-3.178680687
68	0.062520033463	63.95899119	-4.041008814
69	0.061383571686	66.34920126	-2.650798743
70	0.060596693631	68.08354369	-1.91645631
71	0.060096531352	69.22153034	-1.77846966
72	0.059801002127	69.90738952	-2.092610479
73	0.059358711984	70.9530504	-2.046949598
74	0.059082376337	71.61831508	-2.381684923
75	0.058494535281	73.06500505	-1.934994946
76	0.058198524936	73.8101442	-2.189855796
77	0.057851222684	74.69902346	-2.300976544
78	0.057702476635	75.08463969	-2.91536031
79	0.057508497795	75.59202193	-3.407978069
80	0.057370684147	75.95562661	-4.044373387
81	0.056869921112	77.29915689	-3.700843111
82	0.056512271650	78.28065994	-3.719340059
83	0.056129373022	79.35231962	-3.647680383
84	0.055856665888	80.12904946	-3.870950541
85	0.055678405372	80.64295467	-4.357045329
86	0.055572358492	80.95102486	-5.048975143
87	0.054695259721	83.56811975	-3.43188025
88	0.054406262199	84.45827914	-3.541720858
89	0.053947040858	85.90229243	-3.097707566
90	0.053749948307	86.53342767	-3.466572334
91	0.053496719883	87.35458402	-3.645415977
92	0.053317085174	87.94420177	-4.055798235
93	0.052926433388	89.24723116	-3.752768839
94	0.052795362727	89.6909146	-4.309085401
95	0.052420282019	90.97903006	-4.020969936
96	0.052275425470	91.48393912	-4.516060879
97	0.052114795502	92.04875795	-4.951242045
98	0.052032947182	92.33857286	-5.661427143
99	0.051978606450	92.53174343	-6.468256573
100	0.051400605861	94.6244858	-5.375514196
101	0.050612674087	97.59362317	-3.406376828
102	0.050378100041	98.50458364	-3.495416357
103	0.050043297110	99.82703626	-3.172963743
104	0.049827614852	100.6931231	-3.306876948
105	0.049652951071	101.4027838	-3.5972162
106	0.049386974333	102.4979474	-3.502052608
107	0.049102067955	103.6908519	-3.309148077
108	0.048910741068	104.5036652	-3.496334783
109	0.048796382400	104.9940665	-4.005933513
110	0.048552451127	106.0517133	-3.948286685