

MTH 151, Homework #5 Key

①

1a. 12

1, 2, 3, 4, 6, 12

b. 60

1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60

c. 172

1, 2, 4, 43, 86, 172

d. 210

1, 2, 3, 5, 6, 7, 10, 14, 15, 21, 30, 35, 42, 70, 105, 210

e. 400

1, 2, 4, 5, 8, 10, 16, 20, 25, 40, 50, 80, 100, 200, 400

f. 1075

1, 5, 25, 43, 215, 1075

2a. 321

2-no, 3-yes, 4-no, 5-no, 6-no, 8-no, 9-no, 10-no, 12-no

b. 540

2-yes, 3-yes, 4-yes, 5-yes, 6-yes, 8-no, 9-yes, 10-yes, 12-yes

c. 36,360

2-yes, 3-yes, 4-yes, 5-yes, 6-yes, 8-yes, 9-yes, 10-yes, 12-yes

d. 123,456,789

2-no, 3-yes, 4-no, 5-no, 6-no, 8-no, 9-yes, 10-no, 12-no

3a. $126 = 2 \cdot 3^2 \cdot 7$

b. $825 = 3 \cdot 5^2 \cdot 11$

c. $1183 = 7 \cdot 13^2$

d. $340 = 2^2 \cdot 5 \cdot 17$

4. Every integer is either divisible by 4 ($4k$), or when divided by 4 has a remainder of 1 ($4k+1$), a remainder of 2 ($4k+2$), or a remainder of 3 ($4k+3$). There are no other options. And all integers are accounted for, so this is a partition.

5. $F_n = 2^{2^n} + 1$

a. $n=4$, $F_4 = 257$ prime

b. $n=6$, $F_6 = 4097$ $17 * \boxed{241}$ composite

c. $n=7$, $F_7 = 16,385$ composite $5 * 29 * \boxed{113}$

6. $M_n = 2^n - 1$

a. $n=5$, $M_5 = 31$ prime

b. $n=7$, $M_7 = 127$ prime

c. $n=15$, $M_{15} = 32,767$ $7 * 31 * \boxed{151}$ composite

d. $n=23$, $M_{23} = 8,388,607$ prime

7. 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610

8. $\frac{610}{377} = 1.618037135$

9. $\frac{1+\sqrt{5}}{2} = 1.618033989$

10. $F_{21} = 10,946$

11. $F_{120} \approx 5,358 \times 10^{21}$

12. $\varphi^2 = \varphi + 1$ $\varphi^3 = \varphi^2 + \varphi = \varphi + 1 + \varphi = 2\varphi + 1$ $\varphi^4 = \varphi(2\varphi + 1) = 2\varphi^2 + \varphi = 2(\varphi + 1) + \varphi = 3\varphi + 2$ $\varphi^5 = \varphi(3\varphi + 2) = 3\varphi^2 + 2\varphi = 3(\varphi + 1) + 2\varphi = 5\varphi + 3$ $\varphi^6 = \varphi(5\varphi + 3) = 5\varphi^2 + 3\varphi = 5(\varphi + 1) + 3\varphi = 8\varphi + 5$

③

12 contd

$$\phi^7 = \phi(8\phi + 5) = 8\phi^2 + 5\phi = 8(\phi + 1) + 5\phi = 13\phi + 8 \quad \phi^8 = \phi(13\phi + 8)$$

$$= 13\phi^2 + 8\phi + 13(\phi + 1) + 8\phi = 21\phi + 13 \quad \phi^9 = \phi(21\phi + 13) =$$

$$21\phi^2 + 13\phi = 21(\phi + 1) + 13\phi = 34\phi + 21 \quad \phi^{10} = \phi(34\phi + 21) =$$

$$34\phi^2 + 21\phi = 34(\phi + 1) + 21\phi = \boxed{55\phi + 34}$$

13. answers will vary

14. $89 = 55 + 34$

55 rabbits will be born

144 in next generation

15. a yes, b no

16. a. 1, 1, 2, 3



$$1^2 + 2^2 = 5$$

$$1 \times 3 = 3$$

$$1 \times 2 \times 2 = 4$$

3, 4, 5

$$3^2 + 4^2 = 8^2 \quad \checkmark$$

b. 2, 3, 5, 8



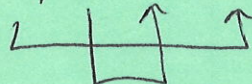
$$3^2 + 5^2 = 9 + 25 = 34$$

$$2 \times 8 = 16$$

$$3 \times 5 \times 2 = 30$$

$$16^2 + 30^2 = 34^2 \quad \checkmark$$

c. 5, 8, 13, 21



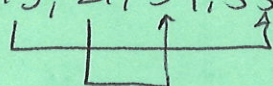
$$8^2 + 13^2 = 233$$

$$5 \times 21 = 105$$

$$8 \times 13 \times 2 = 208$$

$$105^2 + 208^2 = 233^2 \quad \checkmark$$

b. 13, 21, 34, 55



$$21^2 + 34^2 = 1597$$

$$13 \times 55 = 715$$

$$21 \times 34 \times 2 = 1428$$

$$715^2 + 1428^2 = 1597^2 \quad \checkmark$$

257 16.03122 PRIME

Divisor	1	2	3	4	5	6	7	8	9	10	11	12	13
Quotient	257	128.5	85.666667	64.25	51.4	42.83333	36.71429	32.125	28.55556	25.7	23.363636	21.41667	19.769231
	14	15	16										
	18.35714	17.1333333	16.0625										

4097 64.00781 COMPOSITE

Divisor	1	2	3	4	5	6	7	8	9	10	11	12	13
Quotient	4097	2048.5	1365.6667	1024.25	819.4	682.8333	585.2857	512.125	455.2222	409.7	372.45455	341.4167	315.15385
	14	15	16	17	18	19	20	21	22	23	24	25	26
	292.6429	273.133333	256.0625	241	227.61111	215.6316	204.85	195.0952	186.2273	178.1304	170.70833	163.88	157.57692
	27	28	29	30	31	32	33	34	35	36	37	38	39
	151.7407	146.321429	141.27586	136.5666667	132.16129	128.0313	124.1515	120.5	117.0571	113.8056	110.72973	107.8158	105.05128
	40	41	42	43	44	45	46	47	48	49	50	51	52
	102.425	99.9268293	97.547619	95.27906977	93.113636	91.04444	89.06522	87.17021	85.35417	83.61224	81.94	80.33333	78.788462
	53	54	55	56	57	58	59	60	61	62	63	64	65
	77.30189	75.8703704	74.490909	73.16071429	71.877193	70.63793	69.44068	68.28333	67.16393	66.08065	65.031746	64.01563	63.030769

16385 128.0039 COMPOSITE

Divisor	1	2	3	4	5	6	7	8	9	10	11	12	13
Quotient	16385	8192.5	5461.6667	4096.25	3277	2730.833	2340.714	2048.125	1820.556	1638.5	1489.5455	1365.417	1260.3846
	14	15	16	17	18	19	20	21	22	23	24	25	26
	1170.357	1092.33333	1024.0625	963.8235294	910.27778	862.3684	819.25	780.2381	744.7727	712.3913	682.70833	655.4	630.19231
	27	28	29	30	31	32	33	34	35	36	37	38	39
	606.8519	585.178571	565	546.1666667	528.54839	512.0313	496.5152	481.9118	468.1429	455.1389	442.83784	431.1842	420.12821
	40	41	42	43	44	45	46	47	48	49	50	51	52
	409.625	399.634146	390.11905	381.0465116	372.38636	364.1111	356.1957	348.617	341.3542	334.3878	327.7	321.2745	315.09615
	53	54	55	56	57	58	59	60	61	62	63	64	65
	309.1509	303.425926	297.90909	292.5892857	287.45614	282.5	277.7119	273.0833	268.6066	264.2742	260.07937	256.0156	252.07692
	66	67	68	69	70	71	72	73	74	75	76	77	78
	248.2576	244.552239	240.95588	237.4637681	234.07143	230.7746	227.5694	224.4521	221.4189	218.4667	215.59211	212.7922	210.0641
	79	80	81	82	83	84	85	86	87	88	89	90	91
	207.4051	204.8125	202.28395	199.8170732	197.40964	195.0595	192.7647	190.5233	188.3333	186.1932	184.10112	182.0556	180.05495
	92	93	94	95	96	97	98	99	100	101	102	103	104

178.0978	176.182796	174.30851	172.4736842	170.67708	168.9175	167.1939	165.5051	163.85	162.2277	160.63725	159.0777	157.54808
105	106	107	108	109	110	111	112	113	114	115	116	117
156.0476	154.575472	153.13084	151.712963	150.3211	148.9545	147.6126	146.2946	145	143.7281	142.47826	141.25	140.04274
118	119	120	121	122	123	124	125	126	127	128	129	
138.8559	137.689076	136.54167	135.4132231	134.30328	133.2114	132.1371	131.08	130.0397	129.0157	128.00781	127.0155	

31	5.567764 PRIME	2	3	4	5	6
Quotient	31	15.5	10.333333	7.75	6.2	5.166667

127	11.26943 PRIME	2	3	4	5	6	7	8	9	10	11	12
Quotient	127	63.5	42.333333	31.75	25.4	21.16667	18.14286	15.875	14.11111	12.7	11.545455	10.58333

32767 181.0166 COMPOSITE

1	2	3	4	5	6	7	8	9	10	11	12	13
32767	16383.5	10922.333	8191.75	6553.4	5461.167	4681	4095.875	3640.778	3276.7	2978.8182	2730.583	2520.5385
14	15	16	17	18	19	20	21	22	23	24	25	26
2340.5	2184.46667	2047.9375	1927.470588	1820.3889	1724.579	1638.35	1560.333	1489.409	1424.652	1365.2917	1310.68	1260.2692
27	28	29	30	31	32	33	34	35	36	37	38	39
1213.593	1170.25	1129.8966	1092.233333	1057	1023.969	992.9394	963.7353	936.2	910.1944	885.59459	862.2895	840.17949
40	41	42	43	44	45	46	47	48	49	50	51	52
819.175	799.195122	780.16667	762.0232558	744.70455	728.1556	712.3261	697.1702	682.6458	668.7143	655.34	642.4902	630.13462
53	54	55	56	57	58	59	60	61	62	63	64	65
618.2453	606.796296	595.76364	585.125	574.85965	564.9483	555.3729	546.1167	537.1639	528.5	520.11111	511.9844	504.10769
66	67	68	69	70	71	72	73	74	75	76	77	78
496.4697	489.059701	481.86765	474.884058	468.1	461.507	455.0972	448.863	442.7973	436.8933	431.14474	425.5455	420.08974
79	80	81	82	83	84	85	86	87	88	89	90	91
414.7722	409.5875	404.53086	399.597561	394.78313	390.0833	385.4941	381.0116	376.6322	372.3523	368.16854	364.0778	360.07692
92	93	94	95	96	97	98	99	100	101	102	103	104
356.163	352.333333	348.58511	344.9157895	341.32292	337.8041	334.3571	330.9798	327.67	324.4257	321.2451	318.1262	315.06731
105	106	107	108	109	110	111	112	113	114	115	116	117
312.0667	309.122642	306.23364	303.3981481	300.61468	297.8818	295.1982	292.5625	289.9735	287.4298	284.93043	282.4741	280.05983
118	119	120	121	122	123	124	125	126	127	128	129	130

8388607 2896.309 PRIME

277.6864	275.352941	273.05833	270.8016529	268.58197	266.3984	264.25	262.136	260.0556	258.0079	255.99219	254.0078	252.05385
131	132	133	134	135	136	137	138	139	140	141	142	143
250.1298	248.234848	246.36842	244.5298507	242.71852	240.9338	239.1752	237.442	235.7338	234.05	232.39007	230.7535	229.13986
144	145	146	147	148	149	150	151	152	153	154	155	156
227.5486	225.97931	224.43151	222.9047619	221.39865	219.9128	218.4467	217	215.5724	214.1634	212.77273	211.4	210.04487
157	158	159	160	161	162	163	164	165	166	167	168	169
208.707	207.386076	206.08176	204.79375	203.52174	202.2654	201.0245	199.7988	198.5879	197.3916	196.20958	195.0417	193.88757
170	171	172	173	174	175	176	177	178	179	180	181	182
192.7471	191.619883	190.50581	189.4046243	188.31609	187.24	186.1761	185.1243	184.0843	183.0559	182.03889	181.0331	180.03846

Divisor 1 2 3 5 7 9 11 13 15 17 19 21 23

Quotient	8388607	4194303.5	2796202.3	1677721.4	1198372.4	932067.4	762600.6	645277.5	559240.5	493447.5	441505.63	399457.5	364722.04
	21	23	25	27	29	31	33	35	37	39	41	43	45
	399457.5	364722.043	335544.28	310689.1481	289262.31	270600.2	254200.2	239674.5	226719.1	215092.5	204600.17	195083.9	186413.49
	43	45	47	49	51	53	55	57	59	61	63	65	67
	195083.9	186413.489	178481	171196.0612	164482.49	158275.6	152520.1	147168.5	142179.8	137518.1	133152.49	129055.5	125203.09
	65	67	69	71	73	75	77	79	81	83	85	87	89
	129055.5	125203.09	121574.01	118149.3944	114912.42	111848.1	108942.9	106184.9	103563	101067.6	98689.494	96420.77	94254.011
	91	93	95	97	99	101	103	105	107	109	111	113	115
	92182.49	90200.0753	88301.126	86480.48454	84733.404	83055.51	81442.79	79891.5	78398.2	76959.7	75573.036	74235.46	72944.409
	117	119	121	123	125	127	129	131	133	135	137	139	141
	71697.5	70492.4958	69327.331	68200.05691	67108.856	66052.02	65027.96	64035.17	63072.23	62137.83	61230.708	60349.69	59493.667
	143	145	147	149	151	153	155	157	159	161	163	165	167
	58661.59	57852.4621	57065.354	56299.37584	55553.689	54827.5	54120.05	53430.62	52758.53	52103.15	51463.847	50840.04	50231.18
	169	171	173	175	177	179	181	183	185	187	189	191	193
	49636.73	49056.1813	48489.058	47934.89714	47393.26	46863.73	46345.9	45839.38	45343.82	44858.86	44384.164	43919.41	43464.285
	195	197	199	201	203	205	207	209	211	213	215	217	219
	43018.5	42581.7614	42153.804	41734.36318	41323.187	40920.03	40524.67	40136.88	39756.43	39383.13	39016.777	38657.18	38304.142
	221	223	225	227	229	231	233	235	237	239	241	243	245
	37957.5	37617.0717	37282.698	36954.21586	36631.472	36314.32	36002.61	35696.2	35394.97	35098.77	34807.498	34521.02	34239.212
	247	249	251	253	255	257	259	261	263	265	267	269	271
	33961.97	33689.1847	33420.745	33156.54941	32896.498	32640.49	32388.44	32140.26	31895.84	31655.12	31418.004	31184.41	30954.269
	273	275	277	279	281	283	285	287	289	291	293	295	297

30727.5	30504.0255	30283.78	30066.69176	29852.694	29641.72	29433.71	29228.6	29026.32	28826.83	28630.058	28435.96	28244.468
299	301	303	305	307	309	311	313	315	317	319	321	323
28055.54	27869.1262	27685.172	27503.62951	27324.453	27147.6	26973.01	26800.66	26630.5	26462.48	26296.574	26132.73	25970.92
325	327	329	331	333	335	337	339	341	343	345	347	349
25811.1	25653.2324	25497.286	25343.22356	25191.012	25040.62	24892.01	24745.15	24600.02	24456.58	24314.803	24174.66	24036.123
351	353	355	357	359	361	363	365	367	369	371	373	375
23899.17	23763.7592	23629.879	23497.4986	23366.593	23237.14	23109.11	22982.48	22857.24	22733.35	22610.801	22489.56	22369.619
377	379	381	383	385	387	389	391	393	395	397	399	401
22250.95	22133.5277	22017.341	21902.36815	21788.59	21675.99	21564.54	21454.24	21345.06	21236.98	21129.992	21024.08	20919.219
403	405	407	409	411	413	415	417	419	421	423	425	427
20815.4	20712.6099	20610.828	20510.04156	20410.236	20311.4	20213.51	20116.56	20020.54	19925.43	19831.222	19737.9	19645.45
429	431	433	435	437	439	441	443	445	447	449	451	453
19553.86	19463.1253	19373.226	19284.15402	19195.897	19108.44	19021.78	18935.91	18850.8	18766.46	18682.866	18600.02	18517.896
455	457	459	461	463	465	467	469	471	473	475	477	479
18436.5	18355.814	18275.832	18196.54447	18117.942	18040.02	17962.76	17886.16	17810.21	17734.9	17660.225	17586.18	17512.749
481	483	485	487	489	491	493	495	497	499	501	503	505
17439.93	17367.7164	17296.097	17225.06571	17154.616	17084.74	17015.43	16946.68	16878.48	16810.84	16743.727	16677.15	16611.103
507	509	511	513	515	517	519	521	523	525	527	529	531
16545.58	16480.5639	16416.061	16352.06043	16288.557	16225.55	16163.02	16100.97	16039.4	15978.3	15917.66	15857.48	15797.753
533	535	537	539	541	543	545	547	549	551	553	555	557
15738.47	15679.6393	15621.242	15563.27829	15505.743	15448.63	15391.94	15335.66	15279.79	15224.33	15169.271	15114.61	15060.336
559	561	563	565	567	569	571	573	575	577	579	581	583
15006.45	14952.9537	14899.835	14847.09204	14794.721	14742.72	14691.08	14639.8	14588.88	14538.31	14488.095	14438.22	14388.691
585	587	589	591	593	595	597	599	601	603	605	607	609
14339.5	14290.6422	14242.117	14193.92047	14146.049	14098.5	14051.27	14004.35	13957.75	13911.45	13865.466	13819.78	13774.396
611	613	615	617	619	621	623	625	627	629	631	633	635
13729.31	13684.5139	13640.011	13595.79741	13551.869	13508.22	13464.86	13421.77	13378.96	13336.42	13294.147	13252.14	13210.405
637	639	641	643	645	647	649	651	653	655	657	659	661
13168.93	13127.7105	13086.75	13046.0451	13005.592	12965.39	12925.43	12885.73	12846.26	12807.03	12768.047	12729.3	12690.782
663	665	667	669	671	673	675	677	679	681	683	685	687
12652.5	12614.4466	12576.622	12539.02392	12501.65	12464.5	12427.57	12390.85	12354.35	12318.07	12282.001	12246.14	12210.491
689	691	693	695	697	699	701	703	705	707	709	711	713
12175.05	12139.8075	12104.772	12069.93813	12035.304	12000.87	11966.63	11932.58	11898.73	11865.07	11831.604	11798.32	11765.227
715	717	719	721	723	725	727	729	731	733	735	737	739

11732.32	11699.5914	11667.047	11634.68377	11602.499	11570.49	11538.66	11507.01	11475.52	11444.21	11413.071	11382.1	11351.295
741	743	745	747	749	751	753	755	757	759	761	763	765
11320.66	11290.1844	11259.875	11229.72825	11199.742	11169.92	11140.25	11110.74	11081.38	11052.18	11023.137	10994.24	10965.499
767	769	771	773	775	777	779	781	783	785	787	789	791
10936.91	10908.4616	10880.165	10852.01423	10824.009	10796.15	10768.43	10740.85	10713.42	10686.12	10658.967	10631.95	10605.066
793	795	797	799	801	803	805	807	809	811	813	815	817
10578.32	10551.7069	10525.228	10498.88235	10472.668	10446.58	10420.63	10394.8	10369.11	10343.54	10318.09	10292.77	10267.573
819	821	823	825	827	829	831	833	835	837	839	841	843
10242.5	10217.5481	10192.718	10168.00848	10143.418	10118.95	10094.59	10070.36	10046.24	10022.23	9998.3397	9974.562	9950.898
845	847	849	851	853	855	857	859	861	863	865	867	869
9927.346	9903.90437	9880.5736	9857.352526	9834.2403	9811.236	9788.34	9765.549	9742.865	9720.286	9697.8116	9675.441	9653.1726
871	873	875	877	879	881	883	885	887	889	891	893	895
9631.007	9608.94273	9586.9794	9565.116306	9543.3527	9521.688	9500.121	9478.652	9457.28	9436.003	9414.8227	9393.737	9372.7453
897	899	901	903	905	907	909	911	913	915	917	919	921
9351.847	9331.04227	9310.3296	9289.708749	9269.179	9248.74	9228.391	9208.131	9187.959	9167.877	9147.8811	9127.973	9108.1509
923	925	927	929	931	933	935	937	939	941	943	945	947
9088.415	9068.76432	9049.1985	9029.7169	9010.319	8991.004	8971.772	8952.622	8933.554	8914.566	8895.6596	8876.833	8858.0855
949	951	953	955	957	959	961	963	965	967	969	971	973
8839.417	8820.82755	8802.3158	8783.881675	8765.5246	8747.244	8729.04	8710.911	8692.857	8674.878	8656.9732	8639.142	8621.3844
975	977	979	981	983	985	987	989	991	993	995	997	999
8603.699	8586.087	8568.5465	8551.077472	8533.6796	8516.352	8499.095	8481.908	8464.79	8447.741	8430.7608	8413.849	8397.004
1001	1003	1005	1007	1009	1011	1013	1015	1017	1019	1021	1023	1025
8380.227	8363.51645	8346.8726	8330.294935	8313.783	8297.336	8280.955	8264.637	8248.384	8232.195	8216.0695	8200.007	8184.0068
1027	1029	1031	1033	1035	1037	1039	1041	1043	1045	1047	1049	1051
8168.069	8152.19339	8136.3792	8120.626331	8104.9343	8089.303	8073.731	8058.22	8042.768	8027.375	8012.0411	7996.765	7981.548
1053	1055	1057	1059	1061	1063	1065	1067	1069	1071	1073	1075	1077
7966.388	7951.28626	7936.2412	7921.253069	7906.3214	7891.446	7876.626	7861.862	7847.153	7832.5	7817.9003	7803.355	7788.8644
1079	1081	1083	1085	1087	1089	1091	1093	1095	1097	1099	1101	1103
7774.427	7760.04348	7745.7128	7731.435023	7717.2098	7703.037	7688.916	7674.846	7660.828	7646.861	7632.9454	7619.08	7605.2647
1105	1107	1109	1111	1113	1115	1117	1119	1121	1123	1125	1127	1129
7591.5	7577.7841	7564.1181	7550.50135	7536.9335	7523.414	7509.944	7496.521	7483.146	7469.819	7456.5396	7443.307	7430.1213
1131	1133	1135	1137	1139	1141	1143	1145	1147	1149	1151	1153	1155
7416.982	7403.88967	7390.8432	7377.842568	7364.8876	7351.978	7339.114	7326.294	7313.52	7300.789	7288.1034	7275.461	7262.8632
1157	1159	1161	1163	1165	1167	1169	1171	1173	1175	1177	1179	1181

7250.309	7237.79724	7225.329	7212.903697	7200.521	7188.181	7175.883	7163.627	7151.413	7139.24	7127.1088	7115.019	7102.9695
1183	1185	1187	1189	1191	1193	1195	1197	1199	1201	1203	1205	1207
7090.961	7078.99325	7067.0657	7055.178301	7043.3308	7031.523	7019.755	7008.026	6996.336	6984.685	6973.0732	6961.5	6949.9644
1209	1211	1213	1215	1217	1219	1221	1223	1225	1227	1229	1231	1233
6938.467	6927.00826	6915.587	6904.203292	6892.857	6881.548	6870.276	6859.041	6847.842	6836.681	6825.5549	6814.465	6803.412
1235	1237	1239	1241	1243	1245	1247	1249	1251	1253	1255	1257	1259
6792.394	6781.41229	6770.4657	6759.554392	6748.6782	6737.837	6727.03	6716.259	6705.521	6694.818	6684.149	6673.514	6662.9126
1261	1263	1265	1267	1269	1271	1273	1275	1277	1279	1281	1283	1285
6652.345	6641.81077	6631.3099	6620.842147	6610.4074	6600.006	6589.636	6579.3	6568.995	6558.723	6548.4832	6538.275	6528.0988
1287	1289	1291	1293	1295	1297	1299	1301	1303	1305	1307	1309	1311
6517.954	6507.84096	6497.7591	6487.70843	6477.6888	6467.7	6457.742	6447.815	6437.918	6428.051	6418.215	6408.409	6398.6323
1313	1315	1317	1319	1321	1323	1325	1327	1329	1331	1333	1335	1337
6388.886	6379.16882	6369.4814	6359.823351	6350.1945	6340.595	6331.024	6321.482	6311.969	6302.485	6293.0285	6283.601	6274.2012
1339	1341	1343	1345	1347	1349	1351	1353	1355	1357	1359	1361	1363
6264.83	6255.4862	6246.1705	6236.882528	6227.6221	6218.389	6209.184	6200.005	6190.854	6181.73	6172.6321	6163.561	6154.5172
1365	1367	1369	1371	1373	1375	1377	1379	1381	1383	1385	1387	1389
6145.5	6136.50841	6127.5435	6118.604668	6109.6919	6100.805	6091.944	6083.109	6074.299	6065.515	6056.756	6048.022	6039.3139
1391	1393	1395	1397	1399	1401	1403	1405	1407	1409	1411	1413	1415
6030.63	6021.972	6013.3384	6004.72942	5996.1451	5987.585	5979.05	5970.539	5962.052	5953.589	5945.1502	5936.735	5928.3442
1417	1419	1421	1423	1425	1427	1429	1431	1433	1435	1437	1439	1441
5919.977	5911.63284	5903.3125	5895.01546	5886.7418	5878.491	5870.264	5862.059	5853.878	5845.719	5837.5832	5829.47	5821.3789
1443	1445	1447	1449	1451	1453	1455	1457	1459	1461	1463	1465	1467
5813.31	5805.26436	5797.2405	5789.238785	5781.2591	5773.301	5765.366	5757.452	5749.559	5741.689	5733.8394	5726.012	5718.2052
1469	1471	1473	1475	1477	1479	1481	1483	1485	1487	1489	1491	1493
5710.42	5702.65602	5694.9131	5687.191186	5679.4902	5671.81	5664.151	5656.512	5648.894	5641.296	5633.7186	5626.162	5618.6249
1495	1497	1499	1501	1503	1505	1507	1509	1511	1513	1515	1517	1519
5611.108	5603.61189	5596.1354	5588.678881	5581.2422	5573.825	5566.428	5559.05	5551.692	5544.354	5537.0343	5529.734	5522.4536
1521	1523	1525	1527	1529	1531	1533	1535	1537	1539	1541	1543	1545
5515.192	5507.94944	5500.7259	5493.521284	5486.3355	5479.169	5472.02	5464.891	5457.779	5450.687	5443.6126	5436.557	5429.5191
1547	1549	1551	1553	1555	1557	1559	1561	1563	1565	1567	1569	1571
5422.5	5415.49839	5408.5152	5401.549903	5394.6026	5387.673	5380.761	5373.867	5366.991	5360.132	5353.291	5346.467	5339.6607
1573	1575	1577	1579	1581	1583	1585	1587	1589	1591	1593	1595	1597
5332.872	5326.09968	5319.345	5312.607346	5305.8868	5299.183	5292.497	5285.827	5279.174	5272.537	5265.9178	5259.315	5252.7282
1599	1601	1603	1605	1607	1609	1611	1613	1615	1617	1619	1621	1623

5246.158	5239.60462	5233.0674	5226.546417	5220.0417	5213.553	5207.081	5200.624	5194.184	5187.759	5181.3508	5174.958	5168.581
1625	1627	1629	1631	1633	1635	1637	1639	1641	1643	1645	1647	1649
5162.22	5155.874	5149.5439	5143.229307	5136.9302	5130.646	5124.378	5118.125	5111.887	5105.665	5099.4571	5093.265	5087.0873
1651	1653	1655	1657	1659	1661	1663	1665	1667	1669	1671	1673	1675
5080.925	5074.77737	5068.6447	5062.526856	5056.4237	5050.335	5044.262	5038.202	5032.158	5026.128	5020.1119	5014.111	5008.1236
1677	1679	1681	1683	1685	1687	1689	1691	1693	1695	1697	1699	1701
5002.151	4996.19238	4990.2481	4984.317885	4978.4018	4972.5	4966.612	4960.737	4954.877	4949.031	4943.198	4937.379	4931.5738
1703	1705	1707	1709	1711	1713	1715	1717	1719	1721	1723	1725	1727
4925.782	4920.00411	4914.2396	4908.48859	4902.751	4897.027	4891.316	4885.619	4879.934	4874.263	4868.6053	4862.961	4857.3289
1729	1731	1733	1735	1737	1739	1741	1743	1745	1747	1749	1751	1753
4851.71	4846.10456	4840.5118	4834.931988	4829.365	4823.811	4818.269	4812.741	4807.225	4801.721	4796.2304	4790.752	4785.2864
1755	1757	1759	1761	1763	1765	1767	1769	1771	1773	1775	1777	1779
4779.833	4774.39215	4768.9636	4763.547416	4758.1435	4752.752	4747.372	4742.005	4736.65	4731.307	4725.9758	4720.657	4715.3496
1781	1783	1785	1787	1789	1791	1793	1795	1797	1799	1801	1803	1805
4710.054	4704.77117	4699.4997	4694.240067	4688.9922	4683.756	4678.532	4673.319	4668.117	4662.928	4657.7496	4652.583	4647.4277
1807	1809	1811	1813	1815	1817	1819	1821	1823	1825	1827	1829	1831
4642.284	4637.15146	4632.0304	4626.920574	4621.822	4616.735	4611.659	4606.594	4601.54	4596.497	4591.4652	4586.445	4581.4347
1833	1835	1837	1839	1841	1843	1845	1847	1849	1851	1853	1855	1857
4576.436	4571.44796	4566.4709	4561.504622	4556.5492	4551.604	4546.67	4541.747	4536.835	4531.932	4527.041	4522.16	4517.2897
1859	1861	1863	1865	1867	1869	1871	1873	1875	1877	1879	1881	1883
4512.43	4507.58033	4502.7413	4497.912601	4493.0943	4488.286	4483.489	4478.701	4473.924	4469.157	4464.3997	4459.653	4454.9161
1885	1887	1889	1891	1893	1895	1897	1899	1901	1903	1905	1907	1909
4450.189	4445.47271	4440.766	4436.069276	4431.3825	4426.706	4422.038	4417.381	4412.734	4408.096	4403.4682	4398.85	4394.2415
1911	1913	1915	1917	1919	1921	1923	1925	1927	1929	1931	1933	1935
4389.643	4385.05332	4380.4736	4375.903495	4371.3429	4366.792	4362.25	4357.718	4353.195	4348.682	4344.1776	4339.683	4335.1974
1937	1939	1941	1943	1945	1947	1949	1951	1953	1955	1957	1959	1961
4330.721	4326.25425	4321.7965	4317.347916	4312.9085	4308.478	4304.057	4299.645	4295.242	4290.848	4286.4624	4282.086	4277.719
1963	1965	1967	1969	1971	1973	1975	1977	1979	1981	1983	1985	1987
4273.361	4269.0112	4264.6706	4260.338751	4256.0157	4251.701	4247.396	4243.099	4238.811	4234.532	4230.2607	4225.998	4221.7448
1989	1991	1993	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013
4217.5	4213.26318	4209.0351	4204.815539	4200.6044	4196.402	4192.207	4188.021	4183.844	4179.675	4175.5137	4171.361	4167.2166
2015	2017	2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039
4163.08	4158.9524	4154.8326	4150.72093	4146.6174	4142.522	4138.435	4134.355	4130.284	4126.221	4122.1656	4118.118	4114.079
2041	2043	2045	2047	2049	2051	2053	2055	2057	2059	2061	2063	2065

4110.048	4106.02398	4102.0083	4098.000489	4094.0005	4090.008	4086.024	4082.047	4078.078	4074.117	4070.1635	4066.218	4062.2794
2067	2069	2071	2073	2075	2077	2079	2081	2083	2085	2087	2089	2091
4058.349	4054.42581	4050.5104	4046.602508	4042.7022	4038.809	4034.924	4031.046	4027.176	4023.313	4019.4571	4015.609	4011.7681
2093	2095	2097	2099	2101	2103	2105	2107	2109	2111	2113	2115	2117
4007.935	4004.10835	4000.2895	3996.477847	3992.6735	3988.876	3985.086	3981.304	3977.528	3973.76	3969.9986	3966.244	3962.4974
2119	2121	2123	2125	2127	2129	2131	2133	2135	2137	2139	2141	2143
3958.757	3955.02452	3951.2986	3947.579765	3943.8679	3940.163	3936.465	3932.774	3929.09	3925.413	3921.7424	3918.079	3914.4223
2145	2147	2149	2151	2153	2155	2157	2159	2161	2163	2165	2167	2169
3910.772	3907.12948	3903.4933	3899.863784	3896.2411	3892.625	3889.016	3885.413	3881.817	3878.228	3874.6453	3871.069	3867.4998
2171	2173	2175	2177	2179	2181	2183	2185	2187	2189	2191	2193	2195
3863.937	3860.38058	3856.8308	3853.287552	3849.7508	3846.221	3842.697	3839.179	3835.668	3832.164	3828.6659	3825.174	3821.6888
2197	2199	2201	2203	2205	2207	2209	2211	2213	2215	2217	2219	2221
3818.21	3814.73715	3811.2708	3807.810713	3804.3569	3800.909	3797.468	3794.033	3790.604	3787.181	3783.765	3780.355	3776.9505
2223	2225	2227	2229	2231	2233	2235	2237	2239	2241	2243	2245	2247
3773.552	3770.16045	3766.7746	3763.394796	3760.0211	3756.653	3753.292	3749.936	3746.586	3743.243	3739.905	3736.573	3733.2474
2249	2251	2253	2255	2257	2259	2261	2263	2265	2267	2269	2271	2273
3729.928	3726.61351	3723.3054	3720.003104	3716.7067	3713.416	3710.131	3706.852	3703.579	3700.312	3697.0502	3693.794	3690.5442
2275	2277	2279	2281	2283	2285	2287	2289	2291	2293	2295	2297	2299
3687.3	3684.06105	3680.828	3677.600614	3674.3789	3671.163	3667.952	3664.747	3661.548	3658.355	3655.1664	3651.984	3648.8069
2301	2303	2305	2307	2309	2311	2313	2315	2317	2319	2321	2323	2325
3645.635	3642.46939	3639.3089	3636.153879	3633.0043	3629.86	3626.722	3623.588	3620.461	3617.338	3614.221	3611.109	3608.003
2327	2329	2331	2333	2335	2337	2339	2341	2343	2345	2347	2349	2351
3604.902	3601.80635	3598.716	3595.630947	3592.5512	3589.477	3586.407	3583.343	3580.285	3577.231	3574.1828	3571.14	3568.1017
2353	2355	2357	2359	2361	2363	2365	2367	2369	2371	2373	2375	2377
3565.069	3562.04119	3559.0187	3556.001272	3552.989	3549.982	3546.98	3543.983	3540.991	3538.004	3535.0219	3532.045	3529.0732
2379	2381	2383	2385	2387	2389	2391	2393	2395	2397	2399	2401	2403
3526.106	3523.14448	3520.1876	3517.235639	3514.2886	3511.347	3508.409	3505.477	3502.55	3499.627	3496.7099	3493.797	3490.8893
2405	2407	2409	2411	2413	2415	2417	2419	2421	2423	2425	2427	2429
3487.986	3485.08808	3482.1947	3479.306097	3476.4223	3473.543	3470.669	3467.8	3464.935	3462.075	3459.2194	3456.369	3453.5228
2431	2433	2435	2437	2439	2441	2443	2445	2447	2449	2451	2453	2455
3450.682	3447.84505	3445.0131	3442.185884	3439.3633	3436.545	3433.732	3430.923	3428.119	3425.319	3422.5243	3419.734	3416.9479
2457	2459	2461	2463	2465	2467	2469	2471	2473	2475	2477	2479	2481
3414.166	3411.38959	3408.6172	3405.849371	3403.086	3400.327	3397.573	3394.823	3392.077	3389.336	3386.5995	3383.867	3381.1395
2483	2485	2487	2489	2491	2493	2495	2497	2499	2501	2503	2505	2507

3378.416	3375.69698	3372.9823	3370.271997	3367.566	3364.864	3362.167	3359.474	3356.786	3354.101	3351.4211	3348.745	3346.0738
2509	2511	2513	2515	2517	2519	2521	2523	2525	2527	2529	2531	2533
3343.407	3340.74353	3338.0848	3335.430219	3332.7799	3330.134	3327.492	3324.854	3322.221	3319.591	3316.966	3314.345	3311.728
2535	2537	2539	2541	2543	2545	2547	2549	2551	2553	2555	2557	2559
3309.115	3306.5065	3303.9019	3301.301456	3298.7051	3296.113	3293.525	3290.94	3288.36	3285.784	3283.2121	3280.644	3278.0801
2561	2563	2565	2567	2569	2571	2573	2575	2577	2579	2581	2583	2585
3275.52	3272.9641	3270.4121	3267.864044	3265.32	3262.78	3260.244	3257.711	3255.183	3252.659	3250.1383	3247.622	3245.1091
2587	2589	2591	2593	2595	2597	2599	2601	2603	2605	2607	2609	2611
3242.6	3240.0954	3237.5944	3235.097185	3232.6039	3230.114	3227.629	3225.147	3222.669	3220.195	3217.7242	3215.258	3212.7947
2613	2615	2617	2619	2621	2623	2625	2627	2629	2631	2633	2635	2637
3210.336	3207.88031	3205.4287	3202.980909	3200.5368	3198.096	3195.66	3193.227	3190.798	3188.372	3185.9502	3183.532	3181.1176
2639	2641	2643	2645	2647	2649	2651	2653	2655	2657	2659	2661	2663
3178.707	3176.29951	3173.896	3171.49603	3169.0997	3166.707	3164.318	3161.933	3159.551	3157.172	3154.7977	3152.427	3150.059
2665	2667	2669	2671	2673	2675	2677	2679	2681	2683	2685	2687	2689
3147.695	3145.33446	3142.9775	3140.624111	3138.2742	3135.928	3133.585	3131.246	3128.91	3126.577	3124.2484	3121.923	3119.601
2691	2693	2695	2697	2699	2701	2703	2705	2707	2709	2711	2713	2715
3117.282	3114.96732	3112.6557	3110.347423	3108.0426	3105.741	3103.443	3101.149	3098.857	3096.57	3094.2851	3092.004	3089.7263
2717	2719	2721	2723	2725	2727	2729	2731	2733	2735	2737	2739	2741
3087.452	3085.18095	3082.9133	3080.648917	3078.3879	3076.13	3073.876	3071.625	3069.377	3067.132	3064.8911	3062.653	3060.4185
2743	2745	2747	2749	2751	2753	2755	2757	2759	2761	2763	2765	2767
3058.187	3055.95883	3053.7339	3051.512186	3049.2937	3047.078	3044.866	3042.658	3040.452	3038.25	3036.0503	3033.854	3031.6614
2769	2771	2773	2775	2777	2779	2781	2783	2785	2787	2789	2791	2793
3029.472	3027.2851	3025.1017	3022.921441	3020.7443	3018.57	3016.399	3014.232	3012.067	3009.906	3007.7472	3005.592	3003.4397
2795	2797	2799	2801	2803	2805	2807	2809	2811	2813	2815	2817	2819
3001.291	2999.14444	2997.0014	2994.861478	2992.7246	2990.591	2988.46	2986.332	2984.207	2982.086	2979.967	2977.851	2975.7386
2821	2823	2825	2827	2829	2831	2833	2835	2837	2839	2841	2843	2845
2973.629	2971.52214	2969.4184	2967.317651	2965.2199	2963.125	2961.033	2958.944	2956.858	2954.775	2952.6952	2950.618	2948.5438
2847	2849	2851	2853	2855	2857	2859	2861	2863	2865	2867	2869	2871
2946.472	2944.404	2942.3385	2940.27585	2938.2161	2936.159	2934.105	2932.054	2930.006	2927.961	2925.918	2923.878	2921.8415
2873	2875	2877	2879	2881	2883	2885	2887	2889	2891	2893	2895	2897
2919.808	2917.77635	2915.748	2913.722473	2911.6998	2909.68	2907.663	2905.648	2903.637	2901.628	2899.6222	2897.619	2895.6186