

AGETON TABLES

	A 40° B B 130° A	A 41° B B 131° A	A 42° B B 132° A	A 43° B B 133° A	X
↓	B 90° A	B 91° A	B 92° A	B 93° A	X
0	19193;11575	18306;12222	17449;12893	16622;13587	60
1	19178;11585	18291;12233	17435;12904	16608;13599	59
2	19163;11596	18277;12244	17421;12915	16595;13611	58
3	19148;11606	18262;12255	17407;12927	16581;13623	57
4	19133;11617	18248;12266	17393;12938	16568;13634	56
5	19118;11628	18233;12277	17379;12950	16554;13646	55
6	19103;11638	18219;12288	17365;12961	16541;13658	54
7	19088;11649	18204;12299	17351;12972	16527;13670	53
8	19073;11660	18190;12310	17337;12984	16514;13682	52
9	19058;11670	18175;12321	17323;12995	16500;13694	51
10	19043;11681	18161;12332	17309;13007	16487;13705	50
11	19028;11692	18146;12343	17295;13018	16473;13717	49
12	19013;11702	18132;12354	17281;13030	16460;13729	48
13	18998;11713	18118;12365	17267;13041	16446;13741	47
14	18983;11724	18093;12376	17253;13053	16433;13753	46
15	18968;11734	18089;12387	17239;13064	16419;13765	45
16	18953;11745	18074;12399	17225;13076	16406;13777	44
17	18939;11756	18060;12410	17212;13087	16392;13789	43
18	18924;11766	18045;12421	17198;13098	16379;13800	42
19	18909;11777	18031;12432	17184;13110	16366;13812	41
20	18894;11788	18017;12443	17170;13121	16352;13824	40
21	18879;11799	18002;12454	17156;13133	16339;13836	39
22	18864;11809	17988;12465	17142;13145	16326;13848	38
23	18849;11820	17974;12476	17128;13156	16312;13860	37
24	18834;11831	17959;12487	17115;13168	16299;13872	36
25	18820;11842	17945;12499	17101;13179	16285;13884	35
26	18805;11852	17931;12510	17087;13191	16272;13896	34
27	18790;11863	17916;12521	17073;13202	16259;13908	33
28	18775;11874	17902;12532	17059;13214	16245;13920	32
29	18760;11885	17888;12543	17045;13225	16232;13932	31
30	18746;11895	17874;12554	17032;13237	16219;13944	30
	X A 139° B B 49° A	X A 138° B B 48° A	X A 137° B B 47° A	X A 136° B B 46° A	↑

	A 0° B B 90° A	A 1° B B 91° A	A 2° B B 92° A	A 3° B B 93° A	X
↓	B 90° A	B 91° A	B 92° A	B 93° A	X
30	205916;1.7	158208;14.9	136032;41.4	121432;81.1	30
31	204921;1.8	157728;15.2	135744;41.9	121226;81.9	29
32	203113;1.9	157254;15.6	135457;42.5	121021;82.6	28
33	201777;2.0	156784;15.9	135173;43.0	120817;83.4	27
34	200480;2.1	156320;16.2	134890;43.6	120614;84.2	26
35	199221;2.3	155861;16.6	134609;44.2	120412;85.0	25
36	197998;2.4	155406;16.9	134330;44.7	120211;85.8	24
37	196808;2.5	154956;17.3	134053;45.3	120010;86.6	23
38	195650;2.7	154511;17.6	133777;45.9	119811;87.4	22
39	194522;2.8	154070;18.0	133503;46.5	119612;88.2	21
40	193422;2.9	153634;18.4	133231;47.1	119415;89.0	20
41	192350;3.1	153201;18.7	132961;47.6	119218;89.8	19
42	191304;3.2	152774;19.1	132692;48.2	119022;90.6	18
43	190282;3.4	152350;19.5	132425;48.8	118827;91.4	17
44	189283;3.6	151931;19.9	132159;49.4	118633;92.3	16
45	188307;3.7	151515;20.3	131896;50.0	118440;93.1	15
46	187353;3.9	151104;20.6	131633;50.7	118248;93.9	14
47	186419;4.1	150696;21.0	131373;51.3	118056;94.7	13
48	185505;4.2	150292;21.4	131114;51.9	117866;95.6	12
49	184609;4.4	149892;21.8	130856;52.5	117676;96.4	11
50	183732;4.6	149496;22.2	130600;53.1	117487;97.3	10
51	182872;4.8	149103;22.6	130346;53.7	117299;98.1	9
52	182029;5.0	148713;23.1	130093;54.4	117112;99.0	8
53	181202;5.2	148327;23.5	129841;55.0	116925;99.8	7
54	180390;5.4	147945;23.9	129591;55.7	116739;100.7	6
55	179593;5.6	147566;24.3	129342;56.3	116554;101.6	5
56	178811;5.8	147190;24.7	129095;56.9	116370;102.4	4
57	178042;6.0	146817;25.2	128849;57.6	116187;103.3	3
58	177287;6.2	146448;25.6	128605;58.2	116004;104.2	2
59	176544;6.4	146081;26.0	128362;58.9	115823;105.0	1
60	175814;6.6	145718;26.5	128120;59.6	115642;105.9	0
	X A 179° B B 89° A	X A 178° B B 88° A	X A 177° B B 87° A	X A 176° B B 86° A	↑

	A 24° B B 114° A	A 25° B B 115° A	A 26° B B 116° A	A 27° B B 117° A	X
↓	B 114° A	B 115° A	B 116° A	B 117° A	X
0	39069;3927.0	37405;4272.4	35816;4634.0	34295;5011.9	60
1	39040;3932.6	37378;4278.3	35790;4640.4	34271;5018.4	59
2	39012;3938.2	37351;4284.2	35764;4646.3	34246;5024.8	58
3	38984;3943.9	37324;4290.1	35738;4652.5	34221;5031.2	57
4	38955;3949.5	37297;4296.0	35712;4658.7	34196;5037.5	56
5	38927;3955.2	37270;4301.9	35687;4664.8	34172;5044.2	55
6	38899;3960.8	37243;4307.9	35661;4671.0	34147;5050.6	54
7	38871;3966.5	37216;4313.8	35635;4677.2	34122;5057.1	53
8	38842;3972.1	37189;4319.7	35609;4683.4	34098;5063.6	52
9	38814;3977.8	37162;4325.6	35583;4689.6	34073;5070.0	51
10	38786;3983.5	37135;4331.6	35558;4695.8	34048;5076.5	50
11	38758;3989.1	37108;4337.5	35532;4702.0	34024;5083.0	49
12	38730;3994.8	37082;4343.4	35506;4708.2	33998;5089.5	48
13	38702;4000.5	37055;4349.4	35481;4714.5	33975;5096.0	47
14	38674;4006.2	37028;4353.3	35455;4720.7	33950;5102.5	46
15	38646;4010.4	37001;4361.3	35429;4726.9	33925;5109.0	45
16	38618;4017.5	36974;4367.3	35404;4733.1	33901;5115.5	44
17	38589;4023.2	36948;4373.2	35378;4739.4	33876;5122.0	43
18	38562;4028.9	36921;4379.2	35353;4745.6	33852;5128.5	42
19	38534;4034.6	36894;4385.2	35327;4751.9	33827;5130.5	41
20	38506;4040.4	36867;4391.1	35302;4758.1	33803;5141.6	40
21	38478;4046.1	36841;4397.1	35276;4764.4	33779;5148.1	39
22	38450;4051.8	36814;4403.1	35251;4770.6	33754;5154.6	38
23	38422;4057.5	36787;4409.1	35225;4776.9	33730;5161.2	37
24	38394;4063.2	36761;4415.1	35200;4783.2	33705;5167.3	36
25	38366;4069.0	36734;4421.1	35174;4789.4	33681;5174.3	35
26	38338;4074.7	36708;4427.1	35149;4795.7	33657;5180.8	34
27	38311;4080.5	36681;4433.1	35125;4802.0	33632;5187.4	33
28	38283;4086.2	36655;4439.1	35098;4808.3	33608;5194.0	32
29	38255;4092.0	36628;4445.2	35073;4814.6	33584;5200.5	31
30	38227;4097.7	36602;4451.2	35047;4820.9	33559;5207.1	30
	X A 171° B B 81° A	X A 170° B B 80° A	X A 169° B B 79° A	X A 168° B B 78° A	↑

	A 147° B B 57° A	A 146° B B 56° A	A 145° B B 55° A	A 144° B B 54° A	↑
↓	B 57° A	B 56° A	B 55° A	B 54° A	↑
23	27117;7340.9	25945;7830.9	24816;8340.0	23729;8868.5	37
24	27098;7348.9	25926;7839.3	24798;8348.6	23711;8877.4	36
25	27078;7356.9	25907;7847.6	24799;8357.3	23693;8886.4	35
26	27058;7364.9	25887;7855.9	24761;8365.9	23676;8895.4	34
27	27038;7370.3	25868;7864.3	24742;8374.6	23658;8904.0	33
28	27018;7381.0	25849;7867.2	24742;8383.4	23640;8913.4	32
29	26998;7389.0	25830;7881.0	24706;8391.9	23622;8922.4	31
30	26978;7397.1	25811;7889.3	24687;8400.6	23605;8931.4	30
	X A 147° B B 57° A	X A 146° B B 56° A	X A 145° B B 55° A	X A 144° B B 54° A	↑

	A 4° B B 94° A	A 5° B B 95° A	A 6° B B 96° A	A 7° B B 97° A	X
0	115642 105.9	105970 165.6	98077 238.6	91411 324.9	60
1	115461 105.9	105826 166.7	97957 239.9	91308 326.5	59
2	115282 107.7	105683 167.8	97837 241.2	91205 328.0	58
3	115103 108.6	105539 168.9	97717 242.6	91103 329.6	57
4	114925 109.5	105397 170.0	97598 243.9	91001 331.2	56
5	114748 110.4	105254 171.1	97480 245.3	90899 332.7	55
6	114571 111.3	105113 172.3	97361 246.6	90798 334.3	54
7	114395 112.2	104971 173.4	97243 248.0	90696 335.9	53
8	114220 113.1	104830 174.5	97126 249.3	90595 337.5	52
9	114045 114.0	104690 175.7	97008 250.7	90494 339.0	51
10	113872 114.9	104550 176.8	96891 252.0	90394 340.6	50
11	113699 115.9	104411 178.0	96774 253.4	90293 342.2	49
12	113526 116.8	104272 179.1	96658 254.8	90193 343.8	48
13	113355 117.7	104133 180.3	96542 256.1	90093 345.4	47
14	113184 118.7	103995 181.4	96426 257.5	89994 347.0	46
15	113013 119.6	103857 182.6	96310 258.9	89894 348.6	45
16	112844 120.5	103720 183.7	96195 260.3	89795 350.2	44
17	112675 121.5	103583 184.9	96080 261.7	89696 351.8	43
18	112506 122.4	103447 186.1	95966 263.3	89598 353.5	42
19	112339 123.4	103311 187.2	95851 264.5	89499 355.1	41
20	112171 124.3	103175 188.4	95738 265.9	89401 356.7	40
21	112005 125.3	103040 189.6	95624 267.3	89303 358.3	39
22	111839 126.2	102905 190.8	95510 268.7	89205 360.0	38
23	111674 127.2	102771 192.0	95397 270.1	89107 361.6	37
24	111510 128.2	102637 193.2	95285 271.5	89010 363.2	36
25	111346 129.2	102504 194.4	95172 272.9	88913 364.9	35
26	111183 130.1	102371 195.6	95060 274.3	88816 366.5	34
27	111020 131.1	102238 196.8	94948 275.8	88719 368.2	33
28	110858 132.1	102106 198.0	94836 277.2	88623 369.8	32
29	110696 133.1	101974 199.2	94725 278.6	88526 371.5	31
30	110536 134.1	101843 200.4	94614 280.1	88430 373.1	30
	A 175° B B 85° A	A 174° B B 84° A	A 173° B B 83° A	A 172° B B 82° A	↑

	A 36° B B 126° A	A 37° B B 127° A	A 38° B B 128° A	A 39° B B 129° A	X
0	22561 9482.1	21555 10053	20585 10646	19649 11259	30
1	22544 9491.5	21539 10063	20569 10656	19634 11270	29
2	22527 9500.8	21522 10073	20553 10666	19618 11280	28
3	22510 9510.2	21506 10082	20537 10676	19603 11291	27
4	22493 9519.6	21490 10092	20522 10686	19588 11301	26
5	22476 9528.9	21473 10102	20506 10696	19572 11312	25
6	22459 9538.3	21457 10112	20490 10706	19557 11322	24
7	22442 9547.7	21440 10121	20474 10716	19542 11332	23
8	22425 9557.1	21424 10131	20458 10726	19527 11343	22
9	22408 9566.5	21408 10141	20442 10736	19511 11353	21
10	22391 9575.9	21391 10151	20427 10746	19496 11364	20
11	22374 9585.3	21375 10160	20411 10756	19481 11374	19
12	22357 9594.7	21358 10170	20395 10767	19466 11385	18
13	22340 9604.1	21342 10180	20379 10777	19450 11395	17
14	22323 9613.6	21326 10190	20364 10787	19435 11406	16
15	22306 9623.0	21309 10199	20348 10797	19420 11416	15
16	22289 9632.4	21293 10209	20332 10807	19405 11427	14
17	22272 9641.9	21277 10219	20316 10817	19390 11437	13
18	22256 9651.3	21261 10229	20301 10827	19375 11448	12
19	22239 9660.8	21244 10239	20285 10838	19359 11458	11
20	22222 9670.2	21228 10248	20269 10848	19344 11469	10
21	22205 9679.7	21212 10258	20254 10858	19329 11479	9
22	22188 9689.2	21195 10268	20238 10868	19314 11490	8
23	22171 9698.6	21179 10278	20222 10878	19299 11501	7
24	22154 9708.1	21163 10288	20207 10888	19284 11511	6
25	22138 9716.7	21147 10298	20191 10899	19269 11522	5
26	22121 9727.1	21131 10307	20175 10909	19254 11532	4
27	22104 9736.6	21114 10317	20160 10919	19238 11543	3
28	22087 9746.1	21098 10327	20149 10929	19223 11553	2
29	22070 9755.6	21082 10337	20128 10940	19208 11564	1
30	22054 9765.1	21066 10347	20113 10950	19193 11575	0
	A 143° B B 53° A	A 142° B B 52° A	A 141° B B 51° A	A 140° B B 50° A	↑

The tables contain entries for the following 2 functions for the value of the angular argument ranging from 0° to 180°:

$$A(\alpha) = 10^5 \cdot \log \csc \alpha$$

$$B(\alpha) = 10^5 \cdot \log \sec \alpha$$

Instructions

Mark each angle (*Lat*, *Dec*, *t*) with its appropriate name (N, S, W, E). Treat all angles as absolute values.

$$A(R) = A(t) + B(Dec)$$

Note the *B(R)* value that corresponds to *A(R)*.

$$A(K) = A(Dec) - B(R)$$

Note the corresponding angle *K*. When *t* is greater than 90°, take *K* from the range 90°—180°, otherwise from 0°—90°. Give *K* the same name as *Dec* (N or S).

Combine *K* and *Lat* (subtract smaller from larger if same name, add if contrary name). Find *B(K~Lat)*.

Find *A(Hc)*:

$$A(Hc) = B(R) + B(K~Lat)$$

Find closest tabulated value for *A(Hc)* and note corresponding *B(Hc)*.

Calculate *A(Z)*:

$$A(Z) = A(R) - B(Hc)$$

Always take *Z* from the range 90°—180°, unless *K* is same name and greater than *Lat*. Convert to true azimuth *Zn*:

$$Zn = \begin{cases} Z, & Lat > 0 (N) \text{ and } t < 0 (E) \\ 180^\circ - Z, & Lat < 0 (S) \text{ and } t < 0 (E) \\ 180^\circ + Z, & Lat < 0 (S) \text{ and } t > 0 (W) \\ 360^\circ - Z, & Lat > 0 (N) \text{ and } t > 0 (W) \end{cases}$$

	A 20° B B 110° A	A 21° B B 111° A	A 22° B B 112° A	A 23° B B 113° A	X
0	45595 2701.4	44567 2984.8	42642 3283.4	40812 3597.4	60
1	45534 2898.7	42611 3288.5	40782 3602.8	3597 365.9	59
2	45252 2710.6	44501 2994.5	42580 3293.6	40753 3608.1	58
3	46491 2715.2	44468 2999.4	42549 3298.7	40723 3613.5	57
4	46422 2719.8	44436 3000.4	42518 3303.9	40693 3618.9	56
5	46422 2724.5	44043 3009.1	42486 3309.0	40664 3624.5	55
6	46387 2729.1	44370 3014.0	42455 3314.1	40634 3629.6	54
7	46353 2733.7	44337 3018.9	42424 3319.2	40604 3635.0	53
8	46318 2738.3	44305 3023.8	42393 3324.4	40575 3640.4	52
9	46284 2743.0	44272 3028.6	42362 3329.5	40545 3645.8	51
10	46249 2747.6	44239 3033.5	42331 3334.7	40516 3651.2	50
11	46215 2752.2	44207 3038.4	42300 3339.8	40486 3656.6	49
12	46181 2756.9	44174 3043.3	42269 3345.0	40457 3662.1	48
13	46146 2761.5	44142 3048.2	42238 3350.1	40427 3667.5	47
14	46112 2766.2	44109 3053.1	42207 3353.3	40398 3672.9	46
15	46078 2770.9	44077 3058.7	42176 3357.4	40368 3678.3	45
16	45804 2775.6	44064 3062.6	42114 3360.5	40338 3687.8	44
17	45031 2780.2	44012 3067.9	42117 3367.0	40310 3698.2	43
18	45975 2784.9	43979 3072.8	42084 3376.0	40280 3694.6	42
19	45941 2789.5	43977 3077.4	42053 3381.2	40251 3700.1	41
20	45907 2794.2	43915 3082.7	42022 3388.4	40222 3705.5	40
21	45873 2798.9	43882 3087.6	41992 3391.5	40192 3711.0	39
22	45839 2803.6	43850 3092.5	41961 3396.7	40163 3716.4	38
23	45805 2808.3	43818 3097.2	41930 3401.9	40134 3721.9	37
24	45771 2813.0	43875 3102.4	41899 3407.1	40105 3732.3	36
25	45737 2817.7	43753 3107.4	41869 3412.4	40076 3732.8	35
26	45703 2822.4	43721 3112.3	41838 3417.6	40046 3738.3	34
27	45669 2827.1	43689 3117.3	41808 3422.8	40017 3743.8	33
28	45635 2831.8	43657 3122.3	41777 3428.0	39988 3749.2	32
29	45601 2836.5	43625 3127.2	41747 3433.2	39959 3754.7	31
30	45567 2841.2	43592 3132.2	41716 3438.5	39930 3760.2	30
	A 159° B B 69° A	A 158° B B 68° A	A 157° B B 67° A	A 156° B B 66° A	↑

	A 20° B B 102° A	A 21° B B 103° A	A 22° B B 104° A	A 23° B B 105° A	X
0	68212 959.6	64791 1127.6	61632 1309.6	58700 1505.6	60
1	68153 962.2	64737 1130.5	61582 1312.7	58653 1509.0	59
2	68093 964.9	64682 1133.4	61531 1315.9	58606 1512.4	58
3	68034 967.6	64627 1136.4	61481 1319.1	58559 1515.8	57
4	67975 970.3	64573 1139.3	61430 1322.2	58512 1519.2	56
5	67916 973.0	64519 1142.2	61380 1325.4	58465 1522.6	55
6	67857 975.7	64464 1145.2	61330 1328.6	58418 1526.0	

	A 44° B B 134° A	
↓	30 15434 14676 30	↓
0	15823 14307 60	31 15421 14688 29
1	15810 14319 59	32 15408 14701 28
2	15797 14331 58	33 15395 14713 27
3	15784 14343 57	34 15382 14726 26
4	15771 14355 56	35 15370 14738 25
5	15758 14368 55	36 15357 14750 24
6	15745 14380 54	37 15344 14763 23
7	15731 14392 53	38 15331 14775 22
8	15718 14404 52	39 15318 14788 21
9	15705 14417 51	40 15306 14800 20
10	15692 14429 50	41 15293 14813 19
11	15679 14441 49	42 15280 14825 18
12	15666 14453 48	43 15267 14838 17
13	15653 14466 47	44 15255 14850 16
14	15640 14478 46	45 15242 14863 15
15	15627 14490 45	46 15229 14875 14
16	15615 14503 44	47 15216 14888 13
17	15602 14515 43	48 15204 14900 12
18	15589 14527 42	49 15191 14913 11
19	15576 14540 41	50 15178 14926 10
20	15563 14552 40	51 15165 14938 9
21	15550 14564 39	52 15153 14951 8
22	15537 14577 38	53 15140 14963 7
23	15524 14589 37	54 15127 14976 6
24	15511 14601 36	55 15115 14988 5
25	15498 14614 35	56 15102 15001 4
26	15485 14626 34	57 15089 15014 3
27	15473 14639 33	58 15077 15026 2
28	15460 14651 32	59 15064 15039 1
29	15447 14663 31	60 15051 15051 0
30	15434 14676 30	
	A 135° B B 45° A	A 135° B B 45° A

Caution

The Ageton method has a few weak points which require the user's attention:

* * *

If a body is near the visible horizon, it may be below the celestial horizon due to the effects of dip and refraction, and the altitude may be negative. Hc is negative if K is of the same name as Lat and greater than $90^\circ + Lat$, or if K is of contrary name to Lat and greater than $90^\circ - Lat$. In the latter case, Z is less than 90° and should be taken from the top of the table if $K > 180^\circ - Lat$.

* * *

If the azimuth angle, Z , is approximately 90° , the $A(Z)$ may be a negative quantity if the tables have been used without interpolation (which is usually the case). This can be avoided by interpolating throughout or by substituting the nearest tabulated A value for the calculated $A(R)$, at the top of the azimuth column.

* * *

The Ageton method may give inaccurate results if t or K is near 90° . Therefore, values between 82° and 98° should be avoided and the respective sight discarded (forbidden range). The accuracy in this range can be improved by interpolating $B(R)$ from $A(R)$ or using the Ageton tables in combination with Sadler's sight reduction technique. (See A. E. Bayless, Compact Sight Reduction Table (modified H. O. 211 Table), Cornell Maritime Press)

	A 36° B B 126° A	A 37° B B 127° A	A 38° B B 128° A	A 39° B B 129° A	
↓	0 23078 9204.2	22054 9765.1	21066 10347	20113 10950	60
1	23061 9213.4	22037 9774.7	21050 10357	20097 10960	59
2	23043 9222.6	22020 9784.2	21033 10367	20082 10970	58
3	23026 9231.8	22003 9793.7	21017 10376	20066 10980	57
4	23009 9240.1	21987 9803.3	21001 10386	20050 10991	56
5	22991 9250.2	21970 9812.8	20985 10396	20035 11001	55
6	22974 9259.4	21953 9822.4	20969 10406	20019 11011	54
7	22957 9268.6	21937 9831.9	20953 10416	20004 11022	53
8	22939 9277.8	21920 9841.5	20937 10426	19988 11032	52
9	22922 9287.1	21903 9851.0	20921 10436	19973 11042	51
10	22905 9296.3	21887 9860.6	20905 10446	19957 11052	50
11	22888 9305.5	21870 9870.2	20889 10456	19942 11063	49
12	22870 9314.8	21853 9879.8	20872 10466	19926 11073	48
13	22853 9324.0	21837 9889.4	20856 10476	19911 11083	47
14	22836 9333.3	21820 9899.0	20840 10486	19895 11094	46
15	22819 9342.5	21803 9908.6	20824 10496	19880 11104	45
16	22801 9351.8	21787 9918.2	20808 10505	19864 11114	44
17	22784 9361.1	21770 9927.8	20792 10515	19849 11125	43
18	22767 9370.4	21754 9937.4	20776 10525	19834 11135	42
19	22750 9379.6	21737 9947.1	20760 10535	19818 11145	41
20	22732 9388.9	21720 9956.7	20744 10545	19803 11156	40
21	22715 9398.2	21704 9966.3	20728 10555	19787 11166	39
22	22698 9407.5	21687 9976.0	20712 10565	19772 11176	38
23	22681 9416.8	21671 9985.6	20696 10575	19756 11187	37
24	22664 9426.1	21654 9995.3	20681 10585	19741 11197	36
25	22647 9435.5	21638 10005	20665 10595	19726 11207	35
26	22630 9444.8	21621 10015	20649 10605	19710 11218	34
27	22613 9454.1	21605 10024	20633 10615	19695 11228	33
28	22595 9463.4	21588 10034	20617 10625	19680 11239	32
29	22578 9472.8	21572 10044	20601 10636	19664 11249	31
30	22561 9482.1	21555 10053	20585 10646	19649 11259	30
	A 143° B B 53° A	A 142° B B 52° A	A 141° B B 51° A	A 140° B B 50° A	↑

	A 4° B B 94° A	A 5° B B 95° A	A 6° B B 96° A	A 7° B B 97° A	
↓	30 11053 134.1	101843 200.4	94614 280.1	88430 373.1	30
31	11073 135.1	101712 201.6	94503 281.5	88334 374.8	29
32	110216 136.1	101581 202.8	94393 283.0	88239 376.5	28
33	110057 137.1	101451 204.1	94283 284.4	88143 378.1	27
34	109898 138.1	101321 205.3	94173 285.9	88084 379.8	26
35	109740 139.1	101192 206.5	94063 287.3	87953 381.5	25
36	109583 140.1	101063 207.8	93954 288.8	87858 383.2	24
37	109426 141.1	100934 209.0	93845 290.2	87764 384.9	23
38	109270 142.2	100806 210.3	93736 291.7	87669 386.6	22
39	109115 143.2	100678 211.5	93628 293.2	87575 388.3	21
40	108960 144.2	100550 212.8	93519 294.7	87481 390.0	20
41	108805 145.2	100423 214.0	93411 296.1	87388 391.7	19
42	108651 146.3	100296 215.3	93304 297.6	87294 393.4	18
43	108498 147.3	100170 216.5	93196 299.1	87201 395.1	17
44	108345 148.4	100044 217.8	93089 300.6	87108 396.8	16
45	108193 149.4	99918 219.1	92982 302.1	87015 398.5	15
46	108041 150.5	99793 220.3	92876 303.6	86922 400.2	14
47	107890 151.5	99668 221.6	92769 305.1	86829 402.0	13
48	107739 152.6	99544 222.9	92663 306.6	86737 403.7	12
49	107589 153.6	99419 224.2	92558 308.1	86645 405.4	11
50	107439 154.7	99296 225.5	92452 309.6	86553 407.2	10
51	107290 155.8	99172 226.8	92347 311.1	86461 408.9	9
52	107141 156.9	99049 228.1	92242 312.6	86370 410.6	8
53	106993 157.9	98926 229.4	92137 314.2	86278 412.4	7
54	106846 159.0	98804 230.7	92032 315.7	86187 414.1	6
55	106699 160.1	98682 232.0	91928 317.2	86096 415.9	5
56	106552 161.2	98560 233.3	91824 318.8	86006 417.7	4
57	106406 162.3	98439 234.6	91720 320.3	85915 419.4	3
58	106260 163.4	98318 235.9	91617 321.8	85825 421.2	2
59	106115 164.5	98197 237.2	91514 323.4	85734 422.9	1
60	105970 165.6	98077 238.6	91411 324.9	85644 424.7	0
	A 175° B B 85° A	A 174° B B 84° A	A 173° B B 83° A	A 172° B B 82° A	↑

	A 12° B B 102° A	A 13° B B 103° A	A 14° B B 104° A	A 15° B B 105° A	
30	66466 1041.8	63181 1216.8	60140 1405.8	57310 1608.9	30
31	66409 1044.7	63129 1219.9	60091 1409.1	57265 1612.5	29
32	66353 1047.5	63076 1222.9	60042 1412.4	57219 1616.0	28
33	66296 1050.3	63024 1226.0	59994 1415.7	57174 1619.5	27
34	66239 1053.1	62972 1229.0	59945 1418.9	57128 1623.0	26
35	66182 1055.9	62919 1232.1	59897 1422.2	57083 1626.5	25
36	66126 1058.7	62867 1235.1	59848 1425.5	57038 1630.0	24
37	66069 1061.5	62815 1238.2	59800 1428.8	56992 1633.6	23
38	66013 1064.4	62763 1241.2	59751 1432.1	56947 1637.1	22
39	65957 1067.2	62711 1244.3	59703 1435.4	56902 1640.6	21
40	65900 1070.0	62659 1247.4	59654 1438.7	56857 1644.2	20
41	65844 1072.9	62607 1250.4	59606 1442.0	56812 1647.7	19
42	65788 1075.7	62555 1253.5	59558 1445.3	56767 1651.3	18
43	65732 1078.6	62503 1256.6	59510 1448.6	56722 1654.8	17
44	65676 1081.4	62451 1259.7	59462 1452.0	56677 1658.4	16
45	65620 1084.3	62400 1262.8	59414 1455.3	56633 1661.9	15
46	65564 1087.2	62348 1265.9	59366 1458.6	56588 1665.5	14
47	65509 1090.0	62297 1269.0	59318 1461.9	56543 1669.1	13
48	65453 1092.9	62245 1272.1	59270 1465.3	56498 1672.7	12
49	65398 1095.8	62194 1275.2	59222 1468.6	56454 1676.2	11
50	65342 1098.6	62142 1278.3	59175 1472.0	56409 1679.8	10
51	65287 1101.5	62091 1281.4	59127 1475.3	56365 1683.4	9
52	65231 1104.4	62040 1284.5	59079 1478.7	56320 1687.0	8
53	65176 1107.3	61989 1287.6	590		

	A 8° B B 98° A	A 9° B B 99° A	A 10° B B 100° A	A 11° B B 101° A	X
0	85644 424.7	80567 538.0	76033 664.9	71940 805.3	60
1	85555 426.5	80487 540.0	75961 667.1	71875 807.8	59
2	85465 428.3	80408 542.0	75890 669.3	71810 810.3	58
3	85376 430.1	80328 544.0	75819 671.6	71746 812.7	57
4	85286 431.9	80249 546.0	75747 673.8	71681 815.2	56
5	85197 433.6	80170 548.1	75676 676.0	71616 817.7	55
6	85109 435.4	80091 550.1	75605 678.3	71552 820.1	54
7	85020 437.2	80012 552.1	75534 680.5	71488 822.6	53
8	84931 439.0	79933 554.1	75464 682.8	71423 825.1	52
9	84843 440.9	79855 556.2	75393 685.1	71359 827.6	51
10	84755 442.7	79777 558.2	75323 687.3	71295 830.1	50
11	84667 444.5	79698 560.2	75252 689.6	71231 832.6	49
12	84579 446.3	79620 562.3	75182 691.9	71167 835.1	48
13	84492 448.1	79542 564.3	75112 694.1	71104 837.6	47
14	84404 449.9	79465 566.4	75042 696.4	71040 840.1	46
15	84317 451.8	79387 568.4	74972 698.7	70976 842.6	45
16	84230 453.6	79309 570.5	74902 701.0	70913 845.1	44
17	84143 455.4	79232 572.6	74832 703.3	70850 847.6	43
18	84056 457.3	79155 574.6	74763 705.6	70786 850.2	42
19	83970 459.1	79078 576.7	74693 707.9	70732 852.7	41
20	83884 461.0	79001 578.8	74624 710.2	70660 855.2	40
21	83797 462.8	78924 580.9	74555 712.5	70597 857.8	39
22	83711 464.7	78847 582.9	74486 714.8	70534 860.3	38
23	83626 466.6	78771 585.0	74417 717.1	70471 862.8	37
24	83540 468.4	78694 587.1	74348 719.4	70409 865.4	36
25	83455 470.3	78618 589.2	74279 721.7	70346 867.9	35
26	83369 472.2	78542 591.3	74210 724.1	70284 870.5	34
27	83284 474.0	78466 593.4	74142 726.4	70221 873.0	33
28	83199 475.9	78390 595.5	74073 728.7	70159 875.6	32
29	83114 477.8	78315 597.6	74005 731.0	70097 878.2	31
30	83030 479.7	78239 599.7	73937 733.4	70034 880.7	30
X	A 171° B B 81° A	A 170° B B 80° A	A 169° B B 79° A	A 168° B B 78° A	↑

	A 32° B B 122° A	A 33° B B 123° A	A 34° B B 124° A	A 35° B B 125° A	X
0	26978 7397.1	25811 7889.3	24687 8400.6	23605 8931.4	30
1	26959 7405.1	25792 7897.7	24669 8409.3	23587 8940.4	29
2	26939 7413.2	25773 7906.1	24650 8410.8	23569 8949.4	28
3	26919 7421.2	25754 7914.4	24632 8426.7	23552 8958.5	27
4	26889 7429.3	25735 7922.8	24614 8435.4	23534 8967.5	26
5	26879 7437.4	25716 7931.2	24595 8444.1	23516 8976.5	25
6	26860 7445.5	25697 7939.6	24577 8452.8	23499 8985.6	24
7	26840 7453.5	25678 7948.0	24559 8461.5	23481 8994.6	23
8	26820 7461.6	25659 7956.4	24541 8470.3	23463 9003.7	22
9	26800 7469.7	25640 7964.8	24522 8479.0	23446 9012.7	21
10	26781 7477.8	25621 7973.2	24504 8487.7	23428 9021.8	20
11	26761 7485.9	25602 7981.6	24486 8496.5	23410 9030.9	19
12	26741 7494.0	25583 7990.1	24467 8505.2	23393 9039.9	18
13	26722 7502.1	25564 7998.5	24449 8514.0	23375 9049.0	17
14	26702 7510.3	25545 8006.9	24431 8522.7	23358 9051.8	16
15	26682 7518.4	25526 8015.4	24413 8531.5	23340 9067.2	15
16	26663 7526.5	25507 8023.8	24395 8540.2	23323 9076.3	14
17	26643 7534.6	25488 8032.3	24376 8549.0	23305 9085.4	13
18	26623 7542.8	25469 8040.7	24358 8557.8	23288 9094.5	12
19	26604 7550.9	25451 8049.2	24340 8566.6	23270 9103.6	11
20	26584 7559.1	25432 8057.6	24322 8575.4	23253 9112.7	10
21	26565 7567.2	25413 8066.1	24304 8584.2	23235 9121.9	9
22	26545 7575.4	25394 8074.6	24286 8589.3	23218 9131.0	8
23	26526 7583.6	25375 8083.1	24267 8601.8	23200 9140.1	7
24	26506 7591.7	25356 8091.5	24249 8610.6	23183 9149.3	6
25	26487 7599.9	25338 8100.0	24231 8619.4	23165 9158.4	5
26	26467 7608.1	25319 8108.5	24213 8628.2	23148 9167.6	4
27	26448 7616.3	25300 8117.0	24195 8637.0	23130 9176.7	3
28	26428 7624.5	25281 8125.5	24177 8645.9	23113 9185.9	2
29	26409 7632.7	25263 8134.1	24159 8654.7	23096 9195.1	1
30	26389 7640.9	25244 8142.6	24141 8663.5	23078 9204.2	0
X	A 147° B B 57° A	A 146° B B 56° A	A 145° B B 55° A	A 144° B B 54° A	↑

	A 0° B B 90° A	A 1° B B 91° A	A 2° B B 92° A	A 3° B B 93° A	X
0	---	0.0	175814	6.6	145718 26.5
1	135362 70.0	175097	6.8	145358 26.6	172880 60.2
2	323524 70.0	174391	7.1	145001 27.4	127641 60.9
3	305915 70.0	173696	7.3	144646 27.8	127403 61.6
4	293421 70.0	173012	7.5	144295 28.3	127166 62.5
5	283730 70.0	172339	7.8	143946 28.7	126931 62.9
6	275812 70.1	171676	8.0	143600 29.2	126697 63.6
7	269118 70.1	171023	8.2	143257 29.6	126465 64.3
8	263318 70.1	170379	8.5	142916 30.1	126233 65.0
9	258203 70.0	169745	8.7	142579 30.6	126003 65.7
10	253627 70.0	169121	9.0	142243 31.1	125774 66.4
11	249488 70.0	168505	9.3	141911 31.5	125546 67.1
12	245709 70.0	167897	9.5	141581 32.0	125320 67.8
13	242233 70.3	167298	9.8	141253 32.5	125094 68.5
14	239015 70.4	166708 10.1	140928 33.0	124870 69.2	146
15	236018 70.4	166125 10.3	140605 33.5	124647 69.9	145
16	233216 70.5	165550 10.6	140285 34.0	124425 70.6	144
17	230583 70.5	164982 10.9	139967 34.5	124205 71.3	143
18	228100 70.6	164422 11.2	139651 35.0	123985 71.4	142
19	225752 70.7	163869 11.5	139338 35.5	123766 72.4	141
20	223525 70.7	163322 11.8	139027 36.0	123549 73.5	140
21	221406 70.8	162783 12.1	138718 36.5	123333 74.3	139
22	219385 70.9	162250 12.4	138411 37.1	123117 75.0	138
23	217455 70.9	161724 12.7	138106 37.6	122903 75.8	137
24	215607 71.1	161204 13.0	137804 38.1	122690 76.5	136
25	213834 71.1	160609 13.3	137503 38.6	122478 77.3	135
26	212130 71.2	160182 13.6	137205 39.2	122267 78.0	134
27	210491 71.4	159630 13.9	136909 39.7	122057 78.8	133
28	208912 71.4	159184 14.2	136615 40.3	121848 79.5	132
29	207388 71.5	158693 14.6	136322 40.8	121640 80.3	131
30	205916 71.7	158208 14.9	136032 41.4	121432 81.1	130
X	A 179° B B 89° A	A 178° B B 88° A	A 177° B B 87° A	A 176° B B 86° A	↑

	A 40° B B 130° A	A 41° B B 131° A	A 42° B B 132° A	A 43° B B 133° A	X
0	18746 11895	17874 12554	17032 13237	16219 13944	30
1	31183 11906	17859 12566	17018 13248	16205 13956	29
2	318716 11917	17845 12577	17004 13260	16192 13968	28
3	31801 11927	17816 12588	16990 13272	16179 13980	27
4	31868 11936	17816 12599	16977 13269	16163 13982	26
5	31867 11942	17802 12610	16963 13295	16152 14004	25
6	31857 11947	17784 12621	16953 13299	16142 14028	24
7	31842 11952	17769 12632	16943 13303	16131 14042	23
8	31831 11957	17754 12643	16933 13307	16120 14052	22
9	31820 11962	17740 12653	16923 13312	16109 14062	21
10	31806 11967	17725 12663	16913 13317	16098 14072	20
11	31798 11972	17710 12673	16903 13322	16087 14082	19
12	31786 11976	17695 12683	16889 13326	16076 14092	18
13	31774 11980	17679 12693	16876 13329	16065 14102	17
14	31762 11984	17664 12703	16863 13333	16054 14112	16
15	31750 11988	17652 12713	16851 13337	16043 14122	15
16	31738 11992	17640 12723	16840 13341	16032 14132	14
17	31726 11996	17627 12733	16829 13345	16021 14142	13
18	31714 11999	17614 12743	16817 13349	16010 14152	12
19	31702 12003	17602 12753	16805 13353	16000 14162	11
20	31689 12007	17587 12763	16779 13357	15992 14172	10
21	31677 12012	17576 12773	16768 13361	15981 14182	9
22	31665 12016	17565 12783	16757 13365	15970 14192	8
23					