

Table I

1

## LATITUDE AND DECLINATION

Mn	0°	1°	2°	3°	4°	5°	6°	7°	8°	Mn	9°	10°	11°	12°	13°	14°	15°	16°	17°	Mn
0	5000	4999	4997	4994	4989	4983	4976	4968	4958	0	4946	4934	4919	4904	4887	4869	4849	4828	4806	0
1	5000	4999	4997	4994	4989	4983	4976	4967	4957	1	4946	4933	4919	4904	4887	4869	4849	4828	4806	1
2	5000	4999	4997	4994	4989	4983	4976	4967	4957	2	4946	4933	4919	4904	4887	4868	4849	4828	4805	2
3	5000	4999	4997	4994	4989	4983	4976	4967	4957	3	4946	4933	4919	4903	4886	4868	4848	4827	4805	3
4	5000	4999	4997	4994	4989	4983	4976	4967	4957	4	4945	4933	4918	4903	4886	4868	4848	4827	4804	4
5	5000	4999	4997	4994	4989	4983	4975	4967	4957	5	4945	4932	4918	4903	4886	4867	4848	4827	4804	5
6	5000	4999	4997	4994	4989	4983	4975	4967	4956	6	4945	4932	4918	4902	4885	4867	4847	4826	4804	6
7	5000	4999	4997	4994	4989	4983	4975	4966	4956	7	4945	4932	4918	4902	4885	4867	4847	4826	4803	7
8	5000	4999	4997	4994	4989	4983	4975	4966	4956	8	4945	4932	4917	4902	4885	4867	4847	4826	4803	8
9	5000	4999	4997	4993	4989	4982	4975	4966	4956	9	4944	4931	4917	4902	4885	4866	4846	4825	4802	9
10	5000	4999	4997	4993	4989	4982	4975	4966	4956	10	4944	4931	4917	4901	4884	4866	4846	4825	4802	10
11	5000	4999	4997	4993	4988	4982	4975	4966	4956	11	4944	4931	4917	4901	4884	4866	4846	4824	4802	11
12	5000	4999	4997	4993	4988	4982	4975	4966	4955	12	4944	4931	4916	4901	4884	4865	4845	4824	4801	12
13	5000	4999	4997	4993	4988	4982	4974	4965	4955	13	4944	4931	4916	4901	4883	4865	4845	4824	4801	13
14	5000	4999	4997	4993	4988	4982	4974	4965	4955	14	4943	4930	4916	4900	4883	4865	4845	4823	4801	14
15	5000	4999	4997	4993	4988	4982	4974	4965	4955	15	4943	4930	4916	4900	4883	4864	4844	4823	4800	15
16	5000	4999	4997	4993	4988	4982	4974	4965	4955	16	4943	4930	4915	4900	4883	4864	4844	4823	4800	16
17	5000	4999	4997	4993	4988	4982	4974	4965	4954	17	4943	4930	4915	4899	4882	4864	4844	4822	4799	17
18	5000	4999	4996	4993	4988	4981	4974	4965	4954	18	4943	4929	4915	4899	4882	4863	4843	4822	4799	18
19	5000	4999	4996	4993	4988	4981	4974	4964	4954	19	4942	4929	4915	4899	4882	4863	4843	4821	4799	19
20	5000	4999	4996	4993	4988	4981	4973	4964	4954	20	4942	4929	4914	4899	4881	4863	4843	4821	4798	20
21	5000	4999	4996	4993	4987	4981	4973	4964	4954	21	4942	4929	4914	4898	4881	4862	4842	4821	4798	21
22	5000	4999	4996	4992	4987	4981	4973	4964	4954	22	4942	4929	4914	4898	4881	4862	4842	4820	4797	22
23	5000	4999	4996	4992	4987	4981	4973	4964	4953	23	4941	4928	4914	4898	4880	4862	4842	4820	4797	23
24	5000	4999	4996	4992	4987	4981	4973	4964	4953	24	4941	4928	4913	4897	4880	4861	4841	4820	4797	24
25	5000	4999	4996	4992	4987	4981	4973	4964	4953	25	4941	4928	4913	4897	4880	4861	4841	4819	4796	25
26	5000	4999	4996	4992	4987	4980	4973	4963	4953	26	4941	4928	4913	4897	4880	4861	4841	4819	4796	26
27	5000	4999	4996	4992	4987	4980	4972	4963	4953	27	4941	4927	4913	4897	4879	4860	4840	4818	4795	27
28	5000	4999	4996	4992	4987	4980	4972	4963	4952	28	4940	4927	4912	4896	4879	4860	4840	4818	4795	28
29	5000	4999	4996	4992	4987	4980	4972	4963	4952	29	4940	4927	4912	4896	4879	4860	4839	4818	4795	29
30	5000	4999	4996	4992	4987	4980	4972	4963	4952	30	4940	4927	4912	4896	4878	4859	4839	4817	4794	30
31	5000	4998	4996	4992	4986	4980	4972	4963	4952	31	4940	4926	4912	4896	4878	4859	4839	4817	4794	31
32	5000	4998	4996	4992	4986	4980	4972	4962	4952	32	4940	4926	4911	4895	4878	4859	4838	4817	4793	32
33	5000	4998	4996	4992	4986	4980	4972	4962	4951	33	4939	4926	4911	4895	4877	4858	4838	4816	4793	33
34	5000	4998	4996	4992	4986	4979	4971	4962	4951	34	4939	4926	4911	4895	4877	4858	4838	4816	4793	34
35	5000	4998	4996	4992	4986	4979	4971	4962	4951	35	4939	4925	4911	4894	4877	4858	4837	4815	4792	35
36	5000	4998	4996	4991	4986	4979	4971	4962	4951	36	4939	4925	4910	4894	4876	4857	4837	4815	4792	36
37	5000	4998	4995	4991	4986	4979	4971	4962	4951	37	4939	4925	4910	4894	4876	4857	4837	4815	4791	37
38	5000	4998	4995	4991	4986	4979	4971	4961	4951	38	4938	4925	4910	4894	4876	4857	4836	4814	4791	38
39	5000	4998	4995	4991	4986	4979	4971	4961	4950	39	4938	4925	4910	4893	4876	4856	4836	4814	4791	39
40	5000	4998	4995	4991	4986	4979	4971	4961	4950	40	4938	4924	4909	4893	4875	4856	4836	4814	4790	40
41	5000	4998	4995	4991	4985	4979	4970	4961	4950	41	4938	4924	4909	4893	4875	4856	4835	4813	4790	41
42	5000	4998	4995	4991	4985	4978	4970	4961	4950	42	4937	4924	4909	4892	4875	4855	4835	4813	4789	42
43	5000	4998	4995	4991	4985	4978	4970	4960	4950	43	4937	4924	4909	4892	4874	4855	4835	4812	4789	43
44	5000	4998	4995	4991	4985	4978	4970	4960	4949	44	4937	4923	4908	4892	4874	4855	4834	4812	4789	44
45	5000	4998	4995	4991	4985	4978	4970	4960	4949	45	4937	4923	4908	4892	4874	4854	4834	4812	4788	45
46	5000	4998	4995	4991	4985	4978	4970	4960	4949	46	4937	4923	4908	4891	4873	4854	4833	4811	4788	46
47	5000	4998	4995	4991	4985	4978	4969	4960	4949	47	4936	4923	4908	4891	4873	4854	4833	4811	4787	47
48	5000	4998	4995	4990	4985	4978	4969	4960	4949	48	4936	4922	4907	4891	4873	4853	4833	4811	4787	48
49	5000	4998	4995	4990	4985	4978	4969	4959	4948	49	4936	4922	4907	4890	4872	4853	4832	4810	4787	49
50	5000	4998	4995	4990	4985	4977	4969	4959	4948	50	4936	4922	4907	4890	4872	4853	4832	4810	4786	50
51	5000	4998	4995	4990	4984	4977	4969	4959	4948	51	4936	4922	4906	4890	4872	4852	4832	4809	4786	51
52	5000	4998	4995	4990	4984	4977	4969	4959	4948	52	4935	4921	4906	4890	4872	4852	4831	4809	4785	52
53	4999	4998	4994	4990	4984	4977	4969	4959	4948	53	4935	4921	4906	4889	4871	4852	4831	4809	4785	53
54	4999	4998	4994	4990	4984	4977	4968	4959	4947	54	4935	4921	4906	4889	4871	4851	4831	4808	4785	54
55	4999	4998	4994	4990	4984	4977	4968	4958	4947	55	4935	4921	4905	4889	4871	4851	4830	4808	4784	55
56	4999	4998	4994	4990	4984	4977	4968	4958	4947	56	4934	4920	4905	4888	4870	4851	4830	4808	4784	56
57	4999	4997	4994	4990	4984	4977	4968	4958	4947	57	4934	4920	4905	4888	4870	4850	4830	4807	4783	57
58	4999	4997	4994	4990	4984	4976	4968	4958	4947	58	4934	4920	4905	4888	4870	4850	4829	4807	4783	58
59	4999	4997	4994	4989	4984	4976	4968	4958	4946	59	4934	4920	4904	4888	4869	4850	4829	4806	4782	59

Table I  
LATITUDE AND DECLINATION

Mn	18°	19°	20°	21°	22°	23°	24°	25°	26°	Mn	27°	28°	29°	30°	31°	32°	33°	34°	35°	Mn
0	4782	4757	4730	4702	4672	4640	4607	4573	4537	0	4499	4459	4418	4375	4331	4284	4236	4186	4134	0
1	4782	4756	4729	4701	4671	4640	4607	4572	4536	1	4498	4459	4417	4375	4330	4283	4235	4185	4133	1
2	4781	4756	4729	4701	4671	4639	4606	4572	4535	2	4498	4458	4417	4374	4329	4283	4234	4184	4132	2
3	4781	4755	4728	4700	4670	4639	4606	4571	4535	3	4497	4457	4416	4373	4328	4282	4233	4183	4131	3
4	4780	4755	4728	4700	4670	4638	4605	4570	4534	4	4496	4457	4415	4372	4328	4281	4233	4182	4130	4
5	4780	4755	4728	4699	4669	4638	4604	4570	4534	5	4496	4456	4415	4372	4327	4280	4232	4181	4129	5
6	4780	4754	4727	4699	4669	4637	4604	4569	4533	6	4495	4455	4414	4371	4326	4279	4231	4181	4128	6
7	4779	4754	4727	4698	4668	4636	4603	4569	4532	7	4494	4455	4413	4370	4325	4279	4230	4180	4127	7
8	4779	4753	4726	4698	4668	4636	4603	4568	4532	8	4494	4454	4413	4369	4325	4278	4229	4179	4127	8
9	4778	4753	4726	4697	4667	4635	4602	4567	4531	9	4493	4453	4412	4369	4324	4277	4229	4178	4126	9
10	4778	4752	4725	4697	4667	4635	4602	4567	4530	10	4492	4453	4411	4368	4323	4276	4228	4177	4125	10
11	4778	4752	4725	4696	4666	4634	4601	4566	4530	11	4492	4452	4410	4367	4322	4275	4227	4176	4124	11
12	4777	4751	4724	4696	4666	4634	4601	4566	4529	12	4491	4451	4410	4367	4322	4275	4226	4175	4123	12
13	4777	4751	4724	4695	4665	4633	4600	4565	4529	13	4490	4451	4409	4366	4321	4274	4225	4175	4122	13
14	4776	4751	4723	4695	4664	4633	4599	4564	4528	14	4490	4450	4408	4365	4320	4273	4224	4174	4121	14
15	4776	4750	4723	4694	4664	4632	4599	4564	4527	15	4489	4449	4408	4364	4319	4272	4224	4173	4120	15
16	4775	4750	4722	4694	4663	4632	4598	4563	4527	16	4488	4449	4407	4364	4318	4272	4223	4172	4119	16
17	4775	4749	4722	4693	4663	4631	4598	4563	4526	17	4488	4448	4406	4363	4318	4271	4222	4171	4119	17
18	4775	4749	4722	4693	4662	4631	4597	4562	4525	18	4487	4447	4406	4362	4317	4270	4221	4170	4118	18
19	4774	4748	4721	4692	4662	4630	4597	4561	4525	19	4486	4447	4405	4361	4316	4269	4220	4169	4117	19
20	4774	4748	4721	4692	4661	4629	4596	4561	4524	20	4486	4446	4404	4361	4315	4268	4219	4169	4116	20
21	4773	4747	4720	4691	4661	4629	4595	4560	4524	21	4485	4445	4403	4360	4315	4268	4219	4168	4115	21
22	4773	4747	4720	4691	4660	4628	4595	4560	4523	22	4485	4444	4403	4359	4314	4267	4218	4167	4114	22
23	4773	4747	4719	4690	4660	4628	4594	4559	4522	23	4484	4444	4402	4358	4313	4266	4217	4166	4113	23
24	4772	4746	4719	4690	4659	4627	4594	4558	4522	24	4483	4443	4401	4358	4312	4265	4216	4165	4112	24
25	4772	4746	4718	4689	4659	4627	4593	4558	4521	25	4483	4442	4401	4357	4312	4264	4215	4164	4111	25
26	4771	4745	4718	4689	4658	4626	4593	4557	4520	26	4482	4442	4400	4356	4311	4264	4214	4163	4110	26
27	4771	4745	4717	4688	4658	4626	4592	4557	4520	27	4481	4441	4399	4355	4310	4263	4214	4163	4110	27
28	4770	4744	4717	4688	4657	4625	4591	4556	4519	28	4481	4440	4398	4355	4309	4262	4213	4162	4109	28
29	4770	4744	4716	4687	4657	4625	4591	4555	4519	29	4480	4440	4398	4354	4308	4261	4212	4161	4108	29
30	4770	4743	4716	4687	4656	4624	4590	4555	4518	30	4479	4439	4397	4353	4308	4260	4211	4160	4107	30
31	4769	4743	4715	4686	4656	4623	4590	4554	4517	31	4479	4438	4396	4352	4307	4259	4210	4159	4106	31
32	4769	4743	4715	4686	4655	4623	4589	4554	4517	32	4478	4438	4396	4352	4306	4259	4209	4158	4105	32
33	4768	4742	4714	4685	4655	4622	4588	4553	4516	33	4477	4437	4395	4351	4305	4258	4209	4157	4104	33
34	4768	4742	4714	4685	4654	4622	4588	4552	4515	34	4477	4436	4394	4350	4305	4257	4208	4156	4103	34
35	4767	4741	4714	4684	4654	4621	4587	4552	4515	35	4476	4436	4393	4349	4304	4256	4207	4156	4102	35
36	4767	4741	4713	4684	4653	4621	4587	4551	4514	36	4475	4435	4393	4349	4303	4255	4206	4155	4101	36
37	4767	4740	4713	4683	4652	4620	4586	4551	4513	37	4475	4434	4392	4348	4302	4254	4205	4154	4101	37
38	4766	4740	4712	4683	4652	4620	4586	4550	4513	38	4474	4433	4391	4347	4301	4254	4204	4153	4100	38
39	4766	4739	4712	4682	4651	4619	4585	4549	4512	39	4473	4433	4391	4346	4301	4253	4204	4152	4099	39
40	4765	4739	4711	4682	4651	4618	4584	4549	4512	40	4473	4432	4390	4346	4300	4252	4203	4151	4098	40
41	4765	4739	4711	4681	4650	4618	4584	4548	4511	41	4472	4431	4389	4345	4299	4251	4202	4150	4097	41
42	4764	4738	4710	4681	4650	4617	4583	4548	4510	42	4471	4431	4388	4344	4298	4251	4201	4149	4096	42
43	4764	4738	4710	4680	4649	4617	4583	4547	4510	43	4471	4430	4388	4343	4298	4250	4200	4149	4095	43
44	4764	4737	4709	4680	4649	4616	4582	4546	4509	44	4470	4429	4387	4343	4297	4249	4199	4148	4094	44
45	4763	4737	4709	4679	4648	4616	4582	4546	4508	45	4469	4429	4386	4342	4296	4248	4198	4147	4093	45
46	4763	4736	4708	4679	4648	4615	4581	4545	4508	46	4469	4428	4385	4341	4295	4247	4198	4146	4092	46
47	4762	4736	4708	4678	4647	4615	4580	4545	4507	47	4468	4427	4385	4340	4294	4247	4197	4145	4091	47
48	4762	4735	4707	4678	4647	4614	4580	4544	4506	48	4467	4427	4384	4340	4294	4246	4196	4144	4091	48
49	4761	4735	4707	4677	4646	4613	4579	4543	4506	49	4467	4426	4383	4339	4293	4245	4195	4143	4090	49
50	4761	4734	4706	4677	4646	4613	4579	4543	4505	50	4466	4425	4383	4338	4292	4244	4194	4142	4089	50
51	4761	4734	4706	4676	4645	4612	4578	4542	4505	51	4465	4424	4382	4337	4291	4243	4193	4142	4088	51
52	4760	4734	4705	4676	4645	4612	4577	4542	4504	52	4465	4424	4381	4337	4291	4242	4193	4141	4087	52
53	4760	4733	4705	4675	4644	4611	4577	4541	4503	53	4464	4423	4380	4336	4290	4242	4192	4140	4086	53
54	4759	4733	4704	4675	4643	4611	4576	4540	4503	54	4463	4422	4380	4335	4289	4241	4191	4139	4085	54
55	4759	4732	4704	4674	4643	4610	4576	4540	4502	55	4463	4422	4379	4334	4288	4240	4190	4138	4084	55
56	4758	4732	4703	4674	4642	4610	4575	4539	4501	56	4462	4421	4378	4334	4287	4239	4189	4137	4083	56
57	4758	4731	4703	4673	4642	4609	4575	4538	4501	57	4461	4420	4377	4333	4287	4238	4188	4136	4082	57
58	4758	4731	4702	4673	4641	4608	4574	4538	4500	58	4461	4420	4377	4332	4286	4238	4187	4135	4081	58
59	4757	4730	4702	4672	4641	4608	4573	4537	4499	59	4460	4419	4376	4331	4285	4237	4187	4135	4080	59

Table I

## LATITUDE AND DECLINATION

Mn	36°	37°	38°	39°	40°	41°	42°	43°	44°	Mn	45°	46°	47°	48°	49°	50°	51°	52°	53°	Mn
0	4080	4023	3965	3905	3843	3778	3711	3641	3569	0	3495	3418	3338	3255	3169	3081	2989	2893	2795	0
1	4079	4023	3964	3904	3841	3777	3710	3640	3568	1	3494	3416	3336	3254	3168	3079	2987	2892	2793	1
2	4078	4022	3963	3903	3840	3776	3708	3639	3567	2	3492	3415	3335	3252	3167	3078	2986	2890	2791	2
3	4077	4021	3962	3902	3839	3775	3707	3638	3566	3	3491	3414	3334	3251	3165	3076	2984	2889	2790	3
4	4076	4020	3961	3901	3838	3773	3706	3637	3564	4	3490	3412	3332	3249	3164	3075	2982	2887	2788	4
5	4075	4019	3960	3900	3837	3772	3705	3635	3563	5	3489	3411	3331	3248	3162	3073	2981	2885	2786	5
6	4074	4018	3959	3899	3836	3771	3704	3634	3562	6	3487	3410	3330	3247	3161	3072	2979	2884	2785	6
7	4073	4017	3958	3898	3835	3770	3703	3633	3561	7	3486	3409	3328	3245	3159	3070	2978	2882	2783	7
8	4072	4016	3957	3897	3834	3769	3702	3632	3560	8	3485	3407	3327	3244	3158	3069	2976	2880	2781	8
9	4071	4015	3956	3896	3833	3768	3700	3631	3558	9	3483	3406	3326	3242	3156	3067	2975	2879	2780	9
10	4070	4014	3955	3895	3832	3767	3699	3629	3557	10	3482	3405	3324	3241	3155	3066	2973	2877	2778	10
11	4069	4013	3954	3894	3831	3766	3698	3628	3556	11	3481	3403	3323	3240	3153	3064	2972	2876	2776	11
12	4069	4012	3953	3893	3830	3765	3697	3627	3555	12	3480	3402	3322	3238	3152	3063	2970	2874	2774	12
13	4068	4011	3952	3892	3829	3763	3696	3626	3553	13	3478	3401	3320	3237	3150	3061	2968	2872	2773	13
14	4067	4010	3951	3891	3828	3762	3695	3625	3552	14	3477	3399	3319	3235	3149	3060	2967	2871	2771	14
15	4066	4009	3950	3890	3827	3761	3694	3624	3551	15	3476	3398	3317	3234	3148	3058	2965	2869	2769	15
16	4065	4008	3949	3889	3825	3760	3692	3622	3550	16	3475	3397	3316	3233	3146	3056	2964	2867	2768	16
17	4064	4007	3948	3888	3824	3759	3691	3621	3548	17	3473	3395	3315	3231	3145	3055	2962	2866	2766	17
18	4063	4006	3947	3887	3823	3758	3690	3620	3547	18	3472	3394	3313	3230	3143	3053	2960	2864	2764	18
19	4062	4005	3946	3885	3822	3757	3689	3619	3546	19	3471	3393	3312	3228	3142	3052	2959	2863	2763	19
20	4061	4004	3945	3884	3821	3756	3688	3618	3545	20	3469	3391	3311	3227	3140	3050	2957	2861	2761	20
21	4060	4003	3944	3883	3820	3755	3687	3616	3544	21	3468	3390	3309	3225	3139	3049	2956	2859	2759	21
22	4059	4002	3943	3882	3819	3753	3686	3615	3542	22	3467	3389	3308	3224	3137	3047	2954	2858	2758	22
23	4058	4001	3942	3881	3818	3752	3684	3614	3541	23	3466	3387	3306	3223	3136	3046	2953	2856	2756	23
24	4057	4000	3941	3880	3817	3751	3683	3613	3540	24	3464	3386	3305	3221	3134	3044	2951	2854	2754	24
25	4056	4000	3940	3879	3816	3750	3682	3612	3539	25	3463	3385	3304	3220	3133	3043	2949	2853	2752	25
26	4056	3999	3939	3878	3815	3749	3681	3610	3537	26	3462	3383	3302	3218	3131	3041	2948	2851	2751	26
27	4055	3998	3938	3877	3814	3748	3680	3609	3536	27	3460	3382	3301	3217	3130	3040	2946	2849	2749	27
28	4054	3997	3937	3876	3813	3747	3679	3608	3535	28	3459	3381	3300	3215	3128	3038	2945	2848	2747	28
29	4053	3996	3936	3875	3812	3746	3677	3607	3534	29	3458	3379	3298	3214	3127	3037	2943	2846	2746	29
30	4052	3995	3935	3874	3810	3745	3676	3606	3532	30	3457	3378	3297	3213	3125	3035	2941	2844	2744	30
31	4051	3994	3934	3873	3809	3743	3675	3604	3531	31	3455	3377	3295	3211	3124	3034	2940	2843	2742	31
32	4050	3993	3933	3872	3808	3742	3674	3603	3530	32	3454	3375	3294	3210	3122	3032	2938	2841	2740	32
33	4049	3992	3932	3871	3807	3741	3673	3602	3529	33	3453	3374	3293	3208	3121	3031	2937	2840	2739	33
34	4048	3991	3931	3870	3806	3740	3672	3601	3527	34	3451	3373	3291	3207	3120	3029	2935	2838	2737	34
35	4047	3990	3930	3869	3805	3739	3671	3600	3526	35	3450	3371	3290	3205	3118	3027	2934	2836	2735	35
36	4046	3989	3929	3868	3804	3738	3669	3598	3525	36	3449	3370	3289	3204	3117	3026	2932	2835	2734	36
37	4045	3988	3928	3867	3803	3737	3668	3597	3524	37	3448	3369	3287	3203	3115	3024	2930	2833	2732	37
38	4044	3987	3927	3866	3802	3736	3667	3596	3522	38	3446	3367	3286	3201	3114	3023	2929	2831	2730	38
39	4043	3986	3926	3865	3801	3734	3666	3595	3521	39	3445	3366	3284	3200	3112	3021	2927	2830	2728	39
40	4042	3985	3925	3864	3800	3733	3665	3594	3520	40	3444	3365	3283	3198	3111	3020	2926	2828	2727	40
41	4041	3984	3924	3863	3799	3732	3664	3592	3519	41	3442	3363	3282	3197	3109	3018	2924	2826	2725	41
42	4041	3983	3923	3862	3797	3731	3662	3591	3517	42	3441	3362	3280	3195	3108	3017	2922	2825	2723	42
43	4040	3982	3922	3860	3796	3730	3661	3590	3516	43	3440	3361	3279	3194	3106	3015	2921	2823	2722	43
44	4039	3981	3921	3859	3795	3729	3660	3589	3515	44	3439	3359	3277	3193	3105	3014	2919	2821	2720	44
45	4038	3980	3920	3858	3794	3728	3659	3588	3514	45	3437	3358	3276	3191	3103	3012	2918	2820	2718	45
46	4037	3979	3919	3857	3793	3727	3658	3586	3512	46	3436	3357	3275	3190	3102	3010	2916	2818	2716	46
47	4036	3978	3918	3856	3792	3725	3657	3585	3511	47	3435	3355	3273	3188	3100	3009	2914	2816	2715	47
48	4035	3977	3917	3855	3791	3724	3655	3584	3510	48	3433	3354	3272	3187	3099	3007	2913	2815	2713	48
49	4034	3976	3916	3854	3790	3723	3654	3583	3509	49	3432	3353	3270	3185	3097	3006	2911	2813	2711	49
50	4033	3975	3915	3853	3789	3722	3653	3582	3507	50	3431	3351	3269	3184	3096	3004	2910	2811	2710	50
51	4032	3974	3914	3852	3788	3721	3652	3580	3506	51	3429	3350	3268	3182	3094	3003	2908	2810	2708	51
52	4031	3973	3913	3851	3787	3720	3651	3579	3505	52	3428	3349	3266	3181	3093	3001	2906	2808	2706	52
53	4030	3972	3912	3850	3785	3719	3650	3578	3504	53	3427	3347	3265	3180	3091	3000	2905	2806	2704	53
54	4029	3971	3911	3849	3784	3718	3648	3577	3502	54	3426	3346	3264	3178	3090	2998	2903	2805	2703	54
55	4028	3970	3910	3848	3783	3716	3647	3575	3501	55	3424	3345	3262	3177	3088	2997	2901	2803	2701	55
56	4027	3969	3909	3847	3782	3715	3646	3574	3500	56	3423	3343	3261	3175	3087	2995	2900	2801	2699	56
57	4026	3968	3908	3846	3781	3714	3645	3573	3499	57	3422	3342	3259	3174	3085	2993	2898	2800	2697	57
58	4025	3967	3907	3845	3780	3713	3644	3572	3497	58	3420	3341	3258	3172	3084	2992	2897	2798	2696	58
59	4024	3966	3906	3844	3779	3712	3642	3571	3496	59	3419	3339	3257	3171	3082	2990	2895	2796	2694	59

Table I  
LATITUDE AND DECLINATION

Mn	54°	55°	56°	57°	58°	59°	60°	61°	62°	Mn	63°	64°	65°	66°	67°	68°	69°	70°	71°	Mn
0	2692	2586	2476	2361	2242	2118	1990	1856	1716	0	1570	1418	1259	1093	919	736	543	341	126	0
1	2690	2584	2474	2359	2240	2116	1988	1853	1714	1	1568	1416	1257	1090	916	733	540	337	123	1
2	2689	2582	2472	2357	2238	2114	1985	1851	1711	2	1566	1413	1254	1087	913	729	537	334	119	2
3	2687	2580	2470	2355	2236	2112	1983	1849	1709	3	1563	1411	1251	1085	910	726	533	330	115	3
4	2685	2579	2468	2353	2234	2110	1981	1847	1707	4	1561	1408	1249	1082	907	723	530	327	112	4
5	2683	2577	2466	2351	2232	2108	1979	1844	1704	5	1558	1405	1246	1079	904	720	527	323	108	5
6	2682	2575	2464	2349	2230	2106	1977	1842	1702	6	1556	1403	1243	1076	901	717	523	320	104	6
7	2680	2573	2462	2347	2228	2104	1974	1840	1699	7	1553	1400	1240	1073	898	714	520	316	101	7
8	2678	2571	2461	2345	2226	2102	1972	1837	1697	8	1551	1398	1238	1070	895	711	517	313	97	8
9	2676	2570	2459	2344	2224	2099	1970	1835	1695	9	1548	1395	1235	1068	892	708	514	309	93	9
10	2675	2568	2457	2342	2222	2097	1968	1833	1692	10	1546	1392	1232	1065	889	704	510	306	90	10
11	2673	2566	2455	2340	2220	2095	1966	1831	1690	11	1543	1390	1230	1062	886	701	507	302	86	11
12	2671	2564	2453	2338	2218	2093	1963	1828	1687	12	1541	1387	1227	1059	883	698	504	299	82	12
13	2669	2562	2451	2336	2216	2091	1961	1826	1685	13	1538	1385	1224	1056	880	695	500	295	78	13
14	2668	2561	2449	2334	2214	2089	1959	1824	1683	14	1536	1382	1221	1053	877	692	497	292	75	14
15	2666	2559	2447	2332	2212	2087	1957	1821	1680	15	1533	1379	1219	1050	874	689	494	288	71	15
16	2664	2557	2445	2330	2210	2085	1955	1819	1678	16	1531	1377	1216	1047	871	685	490	285	67	16
17	2662	2555	2444	2328	2208	2082	1952	1817	1675	17	1528	1374	1213	1045	868	682	487	281	64	17
18	2661	2553	2442	2326	2205	2080	1950	1814	1673	18	1526	1371	1210	1042	865	679	484	278	60	18
19	2659	2551	2440	2324	2203	2078	1948	1812	1671	19	1523	1369	1208	1039	862	676	480	274	56	19
20	2657	2550	2438	2322	2201	2076	1946	1810	1668	20	1521	1366	1205	1036	859	673	477	270	52	20
21	2655	2548	2436	2320	2199	2074	1943	1808	1666	21	1518	1364	1202	1033	856	670	474	267	49	21
22	2654	2546	2434	2318	2197	2072	1941	1805	1663	22	1515	1361	1199	1030	853	666	470	263	45	22
23	2652	2544	2432	2316	2195	2070	1939	1803	1661	23	1513	1358	1197	1027	850	663	467	260	41	23
24	2650	2542	2430	2314	2193	2068	1937	1801	1659	24	1510	1356	1194	1024	847	660	463	256	37	24
25	2648	2540	2428	2312	2191	2065	1935	1798	1656	25	1508	1353	1191	1021	844	657	460	253	34	25
26	2647	2539	2427	2310	2189	2063	1932	1796	1654	26	1505	1350	1188	1019	841	654	457	249	30	26
27	2645	2537	2425	2308	2187	2061	1930	1794	1651	27	1503	1348	1186	1016	838	650	453	246	26	27
28	2643	2535	2423	2306	2185	2059	1928	1791	1649	28	1500	1345	1183	1013	834	647	450	242	22	28
29	2641	2533	2421	2304	2183	2057	1926	1789	1646	29	1498	1342	1180	1010	831	644	447	239	19	29
30	2640	2531	2419	2302	2181	2055	1923	1787	1644	30	1495	1340	1177	1007	828	641	443	235	15	30
31	2638	2529	2417	2300	2179	2053	1921	1784	1642	31	1493	1337	1174	1004	825	638	440	231	11	31
32	2636	2528	2415	2298	2177	2050	1919	1782	1639	32	1490	1335	1172	1001	822	634	436	228	7	32
33	2634	2526	2413	2296	2175	2048	1917	1780	1637	33	1488	1332	1169	998	819	631	433	224	3	33
34	2632	2524	2411	2294	2173	2046	1914	1777	1634	34	1485	1329	1166	995	816	628	430	221	-0	34
35	2631	2522	2409	2292	2171	2044	1912	1775	1632	35	1483	1327	1163	992	813	625	426	217		35
36	2629	2520	2407	2290	2168	2042	1910	1773	1629	36	1480	1324	1161	990	810	621	423	213		36
37	2627	2518	2406	2288	2166	2040	1908	1770	1627	37	1477	1321	1158	987	807	618	420	210		37
38	2625	2517	2404	2286	2164	2037	1905	1768	1625	38	1475	1319	1155	984	804	615	416	206		38
39	2624	2515	2402	2284	2162	2035	1903	1766	1622	39	1472	1316	1152	981	801	612	413	203		39
40	2622	2513	2400	2282	2160	2033	1901	1763	1620	40	1470	1313	1149	978	798	609	409	199		40
41	2620	2511	2398	2280	2158	2031	1899	1761	1617	41	1467	1311	1147	975	795	605	406	196		41
42	2618	2509	2396	2278	2156	2029	1896	1759	1615	42	1465	1308	1144	972	792	602	402	192		42
43	2616	2507	2394	2276	2154	2027	1894	1756	1612	43	1462	1305	1141	969	789	599	399	188		43
44	2615	2505	2392	2274	2152	2025	1892	1754	1610	44	1460	1303	1138	966	785	596	396	185		44
45	2613	2504	2390	2272	2150	2022	1890	1752	1607	45	1457	1300	1135	963	782	592	392	181		45
46	2611	2502	2388	2270	2148	2020	1887	1749	1605	46	1454	1297	1133	960	779	589	389	177		46
47	2609	2500	2386	2268	2146	2018	1885	1747	1603	47	1452	1295	1130	957	776	586	385	174		47
48	2607	2498	2384	2266	2144	2016	1883	1744	1600	48	1449	1292	1127	954	773	583	382	170		48
49	2606	2496	2382	2264	2141	2014	1881	1742	1598	49	1447	1289	1124	951	770	579	379	167		49
50	2604	2494	2380	2262	2139	2012	1878	1740	1595	50	1444	1286	1121	948	767	576	375	163		50
51	2602	2492	2379	2260	2137	2009	1876	1737	1593	51	1442	1284	1119	945	764	573	372	159		51
52	2600	2491	2377	2258	2135	2007	1874	1735	1590	52	1439	1281	1116	943	761	570	368	156		52
53	2599	2489	2375	2256	2133	2005	1872	1733	1588	53	1437	1278	1113	940	758	566	365	152		53
54	2597	2487	2373	2254	2131	2003	1869	1730	1585	54	1434	1276	1110	937	754	563	361	148		54
55	2595	2485	2371	2252	2129	2001	1867	1728	1583	55	1431	1273	1107	934	751	560	358	145		55
56	2593	2483	2369	2250	2127	1998	1865	1726	1580	56	1429	1270	1104	931	748	556	354	141		56
57	2591	2481	2367	2248	2125	1996	1863	1723	1578	57	1426	1268	1102	928	745	553	351	137		57
58	2590	2479	2365	2246	2123	1994	1860	1721	1575	58	1424	1265	1099	925	742	550	347	134		58
59	2588	2477	2363	2244	2120	1992	1858	1718	1573	59	1421	1262	1096	922	739	547	344	130		59

Table II

## SUM OR DIFFERENCE

Mn	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°
0	20' 0"0	19'59"8	19'59"4	19'58"6	19'57"6	19'56"2	19'54"5	19'52"5	19'50"3	19'47"7	19'44"8	19'41"6	19'38"1	19'34"4	19'30"3
1	0-0	59-8	59-4	58-6	57-5	56-2	54-5	52-5	50-2	47-6	44-8	41-6	38-1	34-3	30-2
2	0-0	59-8	59-4	58-6	57-5	56-1	54-5	52-5	50-2	47-6	44-7	41-5	38-0	34-2	30-2
3	0-0	59-8	59-4	58-6	57-5	56-1	54-4	52-4	50-1	47-6	44-7	41-5	38-0	34-2	30-1
4	0-0	59-8	59-3	58-6	57-5	56-1	54-4	52-4	50-1	47-5	44-6	41-4	37-9	34-1	30-0
5	20 0-0	19 59-8	19 59-3	19 58-6	19 57-5	19 56-1	19 54-4	19 52-4	19 50-1	19 47-5	19 44-6	19 41-3	19 37-8	19 34-0	19 29-9
6	0-0	59-8	59-3	58-5	57-4	56-0	54-3	52-3	50-0	47-4	44-5	41-3	37-8	34-0	29-9
7	0-0	59-8	59-3	58-5	57-4	56-0	54-3	52-3	50-0	47-4	44-5	41-2	37-7	33-9	29-8
8	0-0	59-8	59-3	58-5	57-4	56-0	54-3	52-3	49-9	47-3	44-4	41-2	37-7	33-8	29-7
9	0-0	59-8	59-3	58-5	57-4	56-0	54-2	52-2	49-9	47-3	44-3	41-1	37-6	33-8	29-7
10	20 0-0	19 59-8	19 59-3	19 58-5	19 57-4	19 55-9	19 54-2	19 52-2	19 49-9	19 47-2	19 44-3	19 41-1	19 37-5	19 33-7	19 29-6
11	0-0	59-8	59-3	58-5	57-3	55-9	54-2	52-2	49-8	47-2	44-2	41-0	37-5	33-6	29-5
12	0-0	59-8	59-3	58-4	57-3	55-9	54-2	52-1	49-8	47-1	44-2	41-0	37-4	33-6	29-4
13	0-0	59-8	59-3	58-4	57-3	55-9	54-1	52-1	49-7	47-1	44-1	40-9	37-4	33-5	29-4
14	0-0	59-8	59-2	58-4	57-3	55-8	54-1	52-0	49-7	47-0	44-1	40-8	37-3	33-4	29-3
15	20 0-0	19 59-8	19 59-2	19 58-4	19 57-3	19 55-8	19 54-1	19 52-0	19 49-7	19 47-0	19 44-0	19 40-8	19 37-2	19 33-4	19 29-2
16	0-0	59-8	59-2	58-4	57-2	55-8	54-0	52-0	49-6	46-9	44-0	40-7	37-2	33-3	29-2
17	0-0	59-7	59-2	58-4	57-2	55-8	54-0	51-9	49-6	46-9	43-9	40-7	37-1	33-2	29-1
18	0-0	59-7	59-2	58-3	57-2	55-7	54-0	51-9	49-5	46-9	43-9	40-6	37-0	33-2	29-0
19	0-0	59-7	59-2	58-3	57-2	55-7	53-9	51-9	49-5	46-8	43-8	40-6	37-0	33-1	28-9
20	20 0-0	19 59-7	19 59-2	19 58-3	19 57-1	19 55-7	19 53-9	19 51-8	19 49-4	19 46-8	19 43-8	19 40-5	19 36-9	19 33-0	19 28-9
21	0-0	59-7	59-2	58-3	57-1	55-6	53-9	51-8	49-4	46-7	43-7	40-4	36-9	33-0	28-8
22	0-0	59-7	59-1	58-3	57-1	55-6	53-8	51-7	49-4	46-7	43-7	40-4	36-8	32-9	28-7
23	0-0	59-7	59-1	58-3	57-1	55-6	53-8	51-7	49-3	46-6	43-6	40-3	36-7	32-8	28-7
24	0-0	59-7	59-1	58-2	57-1	55-6	53-8	51-7	49-3	46-6	43-6	40-3	36-7	32-8	28-6
25	20 0-0	19 59-7	19 59-1	19 58-2	19 57-0	19 55-5	19 53-7	19 51-6	19 49-2	19 46-5	19 43-5	19 40-2	19 36-6	19 32-7	19 28-5
26	0-0	59-7	59-1	58-2	57-0	55-5	53-7	51-6	49-2	46-5	43-5	40-2	36-5	32-6	28-4
27	0-0	59-7	59-1	58-2	57-0	55-5	53-7	51-6	49-1	46-4	43-4	40-1	36-5	32-6	28-4
28	0-0	59-7	59-1	58-2	57-0	55-5	53-6	51-5	49-1	46-4	43-4	40-0	36-4	32-5	28-3
29	0-0	59-7	59-1	58-2	56-9	55-4	53-6	51-5	49-1	46-3	43-3	40-0	36-4	32-4	28-2
30	20 0-0	19 59-7	19 59-0	19 58-1	19 56-9	19 55-4	19 53-6	19 51-4	19 49-0	19 46-3	19 43-3	19 39-9	19 36-3	19 32-4	19 28-1
31	0-0	59-6	59-0	58-1	56-9	55-4	53-5	51-4	49-0	46-2	43-2	39-9	36-2	32-3	28-1
32	0-0	59-6	59-0	58-1	56-9	55-3	53-5	51-4	48-9	46-2	43-1	39-8	36-2	32-2	28-0
33	0-0	59-6	59-0	58-1	56-8	55-3	53-5	51-3	48-9	46-1	43-1	39-8	36-1	32-2	27-9
34	0-0	59-6	59-0	58-1	56-8	55-3	53-4	51-3	48-8	46-1	43-0	39-7	36-0	32-1	27-9
35	19 59-9	19 59-6	19 59-0	19 58-0	19 56-8	19 55-3	19 53-4	19 51-3	19 48-8	19 46-0	19 43-0	19 39-6	19 36-0	19 32-0	19 27-8
36	59-9	59-6	59-0	58-0	56-8	55-2	53-4	51-2	48-8	46-0	42-9	39-6	35-9	32-0	27-7
37	59-9	59-6	59-0	58-0	56-8	55-2	53-3	51-2	48-7	45-9	42-9	39-5	35-9	31-9	27-6
38	59-9	59-6	58-9	58-0	56-7	55-2	53-3	51-1	48-7	45-9	42-8	39-5	35-8	31-8	27-6
39	59-9	59-6	58-9	58-0	56-7	55-1	53-3	51-1	48-6	45-9	42-8	39-4	35-7	31-8	27-5
40	19 59-9	19 59-6	19 58-9	19 58-0	19 56-7	19 55-1	19 53-2	19 51-1	19 48-6	19 45-8	19 42-7	19 39-3	19 35-7	19 31-7	19 27-4
41	59-9	59-6	58-9	57-9	56-7	55-1	53-2	51-0	48-5	45-8	42-7	39-3	35-6	31-6	27-3
42	59-9	59-6	58-9	57-9	56-6	55-1	53-2	51-0	48-5	45-7	42-6	39-2	35-5	31-5	27-3
43	59-9	59-6	58-9	57-9	56-6	55-0	53-1	50-9	48-4	45-7	42-6	39-2	35-5	31-5	27-2
44	59-9	59-5	58-9	57-9	56-6	55-0	53-1	50-9	48-4	45-6	42-5	39-1	35-4	31-4	27-1
45	19 59-9	19 59-5	19 58-8	19 57-9	19 56-6	19 55-0	19 53-1	19 50-9	19 48-4	19 45-6	19 42-5	19 39-0	19 35-3	19 31-3	19 27-0
46	59-9	59-5	58-8	57-8	56-5	54-9	53-0	50-8	48-3	45-5	42-4	39-0	35-3	31-3	27-0
47	59-9	59-5	58-8	57-8	56-5	54-9	53-0	50-8	48-3	45-5	42-3	38-9	35-2	31-2	26-9
48	59-9	59-5	58-8	57-8	56-5	54-9	53-0	50-7	48-2	45-4	42-3	38-9	35-1	31-1	26-8
49	59-9	59-5	58-8	57-8	56-5	54-9	52-9	50-7	48-2	45-4	42-2	38-8	35-1	31-1	26-7
50	19 59-9	19 59-5	19 58-8	19 57-8	19 56-4	19 54-8	19 52-9	19 50-7	19 48-1	19 45-3	19 42-2	19 38-7	19 35-0	19 31-0	19 26-7
51	59-9	59-5	58-8	57-7	56-4	54-8	52-9	50-6	48-1	45-3	42-1	38-7	35-0	30-9	26-6
52	59-9	59-5	58-7	57-7	56-4	54-8	52-8	50-6	48-0	45-2	42-1	38-6	34-9	30-9	26-5
53	59-9	59-5	58-7	57-7	56-4	54-7	52-8	50-5	48-0	45-2	42-0	38-6	34-8	30-8	26-5
54	59-9	59-5	58-7	57-7	56-3	54-7	52-8	50-5	48-0	45-1	42-0	38-5	34-8	30-7	26-4
55	19 59-9	19 59-4	19 58-7	19 57-7	19 56-3	19 54-7	19 52-7	19 50-5	19 47-9	19 45-1	19 41-9	19 38-4	19 34-7	19 30-6	19 26-3
56	59-9	59-4	58-7	57-6	56-3	54-6	52-7	50-4	47-9	45-0	41-8	38-4	34-6	30-6	26-2
57	59-9	59-4	58-7	57-6	56-3	54-6	52-7	50-4	47-8	45-0	41-8	38-3	34-6	30-5	26-2
58	59-9	59-4	58-7	57-6	56-2	54-6	52-6	50-3	47-8	44-9	41-7	38-3	34-5	30-4	26-1
59	59-9	59-4	58-6	57-6	56-2	54-6	52-6	50-3	47-7	44-9	41-7	38-2	34-4	30-4	26-0

Table II  
SUM OR DIFFERENCE

Mn	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°
0	19'25"9	19'21"3	19'16"3	19'11"1	19' 5"5	18'59"7	18'53"6	18'47"2	18'40"5	18'33"5	18'26"3	18'18"8	18'11"0	18' 2"9	17'54"6
1	25-9	21-2	16-2	11-0	5-4	59-6	53-5	47-1	40-4	33-4	26-2	18-7	10-9	2-8	54-5
2	25-8	21-1	16-1	10-9	5-3	59-5	53-4	47-0	40-3	33-3	26-1	18-5	10-7	2-7	54-3
3	25-7	21-0	16-0	10-8	5-2	59-4	53-3	46-9	40-2	33-2	25-9	18-4	10-6	2-5	54-2
4	25-6	20-9	16-0	10-7	5-1	59-3	53-2	46-7	40-0	33-1	25-8	18-3	10-5	2-4	54-1
5	19 25-5	19 20-9	19 15-9	19 10-6	19 5-0	18 59-2	18 53-1	18 46-6	18 39-9	18 33-0	18 25-7	18 18-2	18 10-3	18 2-3	17 53-9
6	25-5	20-8	15-8	10-5	4-9	59-1	53-0	46-5	39-8	32-8	25-6	18-0	10-2	2-1	53-8
7	25-4	20-7	15-7	10-4	4-9	59-0	52-8	46-4	39-7	32-7	25-4	17-9	10-1	2-0	53-6
8	25-3	20-6	15-6	10-3	4-8	58-9	52-7	46-3	39-6	32-6	25-3	17-8	9-9	1-9	53-5
9	25-2	20-5	15-5	10-2	4-7	58-8	52-6	46-2	39-5	32-5	25-2	17-6	9-8	1-7	53-3
10	19 25-2	19 20-5	19 15-5	19 10-2	19 4-6	18 58-7	18 52-5	18 46-1	18 39-4	18 32-4	18 25-1	18 17-5	18 9-7	18 1-6	17 53-2
11	25-1	20-4	15-4	10-1	4-5	58-6	52-4	46-0	39-2	32-2	25-0	17-4	9-5	1-4	53-1
12	25-0	20-3	15-3	10-0	4-4	58-5	52-3	45-9	39-1	32-1	24-8	17-3	9-4	1-3	52-9
13	24-9	20-2	15-2	9-9	4-3	58-4	52-2	45-8	39-0	32-0	24-7	17-1	9-3	1-2	52-8
14	24-9	20-1	15-1	9-8	4-2	58-3	52-1	45-7	38-9	31-9	24-6	17-0	9-2	1-0	52-6
15	19 24-8	19 20-0	19 15-0	19 9-7	19 4-1	18 58-2	18 52-0	18 45-5	18 38-8	18 31-8	18 24-5	18 16-9	18 9-0	18 0-9	17 52-5
16	24-7	20-0	14-9	9-6	4-0	58-1	51-9	45-4	38-7	31-6	24-3	16-7	8-9	0-8	52-4
17	24-6	19-9	14-8	9-5	3-9	58-0	51-8	45-3	38-6	31-5	24-2	16-6	8-8	0-6	52-2
18	24-6	19-8	14-8	9-4	3-8	57-9	51-7	45-2	38-4	31-4	24-1	16-5	8-6	0-5	52-1
19	24-5	19-7	14-7	9-3	3-7	57-8	51-6	45-1	38-3	31-3	24-0	16-4	8-5	0-3	51-9
20	19 24-4	19 19-6	19 14-6	19 9-2	19 3-6	18 57-7	18 51-5	18 45-0	18 38-2	18 31-2	18 23-8	18 16-2	18 8-4	18 0-2	17 51-8
21	24-3	19-6	14-5	9-2	3-5	57-6	51-4	44-9	38-1	31-0	23-7	16-1	8-2	0-1	51-6
22	24-2	19-5	14-4	9-1	3-4	57-5	51-3	44-8	38-0	30-9	23-6	16-0	8-1	17 59-9	51-5
23	24-2	19-4	14-3	9-0	3-3	57-4	51-2	44-7	37-9	30-8	23-5	15-8	7-9	59-8	51-4
24	24-1	19-3	14-2	8-9	3-2	57-3	51-1	44-5	37-8	30-7	23-3	15-7	7-8	59-6	51-2
25	19 24-0	19 19-2	19 14-2	19 8-8	19 3-1	18 57-2	18 50-9	18 44-4	18 37-6	18 30-6	18 23-2	18 15-6	18 7-7	17 59-5	17 51-1
26	23-9	19-1	14-1	8-7	3-0	57-1	50-8	44-3	37-5	30-4	23-1	15-5	7-5	59-4	50-9
27	23-9	19-1	14-0	8-6	2-9	57-0	50-7	44-2	37-4	30-3	23-0	15-3	7-4	59-2	50-8
28	23-8	19-0	13-9	8-5	2-8	56-9	50-6	44-1	37-3	30-2	22-8	15-2	7-3	59-1	50-6
29	23-7	18-9	13-8	8-4	2-7	56-8	50-5	44-0	37-2	30-1	22-7	15-1	7-1	59-0	50-5
30	19 23-6	19 18-8	19 13-7	19 8-3	19 2-6	18 56-7	18 50-4	18 43-9	18 37-1	18 30-0	18 22-6	18 14-9	18 7-0	17 58-8	17 50-4
31	23-6	18-7	13-6	8-2	2-5	56-6	50-3	43-8	36-9	29-8	22-5	14-8	6-9	58-7	50-2
32	23-5	18-7	13-5	8-1	2-4	56-5	50-2	43-7	36-8	29-7	22-3	14-7	6-7	58-5	50-1
33	23-4	18-6	13-5	8-0	2-3	56-4	50-1	43-5	36-7	29-6	22-2	14-5	6-6	58-4	49-9
34	23-3	18-5	13-4	8-0	2-3	56-3	50-0	43-4	36-6	29-5	22-1	14-4	6-5	58-3	49-8
35	19 23-2	19 18-4	19 13-3	19 7-9	19 2-2	18 56-2	18 49-9	18 43-3	18 36-5	18 29-4	18 22-0	18 14-3	18 6-3	17 58-1	17 49-6
36	23-2	18-3	13-2	7-8	2-1	56-1	49-8	43-2	36-4	29-2	21-8	14-2	6-2	58-0	49-5
37	23-1	18-2	13-1	7-7	2-0	56-0	49-7	43-1	36-2	29-1	21-7	14-0	6-1	57-8	49-4
38	23-0	18-2	13-0	7-6	1-9	55-9	49-6	43-0	36-1	29-0	21-6	13-9	5-9	57-7	49-2
39	22-9	18-1	12-9	7-5	1-8	55-8	49-5	42-9	36-0	28-9	21-5	13-8	5-8	57-6	49-1
40	19 22-8	19 18-0	19 12-8	19 7-4	19 1-7	18 55-6	18 49-3	18 42-8	18 35-9	18 28-8	18 21-3	18 13-6	18 5-7	17 57-4	17 48-9
41	22-8	17-9	12-7	7-3	1-6	55-5	49-2	42-7	35-8	28-6	21-2	13-5	5-5	57-3	48-8
42	22-7	17-8	12-7	7-2	1-5	55-4	49-1	42-5	35-7	28-5	21-1	13-4	5-4	57-1	48-6
43	22-6	17-7	12-6	7-1	1-4	55-3	49-0	42-4	35-5	28-4	21-0	13-2	5-3	57-0	48-5
44	22-5	17-7	12-5	7-0	1-3	55-2	48-9	42-3	35-4	28-3	20-8	13-1	5-1	56-9	48-3
45	19 22-5	19 17-6	19 12-4	19 6-9	19 1-2	18 55-1	18 48-8	18 42-2	18 35-3	18 28-1	18 20-7	18 13-0	18 5-0	17 56-7	17 48-2
46	22-4	17-5	12-3	6-8	1-1	55-0	48-7	42-1	35-2	28-0	20-6	12-8	4-9	56-6	48-1
47	22-3	17-4	12-2	6-7	1-0	54-9	48-6	42-0	35-1	27-9	20-4	12-7	4-7	56-4	47-9
48	22-2	17-3	12-1	6-6	0-9	54-8	48-5	41-9	35-0	27-8	20-3	12-6	4-6	56-3	47-8
49	22-1	17-2	12-0	6-6	0-8	54-7	48-4	41-8	34-8	27-7	20-2	12-5	4-4	56-2	47-6
50	19 22-1	19 17-2	19 12-0	19 6-5	19 0-7	18 54-6	18 48-3	18 41-6	18 34-7	18 27-5	18 20-1	18 12-3	18 4-3	17 56-0	17 47-5
51	22-0	17-1	11-9	6-4	0-6	54-5	48-2	41-5	34-6	27-4	19-9	12-2	4-2	55-9	47-3
52	21-9	17-0	11-8	6-3	0-5	54-4	48-1	41-4	34-5	27-3	19-8	12-1	4-0	55-7	47-2
53	21-8	16-9	11-7	6-2	0-4	54-3	47-9	41-3	34-4	27-2	19-7	11-9	3-9	55-6	47-0
54	21-7	16-8	11-6	6-1	0-3	54-2	47-8	41-2	34-3	27-0	19-6	11-8	3-8	55-5	46-9
55	19 21-7	19 16-7	19 11-5	19 6-0	19 0-2	18 54-1	18 47-7	18 41-1	18 34-1	18 26-9	18 19-4	18 11-7	18 3-6	17 55-3	17 46-8
56	21-6	16-6	11-4	5-9	0-1	54-0	47-6	41-0	34-0	26-8	19-3	11-5	3-5	55-2	46-6
57	21-5	16-6	11-3	5-8	0-0	53-9	47-5	40-8	33-9	26-7	19-2	11-4	3-4	55-0	46-5
58	21-4	16-5	11-2	5-7	18 59-9	53-8	47-4	40-7	33-8	26-6	19-0	11-3	3-2	54-9	46-3
59	21-3	16-4	11-1	5-6	59-8	53-7	47-3	40-6	33-7	26-4	18-9	11-1	3-1	54-8	46-2

Table II

## SUM OR DIFFERENCE

Mn	30°	31°	32°	33°	34°	35°	36°	37°	38°	39°	40°	41°	42°	43°	44°
0	17'46"0	17'37"2	17'28"0	17'18"7	17' 9"0	16'59"2	16'49"0	16'38"6	16'28"0	16'17"1	16' 6"0	15'54"7	15'43"1	15'31"4	15'19"3
1	45.9	37.0	27.9	18.5	8.9	59.0	48.8	38.5	27.8	17.0	5.9	54.5	43.0	31.2	19.1
2	45.7	36.9	27.7	18.4	8.7	58.8	48.7	38.3	27.7	16.8	5.7	54.3	42.8	31.0	18.9
3	45.6	36.7	27.6	18.2	8.5	58.7	48.5	38.1	27.5	16.6	5.5	54.1	42.6	30.8	18.7
4	45.4	36.6	27.4	18.0	8.4	58.5	48.3	37.9	27.3	16.4	5.3	53.9	42.4	30.6	18.5
5	17 45.3	17 36.4	17 27.3	17 17.9	17 8.2	16 58.3	16 48.2	16 37.8	16 27.1	16 16.2	16 5.1	15 53.8	15 42.2	15 30.4	15 18.3
6	45.2	36.3	27.1	17.7	8.1	58.1	48.0	37.6	26.9	16.0	4.9	53.6	42.0	30.2	18.1
7	45.0	36.1	27.0	17.6	7.9	58.0	47.8	37.4	26.8	15.9	4.7	53.4	41.8	30.0	17.9
8	44.9	36.0	26.8	17.4	7.7	57.8	47.6	37.2	26.6	15.7	4.5	53.2	41.6	29.8	17.7
9	44.7	35.8	26.7	17.2	7.6	57.6	47.5	37.1	26.4	15.5	4.4	53.0	41.4	29.6	17.5
10	17 44.6	17 35.7	17 26.5	17 17.1	17 7.4	16 57.5	16 47.3	16 36.9	16 26.2	16 15.3	16 4.2	15 52.8	15 41.2	15 29.4	15 17.3
11	44.4	35.5	26.3	16.9	7.2	57.3	47.1	36.7	26.0	15.1	4.0	52.6	41.0	29.2	17.1
12	44.3	35.4	26.2	16.8	7.1	57.1	47.0	36.5	25.9	14.9	3.8	52.4	40.8	29.0	16.9
13	44.1	35.2	26.0	16.6	6.9	57.0	46.8	36.4	25.7	14.8	3.6	52.2	40.6	28.8	16.7
14	44.0	35.1	25.9	16.4	6.8	56.8	46.6	36.2	25.5	14.6	3.4	52.0	40.4	28.6	16.5
15	17 43.8	17 34.9	17 25.7	17 16.3	17 6.6	16 56.6	16 46.4	16 36.0	16 25.3	16 14.4	16 3.2	15 51.8	15 40.2	15 28.4	15 16.3
16	43.7	34.8	25.6	16.1	6.4	56.5	46.3	35.8	25.1	14.2	3.0	51.6	40.0	28.2	16.1
17	43.5	34.6	25.4	16.0	6.3	56.3	46.1	35.6	25.0	14.0	2.9	51.5	39.8	28.0	15.9
18	43.4	34.5	25.3	15.8	6.1	56.1	45.9	35.5	24.8	13.8	2.7	51.3	39.6	27.8	15.7
19	43.2	34.3	25.1	15.6	5.9	56.0	45.8	35.3	24.6	13.7	2.5	51.1	39.4	27.6	15.5
20	17 43.1	17 34.2	17 25.0	17 15.5	17 5.8	16 55.8	16 45.6	16 35.1	16 24.4	16 13.5	16 2.3	15 50.9	15 39.2	15 27.4	15 15.3
21	43.0	34.0	24.8	15.3	5.6	55.6	45.4	34.9	24.2	13.3	2.1	50.7	39.0	27.2	15.1
22	42.8	33.9	24.6	15.2	5.4	55.5	45.2	34.8	24.1	13.1	1.9	50.5	38.8	27.0	14.9
23	42.7	33.7	24.5	15.0	5.3	55.3	45.1	34.6	23.9	12.9	1.7	50.3	38.7	26.8	14.7
24	42.5	33.6	24.3	14.8	5.1	55.1	44.9	34.4	23.7	12.7	1.5	50.1	38.5	26.6	14.5
25	17 42.4	17 33.4	17 24.2	17 14.7	17 4.9	16 55.0	16 44.7	16 34.2	16 23.5	16 12.5	16 1.3	15 49.9	15 38.3	15 26.4	15 14.3
26	42.2	33.2	24.0	14.5	4.8	54.8	44.5	34.1	23.3	12.4	1.2	49.7	38.1	26.2	14.1
27	42.1	33.1	23.9	14.4	4.6	54.6	44.4	33.9	23.2	12.2	1.0	49.5	37.9	26.0	13.9
28	41.9	32.9	23.7	14.2	4.5	54.5	44.2	33.7	23.0	12.0	0.8	49.3	37.7	25.8	13.7
29	41.8	32.8	23.5	14.0	4.3	54.3	44.0	33.5	22.8	11.8	0.6	49.1	37.5	25.6	13.5
30	17 41.6	17 32.6	17 23.4	17 13.9	17 4.1	16 54.1	16 43.9	16 33.4	16 22.6	16 11.6	16 0.4	15 49.0	15 37.3	15 25.4	15 13.3
31	41.5	32.5	23.2	13.7	4.0	53.9	43.7	33.2	22.4	11.4	0.2	48.8	37.1	25.2	13.0
32	41.3	32.3	23.1	13.6	3.8	53.8	43.5	33.0	22.2	11.3	0.0	48.6	36.9	25.0	12.8
33	41.2	32.2	22.9	13.4	3.6	53.6	43.3	32.8	22.1	11.1	15 59.8	48.4	36.7	24.8	12.6
34	41.0	32.0	22.8	13.2	3.5	53.4	43.2	32.6	21.9	10.9	59.6	48.2	36.5	24.6	12.4
35	17 40.9	17 31.9	17 22.6	17 13.1	17 3.3	16 53.3	16 43.0	16 32.5	16 21.7	16 10.7	15 59.5	15 48.0	15 36.3	15 24.4	15 12.2
36	40.7	31.7	22.5	12.9	3.1	53.1	42.8	32.3	21.5	10.5	59.3	47.8	36.1	24.2	12.0
37	40.6	31.6	22.3	12.8	3.0	52.9	42.6	32.1	21.3	10.3	59.1	47.6	35.9	24.0	11.8
38	40.4	31.4	22.1	12.6	2.8	52.8	42.5	31.9	21.2	10.1	58.9	47.4	35.7	23.8	11.6
39	40.3	31.3	22.0	12.4	2.6	52.6	42.3	31.8	21.0	10.0	58.7	47.2	35.5	23.6	11.4
40	17 40.1	17 31.1	17 21.8	17 12.3	17 2.5	16 52.4	16 42.1	16 31.6	16 20.8	16 9.8	15 58.5	15 47.0	15 35.3	15 23.4	15 11.2
41	40.0	31.0	21.7	12.1	2.3	52.3	41.9	31.4	20.6	9.6	58.3	46.8	35.1	23.2	11.0
42	39.9	30.8	21.5	12.0	2.1	52.1	41.8	31.2	20.4	9.4	58.1	46.6	34.9	23.0	10.8
43	39.7	30.7	21.4	11.8	2.0	51.9	41.6	31.0	20.2	9.2	57.9	46.4	34.7	22.8	10.6
44	39.6	30.5	21.2	11.6	1.8	51.7	41.4	30.9	20.1	9.0	57.8	46.3	34.5	22.6	10.4
45	17 39.4	17 30.4	17 21.0	17 11.5	17 1.6	16 51.6	16 41.3	16 30.7	16 19.9	16 8.8	15 57.6	15 46.1	15 34.3	15 22.4	15 10.2
46	39.3	30.2	20.9	11.3	1.5	51.4	41.1	30.5	19.7	8.7	57.4	45.9	34.1	22.2	10.0
47	39.1	30.0	20.7	11.1	1.3	51.2	40.9	30.3	19.5	8.5	57.2	45.7	33.9	22.0	9.8
48	39.0	29.9	20.6	11.0	1.1	51.1	40.7	30.2	19.3	8.3	57.0	45.5	33.7	21.8	9.6
49	38.8	29.7	20.4	10.8	1.0	50.9	40.6	30.0	19.2	8.1	56.8	45.3	33.5	21.6	9.4
50	17 38.7	17 29.6	17 20.3	17 10.7	17 0.8	16 50.7	16 40.4	16 29.8	16 19.0	16 7.9	15 56.6	15 45.1	15 33.3	15 21.4	15 9.2
51	38.5	29.4	20.1	10.5	0.7	50.6	40.2	29.6	18.8	7.7	56.4	44.9	33.1	21.2	9.0
52	38.4	29.3	19.9	10.3	0.5	50.4	40.0	29.4	18.6	7.5	56.2	44.7	32.9	21.0	8.8
53	38.2	29.1	19.8	10.2	0.3	50.2	39.9	29.3	18.4	7.4	56.0	44.5	32.7	20.8	8.5
54	38.1	29.0	19.6	10.0	0.2	50.0	39.7	29.1	18.2	7.2	55.9	44.3	32.5	20.6	8.3
55	17 37.9	17 28.8	17 19.5	17 9.9	17 0.0	16 49.9	16 39.5	16 28.9	16 18.1	16 7.0	15 55.7	15 44.1	15 32.3	15 20.3	15 8.1
56	37.8	28.7	19.3	9.7	16 59.8	49.7	39.3	28.7	17.9	6.8	55.5	43.9	32.1	20.1	7.9
57	37.6	28.5	19.1	9.5	59.7	49.5	39.2	28.5	17.7	6.6	55.3	43.7	31.9	19.9	7.7
58	37.5	28.4	19.0	9.4	59.5	49.4	39.0	28.4	17.5	6.4	55.1	43.5	31.8	19.7	7.5
59	37.3	28.2	18.8	9.2	59.3	49.2	38.8	28.2	17.3	6.2	54.9	43.3	31.6	19.5	7.3

Table II  
SUM OR DIFFERENCE

Mn	45°	46°	47°	48°	49°	50°	51°	52°	53°	54°	55°	56°	57°	58°	59°
0	15' 7"1	14'54"7	14'42"0	14'29"1	14'16"1	14' 2"8	13'49"3	13'35"7	13'21"8	13' 7"8	12'53"6	12'39"2	12'24"6	12' 9"9	11'55"0
1	6·9	54·4	41·8	28·9	15·8	2·6	49·1	35·4	21·6	7·5	53·3	39·0	24·4	9·7	54·8
2	6·7	54·2	41·6	28·7	15·6	2·3	48·9	35·2	21·4	7·3	53·1	38·7	24·2	9·4	54·5
3	6·5	54·0	41·4	28·5	15·4	2·1	48·6	35·0	21·1	7·1	52·9	38·5	23·9	9·2	54·3
4	6·3	53·8	41·1	28·3	15·2	1·9	48·4	34·7	20·9	6·8	52·6	38·2	23·7	8·9	54·0
5	15 6·1	14 53·6	14 40·9	14 28·0	14 15·0	14 1·7	13 48·2	13 34·5	13 20·7	13 6·6	12 52·4	12 38·0	12 23·4	12 8·7	11 53·8
6	5·9	53·4	40·7	27·8	14·7	1·4	48·0	34·3	20·4	6·4	52·1	37·7	23·2	8·4	53·5
7	5·7	53·2	40·5	27·6	14·5	1·2	47·7	34·1	20·2	6·1	51·9	37·5	22·9	8·2	53·3
8	5·5	53·0	40·3	27·4	14·3	1·0	47·5	33·8	20·0	5·9	51·7	37·3	22·7	7·9	53·0
9	5·3	52·8	40·1	27·2	14·1	0·8	47·3	33·6	19·7	5·7	51·4	37·0	22·4	7·7	52·8
10	15 5·0	14 52·6	14 39·9	14 27·0	14 13·9	14 0·6	13 47·1	13 33·4	13 19·5	13 5·4	12 51·2	12 36·8	12 22·2	12 7·5	11 52·5
11	4·8	52·4	39·7	26·7	13·6	0·3	46·8	33·1	19·3	5·2	51·0	36·5	22·0	7·2	52·3
12	4·6	52·1	39·4	26·5	13·4	0·1	46·6	32·9	19·0	5·0	50·7	36·3	21·7	7·0	52·0
13	4·4	51·9	39·2	26·3	13·2	13 59·9	46·4	32·7	18·8	4·7	50·5	36·1	21·5	6·7	51·8
14	4·2	51·7	39·0	26·1	13·0	59·7	46·2	32·4	18·6	4·5	50·2	35·8	21·2	6·5	51·5
15	15 4·0	14 51·5	14 38·8	14 25·9	14 12·8	13 59·4	13 45·9	13 32·2	13 18·3	13 4·2	12 50·0	12 35·6	12 21·0	12 6·2	11 51·3
16	3·8	51·3	38·6	25·7	12·5	59·2	45·7	32·0	18·1	4·0	49·8	35·3	20·7	6·0	51·0
17	3·6	51·1	38·4	25·4	12·3	59·0	45·5	31·8	17·9	3·8	49·5	35·1	20·5	5·7	50·8
18	3·4	50·9	38·2	25·2	12·1	58·8	45·2	31·5	17·6	3·5	49·3	34·8	20·2	5·5	50·5
19	3·2	50·7	37·9	25·0	11·9	58·5	45·0	31·3	17·4	3·3	49·0	34·6	20·0	5·2	50·3
20	15 3·0	14 50·5	14 37·7	14 24·8	14 11·7	13 58·3	13 44·8	13 31·1	13 17·2	13 3·1	12 48·8	12 34·4	12 19·8	12 5·0	11 50·0
21	2·8	50·3	37·5	24·6	11·4	58·1	44·6	30·8	16·9	2·8	48·6	34·1	19·5	4·7	49·8
22	2·6	50·0	37·3	24·4	11·2	57·9	44·3	30·6	16·7	2·6	48·3	33·9	19·3	4·5	49·5
23	2·4	49·8	37·1	24·1	11·0	57·6	44·1	30·4	16·5	2·4	48·1	33·6	19·0	4·2	49·3
24	2·2	49·6	36·9	23·9	10·8	57·4	43·9	30·1	16·2	2·1	47·8	33·4	18·8	4·0	49·0
25	15 1·9	14 49·4	14 36·7	14 23·7	14 10·6	13 57·2	13 43·7	13 29·9	13 16·0	13 1·9	12 47·6	12 33·1	12 18·5	12 3·7	11 48·8
26	1·7	49·2	36·4	23·5	10·3	57·0	43·4	29·7	15·8	1·6	47·4	32·9	18·3	3·5	48·5
27	1·5	49·0	36·2	23·3	10·1	56·8	43·2	29·5	15·5	1·4	47·1	32·7	18·0	3·2	48·3
28	1·3	48·8	36·0	23·1	9·9	56·5	43·0	29·2	15·3	1·2	46·9	32·4	17·8	3·0	48·0
29	1·1	48·6	35·8	22·8	9·7	56·3	42·7	29·0	15·1	0·9	46·6	32·2	17·5	2·7	47·8
30	15 0·9	14 48·4	14 35·6	14 22·6	14 9·4	13 56·1	13 42·5	13 28·8	13 14·8	13 0·7	12 46·4	12 31·9	12 17·3	12 2·5	11 47·5
31	0·7	48·1	35·4	22·4	9·2	55·9	42·3	28·5	14·6	0·5	46·2	31·7	17·1	2·3	47·3
32	0·5	47·9	35·2	22·2	9·0	55·6	42·1	28·3	14·4	0·2	45·9	31·5	16·8	2·0	47·0
33	0·3	47·7	34·9	22·0	8·8	55·4	41·8	28·1	14·1	0·0	45·7	31·2	16·6	1·8	46·8
34	0·1	47·5	34·7	21·7	8·6	55·2	41·6	27·8	13·9	12 59·8	45·4	31·0	16·3	1·5	46·5
35	14 59·9	14 47·3	14 34·5	14 21·5	14 8·3	13 55·0	13 41·4	13 27·6	13 13·7	12 59·5	12 45·2	12 30·7	12 16·1	12 1·3	11 46·3
36	59·7	47·1	34·3	21·3	8·1	54·7	41·1	27·4	13·4	59·3	45·0	30·5	15·8	1·0	46·0
37	59·5	46·9	34·1	21·1	7·9	54·5	40·9	27·1	13·2	59·0	44·7	30·2	15·6	0·8	45·8
38	59·2	46·7	33·9	20·9	7·7	54·3	40·7	26·9	13·0	58·8	44·5	30·0	15·3	0·5	45·5
39	59·0	46·5	33·7	20·7	7·5	54·1	40·5	26·7	12·7	58·6	44·2	29·8	15·1	0·3	45·3
40	14 58·8	14 46·2	14 33·4	14 20·4	14 7·2	13 53·8	13 40·2	13 26·5	13 12·5	12 58·3	12 44·0	12 29·5	12 14·8	12 0·0	11 45·0
41	58·6	46·0	33·2	20·2	7·0	53·6	40·0	26·2	12·2	58·1	43·8	29·3	14·6	11 59·8	44·8
42	58·4	45·8	33·0	20·0	6·8	53·4	39·8	26·0	12·0	57·9	43·5	29·0	14·4	59·5	44·5
43	58·2	45·6	32·8	19·8	6·6	53·2	39·6	25·8	11·8	57·6	43·3	28·8	14·1	59·3	44·3
44	58·0	45·4	32·6	19·6	6·3	52·9	39·3	25·5	11·5	57·4	43·0	28·5	13·9	59·0	44·0
45	14 57·8	14 45·2	14 32·4	14 19·3	14 6·1	13 52·7	13 39·1	13 25·3	13 11·3	12 57·1	12 42·8	12 28·3	12 13·6	11 58·8	11 43·8
46	57·6	45·0	32·2	19·1	5·9	52·5	38·9	25·1	11·1	56·9	42·6	28·0	13·4	58·5	43·5
47	57·4	44·8	31·9	18·9	5·7	52·3	38·6	24·8	10·8	56·7	42·3	27·8	13·1	58·3	43·3
48	57·2	44·5	31·7	18·7	5·5	52·0	38·4	24·6	10·6	56·4	42·1	27·6	12·9	58·0	43·0
49	57·0	44·3	31·5	18·5	5·2	51·8	38·2	24·4	10·4	56·2	41·8	27·3	12·6	57·8	42·8
50	14 56·7	14 44·1	14 31·3	14 18·3	14 5·0	13 51·6	13 38·0	13 24·1	13 10·1	12 56·0	12 41·6	12 27·1	12 12·4	11 57·5	11 42·5
51	56·5	43·9	31·1	18·0	4·8	51·4	37·7	23·9	9·9	55·7	41·4	26·8	12·1	57·3	42·3
52	56·3	43·7	30·9	17·8	4·6	51·1	37·5	23·7	9·7	55·5	41·1	26·6	11·9	57·0	42·0
53	56·1	43·5	30·6	17·6	4·3	50·9	37·3	23·4	9·4	55·2	40·9	26·3	11·6	56·8	41·8
54	55·9	43·3	30·4	17·4	4·1	50·7	37·0	23·2	9·2	55·0	40·6	26·1	11·4	56·5	41·5
55	14 55·7	14 43·1	14 30·2	14 17·2	14 3·9	13 50·5	13 36·8	13 23·0	13 9·0	12 54·8	12 40·4	12 25·9	12 11·2	11 56·3	11 41·3
56	55·5	42·8	30·0	16·9	3·7	50·2	36·6	22·7	8·7	54·5	40·2	25·6	10·9	56·0	41·0
57	55·3	42·6	29·8	16·7	3·5	50·0	36·3	22·5	8·5	54·3	39·9	25·4	10·7	55·8	40·8
58	55·1	42·4	29·6	16·5	3·2	49·8	36·1	22·3	8·3	54·1	39·7	25·1	10·4	55·5	40·5
59	54·9	42·2	29·3	16·3	3·0	49·5	35·9	22·0	8·0	53·8	39·4	24·9	10·2	55·3	40·3



Table II

## SUM OR DIFFERENCE

Mn	60°	61°	62°	63°	64°	65°	66°	67°	68°	69°	70°	71°	72°	73°	74°
0	11'40"0	11'24"8	11' 9"5	10'54"0	10'38"4	10'22"6	10' 6"7	9'50"7	9'34"6	9'18"4	9' 2"0	8'45"6	8'29"0	8'12"4	7'55"6
1	39.7	24.6	9.2	53.7	38.1	22.4	6.5	50.5	34.3	18.1	1.7	45.3	28.7	12.1	55.4
2	39.5	24.3	9.0	53.5	37.8	22.1	6.2	50.2	34.1	17.8	1.5	45.0	28.5	11.8	55.1
3	39.2	24.0	8.7	53.2	37.6	21.8	5.9	49.9	33.8	17.6	1.2	44.7	28.2	11.5	54.8
4	39.0	23.8	8.4	53.0	37.3	21.6	5.7	49.7	33.5	17.3	0.9	44.5	27.9	11.3	54.5
5	11 38.7	11 23.5	11 8.2	10 52.7	10 37.1	10 21.3	10 5.4	9 49.4	9 33.3	9 17.0	9 0.7	8 44.2	8 27.6	8 11.0	7 54.2
6	38.5	23.3	7.9	52.4	36.8	21.0	5.1	49.1	33.0	16.7	0.4	43.9	27.4	10.7	54.0
7	38.2	23.0	7.7	52.2	36.5	20.8	4.9	48.9	32.7	16.5	0.1	43.6	27.1	10.4	53.7
8	38.0	22.8	7.4	51.9	36.3	20.5	4.6	48.6	32.4	16.2	8 59.8	43.4	26.8	10.1	53.4
9	37.7	22.5	7.2	51.7	36.0	20.2	4.3	48.3	32.2	15.9	59.6	43.1	26.5	9.9	53.1
10	11 37.5	11 22.3	11 6.9	10 51.4	10 35.8	10 20.0	10 4.1	9 48.1	9 31.9	9 15.7	8 59.3	8 42.8	8 26.2	8 9.6	7 52.8
11	37.2	22.0	6.6	51.1	35.5	19.7	3.8	47.8	31.6	15.4	59.0	42.5	26.0	9.3	52.6
12	37.0	21.8	6.4	50.9	35.2	19.5	3.5	47.5	31.4	15.1	58.7	42.3	25.7	9.0	52.3
13	36.7	21.5	6.1	50.6	35.0	19.2	3.3	47.2	31.1	14.8	58.5	42.0	25.4	8.8	52.0
14	36.5	21.2	5.9	50.4	34.7	18.9	3.0	47.0	30.8	14.6	58.2	41.7	25.1	8.5	51.7
15	11 36.2	11 21.0	11 5.6	10 50.1	10 34.4	10 18.7	10 2.7	9 46.7	9 30.6	9 14.3	8 57.9	8 41.4	8 24.9	8 8.2	7 51.4
16	36.0	20.7	5.4	49.8	34.2	18.4	2.5	46.4	30.3	14.0	57.6	41.2	24.6	7.9	51.2
17	35.7	20.5	5.1	49.6	33.9	18.1	2.2	46.2	30.0	13.7	57.4	40.9	24.3	7.6	50.9
18	35.5	20.2	4.8	49.3	33.7	17.9	1.9	45.9	29.7	13.5	57.1	40.6	24.0	7.4	50.6
19	35.2	20.0	4.6	49.1	33.4	17.6	1.7	45.6	29.5	13.2	56.8	40.3	23.8	7.1	50.3
20	11 35.0	11 19.7	11 4.3	10 48.8	10 33.1	10 17.3	10 1.4	9 45.4	9 29.2	9 12.9	8 56.5	8 40.1	8 23.5	8 6.8	7 50.0
21	34.7	19.5	4.1	48.5	32.9	17.1	1.1	45.1	28.9	12.7	56.3	39.8	23.2	6.5	49.8
22	34.4	19.2	3.8	48.3	32.6	16.8	0.9	44.8	28.7	12.4	56.0	39.5	22.9	6.2	49.5
23	34.2	18.9	3.6	48.0	32.3	16.5	0.6	44.6	28.4	12.1	55.7	39.2	22.6	6.0	49.2
24	33.9	18.7	3.3	47.8	32.1	16.3	0.3	44.3	28.1	11.8	55.5	39.0	22.4	5.7	48.9
25	11 33.7	11 18.4	11 3.0	10 47.5	10 31.8	10 16.0	10 0.1	9 44.0	9 27.9	9 11.6	8 55.2	8 38.7	8 22.1	8 5.4	7 48.6
26	33.4	18.2	2.8	47.2	31.6	15.8	9 59.8	43.8	27.6	11.3	54.9	38.4	21.8	5.1	48.4
27	33.2	17.9	2.5	47.0	31.3	15.5	59.5	43.5	27.3	11.0	54.6	38.1	21.5	4.9	48.1
28	32.9	17.7	2.3	46.7	31.0	15.2	59.3	43.2	27.0	10.8	54.4	37.9	21.3	4.6	47.8
29	32.7	17.4	2.0	46.5	30.8	15.0	59.0	43.0	26.8	10.5	54.1	37.6	21.0	4.3	47.5
30	11 32.4	11 17.2	11 1.7	10 46.2	10 30.5	10 14.7	9 58.7	9 42.7	9 26.5	9 10.2	8 53.8	8 37.3	8 20.7	8 4.0	7 47.2
31	32.2	16.9	1.5	45.9	30.2	14.4	58.5	42.4	26.2	9.9	53.5	37.0	20.4	3.7	47.0
32	31.9	16.6	1.2	45.7	30.0	14.2	58.2	42.1	26.0	9.7	53.3	36.8	20.2	3.5	46.7
33	31.7	16.4	1.0	45.4	29.7	13.9	57.9	41.9	25.7	9.4	53.0	36.5	19.9	3.2	46.4
34	31.4	16.1	0.7	45.2	29.5	13.6	57.7	41.6	25.4	9.1	52.7	36.2	19.6	2.9	46.1
35	11 31.2	11 15.9	11 0.5	10 44.9	10 29.2	10 13.4	9 57.4	9 41.3	9 25.1	9 8.8	8 52.4	8 35.9	8 19.3	8 2.6	7 45.8
36	30.9	15.6	0.2	44.6	28.9	13.1	57.1	41.1	24.9	8.6	52.2	35.6	19.0	2.3	45.6
37	30.7	15.4	10 59.9	44.4	28.7	12.8	56.9	40.8	24.6	8.3	51.9	35.4	18.8	2.1	45.3
38	30.4	15.1	59.7	44.1	28.4	12.6	56.6	40.5	24.3	8.0	51.6	35.1	18.5	1.8	45.0
39	30.1	14.9	59.4	43.9	28.1	12.3	56.3	40.3	24.1	7.8	51.3	34.8	18.2	1.5	44.7
40	11 29.9	11 14.6	10 59.2	10 43.6	10 27.9	10 12.0	9 56.1	9 40.0	9 23.8	9 7.5	8 51.1	8 34.5	8 17.9	8 1.2	7 44.4
41	29.6	14.3	58.9	43.3	27.6	11.8	55.8	39.7	23.5	7.2	50.8	34.3	17.7	0.9	44.2
42	29.4	14.1	58.6	43.1	27.4	11.5	55.5	39.5	23.3	6.9	50.5	34.0	17.4	0.7	43.9
43	29.1	13.8	58.4	42.8	27.1	11.2	55.3	39.2	23.0	6.7	50.2	33.7	17.1	0.4	43.6
44	28.9	13.6	58.1	42.5	26.8	11.0	55.0	38.9	22.7	6.4	50.0	33.4	16.8	0.1	43.3
45	11 28.6	11 13.3	10 57.9	10 42.3	10 26.6	10 10.7	9 54.7	9 38.6	9 22.4	9 6.1	8 49.7	8 33.2	8 16.5	7 59.8	7 43.0
46	28.4	13.1	57.6	42.0	26.3	10.5	54.5	38.4	22.2	5.8	49.4	32.9	16.3	59.5	42.8
47	28.1	12.8	57.4	41.8	26.0	10.2	54.2	38.1	21.9	5.6	49.1	32.6	16.0	59.3	42.5
48	27.9	12.6	57.1	41.5	25.8	9.9	53.9	37.8	21.6	5.3	48.9	32.3	15.7	59.0	42.2
49	27.6	12.3	56.8	41.2	25.5	9.7	53.7	37.6	21.4	5.0	48.6	32.1	15.4	58.7	41.9
50	11 27.4	11 12.0	10 56.6	10 41.0	10 25.3	10 9.4	9 53.4	9 37.3	9 21.1	9 4.8	8 48.3	8 31.8	8 15.2	7 58.4	7 41.6
51	27.1	11.8	56.3	40.7	25.0	9.1	53.1	37.0	20.8	4.5	48.0	31.5	14.9	58.2	41.3
52	26.8	11.5	56.1	40.5	24.7	8.9	52.9	36.8	20.5	4.2	47.8	31.2	14.6	57.9	41.1
53	26.6	11.3	55.8	40.2	24.5	8.6	52.6	36.5	20.3	3.9	47.5	31.0	14.3	57.6	40.8
54	26.3	11.0	55.5	39.9	24.2	8.3	52.3	36.2	20.0	3.7	47.2	30.7	14.0	57.3	40.5
55	11 26.1	11 10.8	10 55.3	10 39.7	10 23.9	10 8.1	9 52.1	9 36.0	9 19.7	9 3.4	8 46.9	8 30.4	8 13.8	7 57.0	7 40.2
56	25.8	10.5	55.0	39.4	23.7	7.8	51.8	35.7	19.5	3.1	46.7	30.1	13.5	56.8	39.9
57	25.6	10.2	54.8	39.2	23.4	7.5	51.5	35.4	19.2	2.8	46.4	29.8	13.2	56.5	39.7
58	25.3	10.0	54.5	38.9	23.1	7.3	51.3	35.1	18.9	2.6	46.1	29.6	12.9	56.2	39.4
59	25.1	9.7	54.2	38.6	22.9	7.0	51.0	34.9	18.6	2.3	45.8	29.3	12.6	55.9	39.1

Table II  
SUM OR DIFFERENCE

Mn	75°	76°	77°	78°	79°	80°	81°	82°	83°	84°	85°	86°	87°	88°	89°
0	7'38"8	7'21"9	7' 5"0	6'47"9	6'30"8	6'13"6	5'56"4	5'39"2	5'21"9	5' 4"5	4'47"2	4'29"8	4'12"3	3'54"9	3'37"5
1	38-5	21-6	4-7	47-6	30-5	13-4	56-1	38-9	21-6	4-2	46-9	29-5	12-0	54-6	37-2
2	38-3	21-4	4-4	47-3	30-2	13-1	55-9	38-6	21-3	3-9	46-6	29-2	11-8	54-3	36-9
3	38-0	21-1	4-1	47-1	30-0	12-8	55-6	38-3	21-0	3-7	46-3	28-9	11-5	54-0	36-6
4	37-7	20-8	3-8	46-8	29-7	12-5	55-3	38-0	20-7	3-4	46-0	28-6	11-2	53-7	36-3
5	7 37-4	7 20-5	7 3-5	6 46-5	6 29-4	6 12-2	5 55-0	5 37-7	5 20-4	5 3-1	4 45-7	4 28-3	4 10-9	3 53-4	3 36-0
6	37-1	20-2	3-3	46-2	29-1	11-9	54-7	37-4	20-1	2-8	45-4	28-0	10-6	53-2	35-7
7	36-9	19-9	3-0	45-9	28-8	11-6	54-4	37-2	19-8	2-5	45-1	27-7	10-3	52-9	35-4
8	36-6	19-7	2-7	45-6	28-5	11-4	54-1	36-9	19-6	2-2	44-8	27-4	10-0	52-6	35-1
9	36-3	19-4	2-4	45-4	28-2	11-1	53-8	36-6	19-3	1-9	44-5	27-1	9-7	52-3	34-8
10	7 36-0	7 19-1	7 2-1	6 45-1	6 28-0	6 10-8	5 53-6	5 36-3	5 19-0	5 1-6	4 44-3	4 26-9	4 9-4	3 52-0	3 34-5
11	35-7	18-8	1-8	44-8	27-7	10-5	53-3	36-0	18-7	1-3	44-0	26-6	9-1	51-7	34-3
12	35-4	18-5	1-5	44-5	27-4	10-2	53-0	35-7	18-4	1-1	43-7	26-3	8-8	51-4	34-0
13	35-2	18-3	1-3	44-2	27-1	9-9	52-7	35-4	18-1	0-8	43-4	26-0	8-6	51-1	33-7
14	34-9	18-0	1-0	43-9	26-8	9-6	52-4	35-1	17-8	0-5	43-1	25-7	8-3	50-8	33-4
15	7 34-6	7 17-7	7 0-7	6 43-6	6 26-5	6 9-3	5 52-1	5 34-9	5 17-5	5 0-2	4 42-8	4 25-4	4 8-0	3 50-5	3 33-1
16	34-3	17-4	0-4	43-4	26-2	9-1	51-8	34-6	17-2	4 59-9	42-5	25-1	7-7	50-2	32-8
17	34-0	17-1	0-1	43-1	26-0	8-8	51-5	34-3	17-0	59-6	42-2	24-8	7-4	50-0	32-5
18	33-8	16-8	6 59-8	42-8	25-7	8-5	51-3	34-0	16-7	59-3	41-9	24-5	7-1	49-7	32-2
19	33-5	16-6	59-6	42-5	25-4	8-2	51-0	33-7	16-4	59-0	41-6	24-2	6-8	49-4	31-9
20	7 33-2	7 16-3	6 59-3	6 42-2	6 25-1	6 7-9	5 50-7	5 33-4	5 16-1	4 58-7	4 41-4	4 24-0	4 6-5	3 49-1	3 31-6
21	32-9	16-0	59-0	41-9	24-8	7-6	50-4	33-1	15-8	58-5	41-1	23-7	6-2	48-8	31-3
22	32-6	15-7	58-7	41-6	24-5	7-3	50-1	32-8	15-5	58-2	40-8	23-4	5-9	48-5	31-1
23	32-4	15-4	58-4	41-4	24-2	7-1	49-8	32-5	15-2	57-9	40-5	23-1	5-7	48-2	30-8
24	32-1	15-1	58-1	41-1	24-0	6-8	49-5	32-3	14-9	57-6	40-2	22-8	5-4	47-9	30-5
25	7 31-8	7 14-9	6 57-9	6 40-8	6 23-7	6 6-5	5 49-2	5 32-0	5 14-6	4 57-3	4 39-9	4 22-5	4 5-1	3 47-6	3 30-2
26	31-5	14-6	57-6	40-5	23-4	6-2	49-0	31-7	14-4	57-0	39-6	22-2	4-8	47-3	29-9
27	31-2	14-3	57-3	40-2	23-1	5-9	48-7	31-4	14-1	56-7	39-3	21-9	4-5	47-0	29-6
28	30-9	14-0	57-0	39-9	22-8	5-6	48-4	31-1	13-8	56-4	39-0	21-6	4-2	46-8	29-3
29	30-7	13-7	56-7	39-7	22-5	5-3	48-1	30-8	13-5	56-1	38-7	21-3	3-9	46-5	29-0
30	7 30-4	7 13-4	6 56-4	6 39-4	6 22-2	6 5-0	5 47-8	5 30-5	5 13-2	4 55-8	4 38-5	4 21-0	4 3-6	3 46-2	3 28-7
31	30-1	13-2	56-2	39-1	21-9	4-8	47-5	30-2	12-9	55-6	38-2	20-8	3-3	45-9	28-4
32	29-8	12-9	55-9	38-8	21-7	4-5	47-2	29-9	12-6	55-3	37-9	20-5	3-0	45-6	28-1
33	29-5	12-6	55-6	38-5	21-4	4-2	46-9	29-7	12-3	55-0	37-6	20-2	2-7	45-3	27-9
34	29-3	12-3	55-3	38-2	21-1	3-9	46-7	29-4	12-0	54-7	37-3	19-9	2-5	45-0	27-6
35	7 29-0	7 12-0	6 55-0	6 37-9	6 20-8	6 3-6	5 46-4	5 29-1	5 11-8	4 54-4	4 37-0	4 19-6	4 2-2	3 44-7	3 27-3
36	28-7	11-7	54-7	37-7	20-5	3-3	46-1	28-8	11-5	54-1	36-7	19-3	1-9	44-4	27-0
37	28-4	11-5	54-5	37-4	20-2	3-0	45-8	28-5	11-2	53-8	36-4	19-0	1-6	44-1	26-7
38	28-1	11-2	54-2	37-1	19-9	2-8	45-5	28-2	10-9	53-5	36-1	18-7	1-3	43-9	26-4
39	27-8	10-9	53-9	36-8	19-7	2-5	45-2	27-9	10-6	53-2	35-8	18-4	1-0	43-6	26-1
40	7 27-6	7 10-6	6 53-6	6 36-5	6 19-4	6 2-2	5 44-9	5 27-6	5 10-3	4 52-9	4 35-6	4 18-1	4 0-7	3 43-3	3 25-8
41	27-3	10-3	53-3	36-2	19-1	1-9	44-6	27-4	10-0	52-7	35-3	17-9	0-4	43-0	25-5
42	27-0	10-0	53-0	35-9	18-8	1-6	44-4	27-1	9-7	52-4	35-0	17-6	0-1	42-7	25-2
43	26-7	9-8	52-7	35-7	18-5	1-3	44-1	26-8	9-4	52-1	34-7	17-3	3 59-8	42-4	24-9
44	26-4	9-5	52-5	35-4	18-2	1-0	43-8	26-5	9-2	51-8	34-4	17-0	59-6	42-1	24-7
45	7 26-2	7 9-2	6 52-2	6 35-1	6 17-9	6 0-7	5 43-5	5 26-2	5 8-9	4 51-5	4 34-1	4 16-7	3 59-3	3 41-8	3 24-4
46	25-9	8-9	51-9	34-8	17-7	0-5	43-2	25-9	8-6	51-2	33-8	16-4	59-0	41-5	24-1
47	25-6	8-6	51-6	34-5	17-4	0-2	42-9	25-6	8-3	50-9	33-5	16-1	58-7	41-2	23-8
48	25-3	8-4	51-3	34-2	17-1	5 59-9	42-6	25-3	8-0	50-6	33-2	15-8	58-4	40-9	23-5
49	25-0	8-1	51-0	33-9	16-8	59-6	42-3	25-0	7-7	50-3	32-9	15-5	58-1	40-7	23-2
50	7 24-7	7 7-8	6 50-8	6 33-7	6 16-5	5 59-3	5 42-1	5 24-8	5 7-4	4 50-1	4 32-7	4 15-2	3 57-8	3 40-4	3 22-9
51	24-5	7-5	50-5	33-4	16-2	59-0	41-8	24-5	7-1	49-8	32-4	15-0	57-5	40-1	22-6
52	24-2	7-2	50-2	33-1	15-9	58-7	41-5	24-2	6-8	49-5	32-1	14-7	57-2	39-8	22-3
53	23-9	6-9	49-9	32-8	15-7	58-4	41-2	23-9	6-6	49-2	31-8	14-4	56-9	39-5	22-0
54	23-6	6-7	49-6	32-5	15-4	58-2	40-9	23-6	6-3	48-9	31-5	14-1	56-6	39-2	21-7
55	7 23-3	7 6-4	6 49-3	6 32-2	6 15-1	5 57-9	5 40-6	5 23-3	5 6-0	4 48-6	4 31-2	4 13-8	3 56-4	3 38-9	3 21-5
56	23-1	6-1	49-0	32-0	14-8	57-6	40-3	23-0	5-7	48-3	30-9	13-5	56-1	38-6	21-2
57	22-8	5-8	48-8	31-7	14-5	57-3	40-0	22-7	5-4	48-0	30-6	13-2	55-8	38-3	20-9
58	22-5	5-5	48-5	31-4	14-2	57-0	39-7	22-4	5-1	47-7	30-3	12-9	55-5	38-0	20-6
59	22-2	5-2	48-2	31-1	13-9	56-7	39-5	22-2	4-8	47-4	30-0	12-6	55-2	37-7	20-3

Table III

## ANGLE OF ALTITUDE

Mn	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°
0	16'40"0	16'22"5	16' 5"1	15'47"7	15'30"2	15'12"8	14'55"5	14'38"1	14'20"8	14' 3"6	13'46"4	13'29"2	13'12"1	12'55"0	12'38"1
1	39.7	22.3	4.8	47.4	30.0	12.6	55.2	37.8	20.5	3.3	46.1	28.9	11.8	54.8	37.8
2	39.4	22.0	4.5	47.1	29.7	12.3	54.9	37.6	20.3	3.0	45.8	28.6	11.5	54.5	37.5
3	39.1	21.7	4.2	46.8	29.4	12.0	54.6	37.3	20.0	2.7	45.5	28.3	11.2	54.2	37.2
4	38.8	21.4	3.9	46.5	29.1	11.7	54.3	37.0	19.7	2.4	45.2	28.0	11.0	53.9	36.9
5	16 38.5	16 21.1	16 3.6	15 46.2	15 28.8	15 11.4	14 54.0	14 36.7	14 19.4	14 2.1	13 44.9	13 27.8	13 10.7	12 53.6	12 36.7
6	38.3	20.8	3.4	45.9	28.5	11.1	53.7	36.4	19.1	1.8	44.6	27.5	10.4	53.3	36.4
7	38.0	20.5	3.1	45.6	28.2	10.8	53.4	36.1	18.8	1.6	44.3	27.2	10.1	53.1	36.1
8	37.7	20.2	2.8	45.3	27.9	10.5	53.2	35.8	18.5	1.3	44.1	26.9	9.8	52.8	35.8
9	37.4	19.9	2.5	45.0	27.6	10.2	52.9	35.5	18.2	1.0	43.8	26.6	9.5	52.5	35.5
10	16 37.1	16 19.6	16 2.2	15 44.8	15 27.3	15 9.9	14 52.6	14 35.2	14 17.9	14 0.7	13 43.5	13 26.3	13 9.2	12 52.2	12 35.3
11	36.8	19.3	1.9	44.5	27.1	9.7	52.3	35.0	17.7	0.4	43.2	26.1	9.0	51.9	35.0
12	36.5	19.1	1.6	44.2	26.8	9.4	52.0	34.7	17.4	0.1	42.9	25.8	8.7	51.6	34.7
13	36.2	18.8	1.3	43.9	26.5	9.1	51.7	34.4	17.1	13 59.8	42.6	25.5	8.4	51.4	34.4
14	35.9	18.5	1.0	43.6	26.2	8.8	51.4	34.1	16.8	59.5	42.3	25.2	8.1	51.1	34.1
15	16 35.6	16 18.2	16 0.7	15 43.3	15 25.9	15 8.5	14 51.1	14 33.8	14 16.5	13 59.3	13 42.1	13 24.9	13 7.8	12 50.8	12 33.8
16	35.3	17.9	0.4	43.0	25.6	8.2	50.8	33.5	16.2	59.0	41.8	24.6	7.5	50.5	33.6
17	35.1	17.6	0.2	42.7	25.3	7.9	50.6	33.2	15.9	58.7	41.5	24.3	7.3	50.2	33.3
18	34.8	17.3	15 59.9	42.4	25.0	7.6	50.3	32.9	15.6	58.4	41.2	24.1	7.0	50.0	33.0
19	34.5	17.0	59.6	42.1	24.7	7.3	50.0	32.6	15.4	58.1	40.9	23.8	6.7	49.7	32.7
20	16 34.2	16 16.7	15 59.3	15 41.9	15 24.4	15 7.1	14 49.7	14 32.4	14 15.1	13 57.8	13 40.6	13 23.5	13 6.4	12 49.4	12 32.4
21	33.9	16.4	59.0	41.6	24.2	6.8	49.4	32.1	14.8	57.5	40.3	23.2	6.1	49.1	32.2
22	33.6	16.1	58.7	41.3	23.9	6.5	49.1	31.8	14.5	57.2	40.1	22.9	5.8	48.8	31.9
23	33.3	15.9	58.4	41.0	23.6	6.2	48.8	31.5	14.2	57.0	39.8	22.6	5.5	48.5	31.6
24	33.0	15.6	58.1	40.7	23.3	5.9	48.5	31.2	13.9	56.7	39.5	22.3	5.3	48.3	31.3
25	16 32.7	16 15.3	15 57.8	15 40.4	15 23.0	15 5.6	14 48.2	14 30.9	14 13.6	13 56.4	13 39.2	13 22.1	13 5.0	12 48.0	12 31.0
26	32.4	15.0	57.5	40.1	22.7	5.3	48.0	30.6	13.3	56.1	38.9	21.8	4.7	47.7	30.7
27	32.1	14.7	57.3	39.8	22.4	5.0	47.7	30.3	13.1	55.8	38.6	21.5	4.4	47.4	30.5
28	31.9	14.4	57.0	39.5	22.1	4.7	47.4	30.1	12.8	55.5	38.3	21.2	4.1	47.1	30.2
29	31.6	14.1	56.7	39.2	21.8	4.4	47.1	29.8	12.5	55.2	38.1	20.9	3.8	46.8	29.9
30	16 31.3	16 13.8	15 56.4	15 39.0	15 21.5	15 4.2	14 46.8	14 29.5	14 12.2	13 55.0	13 37.8	13 20.6	13 3.6	12 46.6	12 29.6
31	31.0	13.5	56.1	38.7	21.3	3.9	46.5	29.2	11.9	54.7	37.5	20.3	3.3	46.3	29.3
32	30.7	13.2	55.8	38.4	21.0	3.6	46.2	28.9	11.6	54.4	37.2	20.1	3.0	46.0	29.1
33	30.4	13.0	55.5	38.1	20.7	3.3	45.9	28.6	11.3	54.1	36.9	19.8	2.7	45.7	28.8
34	30.1	12.7	55.2	37.8	20.4	3.0	45.6	28.3	11.0	53.8	36.6	19.5	2.4	45.4	28.5
35	16 29.8	16 12.4	15 54.9	15 37.5	15 20.1	15 2.7	14 45.4	14 28.0	14 10.8	13 53.5	13 36.3	13 19.2	13 2.1	12 45.1	12 28.2
36	29.5	12.1	54.6	37.2	19.8	2.4	45.1	27.7	10.5	53.2	36.0	18.9	1.9	44.9	27.9
37	29.2	11.8	54.3	36.9	19.5	2.1	44.8	27.5	10.2	52.9	35.8	18.6	1.6	44.6	27.6
38	28.9	11.5	54.1	36.6	19.2	1.8	44.5	27.2	9.9	52.7	35.5	18.4	1.3	44.3	27.4
39	28.7	11.2	53.8	36.3	18.9	1.5	44.2	26.9	9.6	52.4	35.2	18.1	1.0	44.0	27.1
40	16 28.4	16 10.9	15 53.5	15 36.0	15 18.6	15 1.3	14 43.9	14 26.6	14 9.3	13 52.1	13 34.9	13 17.8	13 0.7	12 43.7	12 26.8
41	28.1	10.6	53.2	35.8	18.4	1.0	43.6	26.3	9.0	51.8	34.6	17.5	0.4	43.4	26.5
42	27.8	10.3	52.9	35.5	18.1	0.7	43.3	26.0	8.7	51.5	34.3	17.2	0.2	43.2	26.2
43	27.5	10.0	52.6	35.2	17.8	0.4	43.0	25.7	8.5	51.2	34.0	16.9	12 59.9	42.9	26.0
44	27.2	9.8	52.3	34.9	17.5	0.1	42.8	25.4	8.2	50.9	33.8	16.6	59.6	42.6	25.7
45	16 26.9	16 9.5	15 52.0	15 34.6	15 17.2	14 59.8	14 42.5	14 25.1	14 7.9	13 50.7	13 33.5	13 16.4	12 59.3	12 42.3	12 25.4
46	26.6	9.2	51.7	34.3	16.9	59.5	42.2	24.9	7.6	50.4	33.2	16.1	59.0	42.0	25.1
47	26.3	8.9	51.4	34.0	16.6	59.2	41.9	24.6	7.3	50.1	32.9	15.8	58.7	41.7	24.8
48	26.0	8.6	51.2	33.7	16.3	58.9	41.6	24.3	7.0	49.8	32.6	15.5	58.5	41.5	24.6
49	25.7	8.3	50.9	33.4	16.0	58.7	41.3	24.0	6.7	49.5	32.3	15.2	58.2	41.2	24.3
50	16 25.5	16 8.0	15 50.6	15 33.1	15 15.7	14 58.4	14 41.0	14 23.7	14 6.4	13 49.2	13 32.0	13 14.9	12 57.9	12 40.9	12 24.0
51	25.2	7.7	50.3	32.9	15.5	58.1	40.7	23.4	6.2	48.9	31.8	14.6	57.6	40.6	23.7
52	24.9	7.4	50.0	32.6	15.2	57.8	40.4	23.1	5.9	48.6	31.5	14.4	57.3	40.3	23.4
53	24.6	7.1	49.7	32.3	14.9	57.5	40.2	22.8	5.6	48.4	31.2	14.1	57.0	40.1	23.1
54	24.3	6.8	49.4	32.0	14.6	57.2	39.9	22.6	5.3	48.1	30.9	13.8	56.7	39.8	22.9
55	16 24.0	16 6.6	15 49.1	15 31.7	15 14.3	14 56.9	14 39.6	14 22.3	14 5.0	13 47.8	13 30.6	13 13.5	12 56.5	12 39.5	12 22.6
56	23.7	6.3	48.8	31.4	14.0	56.6	39.3	22.0	4.7	47.5	30.3	13.2	56.2	39.2	22.3
57	23.4	6.0	48.5	31.1	13.7	56.3	39.0	21.7	4.4	47.2	30.0	12.9	55.9	38.9	22.0
58	23.1	5.7	48.2	30.8	13.4	56.1	38.7	21.4	4.1	46.9	29.8	12.7	55.6	38.6	21.7
59	22.8	5.4	48.0	30.5	13.1	55.8	38.4	21.1	3.9	46.6	29.5	12.4	55.3	38.4	21.5

Table III  
ANGLE OF ALTITUDE

Mn	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°
0	12'21"2	12' 4"4	11'47"6	11'31"0	11'14"4	10'58"0	10'41"6	10'25"4	10' 9"3	9'53"3	9'37"4	9'21"6	9' 6"0	8'50"5	8'35"2
1	20·9	4·1	47·4	30·7	14·2	57·7	41·4	25·1	9·0	53·0	37·1	21·4	5·8	50·3	34·9
2	20·6	3·8	47·1	30·4	13·9	57·4	41·1	24·9	8·7	52·7	36·9	21·1	5·5	50·0	34·7
3	20·3	3·5	46·8	30·2	13·6	57·2	40·8	24·6	8·5	52·5	36·6	20·8	5·2	49·8	34·4
4	20·1	3·2	46·5	29·9	13·3	56·9	40·5	24·3	8·2	52·2	36·3	20·6	5·0	49·5	34·2
5	12 19·8	12 3·0	11 46·2	11 29·6	11 13·1	10 56·6	10 40·3	10 24·0	10 7·9	9 51·9	9 36·1	9 20·3	9 4·7	8 49·2	8 33·9
6	19·5	2·7	46·0	29·3	12·8	56·3	40·0	23·8	7·7	51·7	35·8	20·1	4·5	49·0	33·7
7	19·2	2·4	45·7	29·0	12·5	56·1	39·7	23·5	7·4	51·4	35·5	19·8	4·2	48·7	33·4
8	18·9	2·1	45·4	28·8	12·2	55·8	39·5	23·2	7·1	51·1	35·3	19·5	3·9	48·5	33·2
9	18·7	1·8	45·1	28·5	12·0	55·5	39·2	23·0	6·9	50·9	35·0	19·3	3·7	48·2	32·9
10	12 18·4	12 1·6	11 44·8	11 28·2	11 11·7	10 55·2	10 38·9	10 22·7	10 6·6	9 50·6	9 34·7	9 19·0	9 3·4	8 48·0	8 32·6
11	18·1	1·3	44·6	27·9	11·4	55·0	38·6	22·4	6·3	50·3	34·5	18·8	3·2	47·7	32·4
12	17·8	1·0	44·3	27·7	11·1	54·7	38·4	22·2	6·1	50·1	34·2	18·5	2·9	47·4	32·1
13	17·5	0·7	44·0	27·4	10·9	54·4	38·1	21·9	5·8	49·8	34·0	18·2	2·6	47·2	31·9
14	17·2	0·5	43·7	27·1	10·6	54·2	37·8	21·6	5·5	49·5	33·7	18·0	2·4	46·9	31·6
15	12 17·0	12 0·2	11 43·5	11 26·8	11 10·3	10 53·9	10 37·6	10 21·4	10 5·3	9 49·3	9 33·4	9 17·7	9 2·1	8 46·7	8 31·4
16	16·7	11 59·9	43·2	26·6	10·0	53·6	37·3	21·1	5·0	49·0	33·2	17·5	1·9	46·4	31·1
17	16·4	59·6	42·9	26·3	9·8	53·3	37·0	20·8	4·7	48·8	32·9	17·2	1·6	46·2	30·9
18	16·1	59·3	42·6	26·0	9·5	53·1	36·7	20·5	4·5	48·5	32·6	16·9	1·4	45·9	30·6
19	15·8	59·1	42·3	25·7	9·2	52·8	36·5	20·3	4·2	48·2	32·4	16·7	1·1	45·7	30·4
20	12 15·6	11 58·8	11 42·1	11 25·5	11 8·9	10 52·5	10 36·2	10 20·0	10 3·9	9 48·0	9 32·1	9 16·4	9 0·8	8 45·4	8 30·1
21	15·3	58·5	41·8	25·2	8·7	52·2	35·9	19·7	3·7	47·7	31·9	16·1	0·6	45·1	29·9
22	15·0	58·2	41·5	24·9	8·4	52·0	35·7	19·5	3·4	47·4	31·6	15·9	0·3	44·9	29·6
23	14·7	57·9	41·2	24·6	8·1	51·7	35·4	19·2	3·1	47·2	31·3	15·6	0·1	44·6	29·3
24	14·4	57·7	41·0	24·4	7·8	51·4	35·1	18·9	2·9	46·9	31·1	15·4	8 59·8	44·4	29·1
25	12 14·2	11 57·4	11 40·7	11 24·1	11 7·6	10 51·2	10 34·9	10 18·7	10 2·6	9 46·6	9 30·8	9 15·1	8 59·5	8 44·1	8 28·8
26	13·9	57·1	40·4	23·8	7·3	50·9	34·6	18·4	2·3	46·4	30·5	14·8	59·3	43·9	28·6
27	13·6	56·8	40·1	23·5	7·0	50·6	34·3	18·1	2·1	46·1	30·3	14·6	59·0	43·6	28·3
28	13·3	56·5	39·8	23·2	6·7	50·3	34·0	17·9	1·8	45·8	30·0	14·3	58·8	43·4	28·1
29	13·0	56·3	39·6	23·0	6·5	50·1	33·8	17·6	1·5	45·6	29·8	14·1	58·5	43·1	27·8
30	12 12·8	11 56·0	11 39·3	11 22·7	11 6·2	10 49·8	10 33·5	10 17·3	10 1·3	9 45·3	9 29·5	9 13·8	8 58·3	8 42·8	8 27·6
31	12·5	55·7	39·0	22·4	5·9	49·5	33·2	17·0	1·0	45·0	29·2	13·5	58·0	42·6	27·3
32	12·2	55·4	38·7	22·1	5·6	49·2	33·0	16·8	0·7	44·8	29·0	13·3	57·7	42·3	27·1
33	11·9	55·1	38·5	21·9	5·4	49·0	32·7	16·5	0·5	44·5	28·7	13·0	57·5	42·1	26·8
34	11·6	54·9	38·2	21·6	5·1	48·7	32·4	16·2	0·2	44·2	28·4	12·8	57·2	41·8	26·6
35	12 11·4	11 54·6	11 37·9	11 21·3	11 4·8	10 48·4	10 32·1	10 16·0	9 59·9	9 44·0	9 28·2	9 12·5	8 57·0	8 41·6	8 26·3
36	11·1	54·3	37·6	21·0	4·5	48·2	31·9	15·7	59·7	43·7	27·9	12·2	56·7	41·3	26·1
37	10·8	54·0	37·4	20·8	4·3	47·9	31·6	15·4	59·4	43·5	27·7	12·0	56·4	41·1	25·8
38	10·5	53·8	37·1	20·5	4·0	47·6	31·3	15·2	59·1	43·2	27·4	11·7	56·2	40·8	25·6
39	10·2	53·5	36·8	20·2	3·7	47·3	31·1	14·9	58·9	42·9	27·1	11·5	55·9	40·5	25·3
40	12 10·0	11 53·2	11 36·5	11 19·9	11 3·5	10 47·1	10 30·8	10 14·6	9 58·6	9 42·7	9 26·9	9 11·2	8 55·7	8 40·3	8 25·0
41	9·7	52·9	36·2	19·7	3·2	46·8	30·5	14·4	58·3	42·4	26·6	10·9	55·4	40·0	24·8
42	9·4	52·6	36·0	19·4	2·9	46·5	30·3	14·1	58·1	42·1	26·3	10·7	55·2	39·8	24·5
43	9·1	52·4	35·7	19·1	2·6	46·3	30·0	13·8	57·8	41·9	26·1	10·4	54·9	39·5	24·3
44	8·8	52·1	35·4	18·8	2·4	46·0	29·7	13·6	57·5	41·6	25·8	10·2	54·6	39·3	24·0
45	12 8·6	11 51·8	11 35·1	11 18·6	11 2·1	10 45·7	10 29·4	10 13·3	9 57·3	9 41·3	9 25·6	9 9·9	8 54·4	8 39·0	8 23·8
46	8·3	51·5	34·9	18·3	1·8	45·4	29·2	13·0	57·0	41·1	25·3	9·6	54·1	38·8	23·5
47	8·0	51·2	34·6	18·0	1·5	45·2	28·9	12·8	56·7	40·8	25·0	9·4	53·9	38·5	23·3
48	7·7	51·0	34·3	17·7	1·3	44·9	28·6	12·5	56·5	40·5	24·8	9·1	53·6	38·2	23·0
49	7·4	50·7	34·0	17·5	1·0	44·6	28·4	12·2	56·2	40·3	24·5	8·9	53·4	38·0	22·8
50	12 7·2	11 50·4	11 33·8	11 17·2	11 0·7	10 44·3	10 28·1	10 11·9	9 55·9	9 40·0	9 24·2	9 8·6	8 53·1	8 37·7	8 22·5
51	6·9	50·1	33·5	16·9	0·4	44·1	27·8	11·7	55·7	39·8	24·0	8·3	52·8	37·5	22·3
52	6·6	49·9	33·2	16·6	0·2	43·8	27·6	11·4	55·4	39·5	23·7	8·1	52·6	37·2	22·0
53	6·3	49·6	32·9	16·4	10 59·9	43·5	27·3	11·1	55·1	39·2	23·5	7·8	52·3	37·0	21·8
54	6·0	49·3	32·6	16·1	59·6	43·3	27·0	10·9	54·9	39·0	23·2	7·6	52·1	36·7	21·5
55	12 5·8	11 49·0	11 32·4	11 15·8	10 59·3	10 43·0	10 26·7	10 10·6	9 54·6	9 38·7	9 22·9	9 7·3	8 51·8	8 36·5	8 21·3
56	5·5	48·7	32·1	15·5	59·1	42·7	26·5	10·3	54·3	38·4	22·7	7·0	51·6	36·2	21·0
57	5·2	48·5	31·8	15·3	58·8	42·4	26·2	10·1	54·1	38·2	22·4	6·8	51·3	36·0	20·8
58	4·9	48·2	31·5	15·0	58·5	42·2	25·9	9·8	53·8	37·9	22·2	6·5	51·0	35·7	20·5
59	4·6	47·9	31·3	14·7	58·3	41·9	25·7	9·5	53·5	37·6	21·9	6·3	50·8	35·4	20·3

Table III

## ANGLE OF ALTITUDE

Mn	30°	31°	32°	33°	34°	35°	36°	37°	38°	39°	40°	41°	42°	43°	44°
0	8'20"0	8' 5"0	7'50"1	7'35"4	7'20"8	7' 6"4	6'52"2	6'38"2	6'24"3	6'10"7	5'57"2	5'43"9	5'30"9	5'18"0	5' 5"3
1	19.7	4.7	49.8	35.1	20.6	6.2	52.0	38.0	24.1	10.5	57.0	43.7	30.7	17.8	5.1
2	19.5	4.5	49.6	34.9	20.3	5.9	51.7	37.7	23.9	10.2	56.8	43.5	30.4	17.6	4.9
3	19.2	4.2	49.3	34.6	20.1	5.7	51.5	37.5	23.7	10.0	56.5	43.3	30.2	17.4	4.7
4	19.0	4.0	49.1	34.4	19.8	5.5	51.3	37.3	23.4	9.8	56.3	43.1	30.0	17.2	4.5
5	8 18.7	8 3.7	7 48.8	7 34.1	7 19.6	7 5.2	6 51.0	6 37.0	6 23.2	6 9.5	5 56.1	5 42.8	5 29.8	5 16.9	5 4.3
6	18.5	3.5	48.6	33.9	19.4	5.0	50.8	36.8	23.0	9.3	55.9	42.6	29.6	16.7	4.1
7	18.2	3.2	48.4	33.7	19.1	4.8	50.6	36.6	22.7	9.1	55.7	42.4	29.4	16.5	3.9
8	18.0	3.0	48.1	33.4	18.9	4.5	50.3	36.3	22.5	8.9	55.4	42.2	29.1	16.3	3.7
9	17.7	2.7	47.9	33.2	18.6	4.3	50.1	36.1	22.3	8.6	55.2	42.0	28.9	16.1	3.5
10	8 17.5	8 2.5	7 47.6	7 32.9	7 18.4	7 4.0	6 49.9	6 35.9	6 22.0	6 8.4	5 55.0	5 41.7	5 28.7	5 15.9	5 3.3
11	17.2	2.2	47.4	32.7	18.2	3.8	49.6	35.6	21.8	8.2	54.8	41.5	28.5	15.7	3.0
12	17.0	2.0	47.1	32.4	17.9	3.6	49.4	35.4	21.6	8.0	54.5	41.3	28.3	15.5	2.8
13	16.7	1.7	46.9	32.2	17.7	3.3	49.2	35.2	21.4	7.7	54.3	41.1	28.1	15.2	2.6
14	16.5	1.5	46.6	32.0	17.4	3.1	48.9	34.9	21.1	7.5	54.1	40.9	27.8	15.0	2.4
15	8 16.2	8 1.2	7 46.4	7 31.7	7 17.2	7 2.9	6 48.7	6 34.7	6 20.9	6 7.3	5 53.9	5 40.7	5 27.6	5 14.8	5 2.2
16	16.0	1.0	46.1	31.5	17.0	2.6	48.5	34.5	20.7	7.1	53.7	40.4	27.4	14.6	2.0
17	15.7	0.7	45.9	31.2	16.7	2.4	48.2	34.2	20.4	6.8	53.4	40.2	27.2	14.4	1.8
18	15.5	0.5	45.6	31.0	16.5	2.1	48.0	34.0	20.2	6.6	53.2	40.0	27.0	14.2	1.6
19	15.2	0.2	45.4	30.7	16.2	1.9	47.8	33.8	20.0	6.4	53.0	39.8	26.8	14.0	1.4
20	8 15.0	8 0.0	7 45.2	7 30.5	7 16.0	7 1.7	6 47.5	6 33.5	6 19.8	6 6.2	5 52.8	5 39.6	5 26.6	5 13.8	5 1.2
21	14.7	7 59.7	44.9	30.2	15.8	1.4	47.3	33.3	19.5	5.9	52.5	39.3	26.3	13.5	1.0
22	14.5	59.5	44.7	30.0	15.5	1.2	47.0	33.1	19.3	5.7	52.3	39.1	26.1	13.3	0.8
23	14.2	59.2	44.4	29.8	15.3	1.0	46.8	32.9	19.1	5.5	52.1	38.9	25.9	13.1	0.5
24	14.0	59.0	44.2	29.5	15.0	0.7	46.6	32.6	18.9	5.3	51.9	38.7	25.7	12.9	0.3
25	8 13.7	7 58.7	7 43.9	7 29.3	7 14.8	7 0.5	6 46.3	6 32.4	6 18.6	6 5.0	5 51.7	5 38.5	5 25.5	5 12.7	5 0.1
26	13.5	58.5	43.7	29.0	14.6	0.2	46.1	32.2	18.4	4.8	51.4	38.3	25.3	12.5	4 59.9
27	13.2	58.2	43.4	28.8	14.3	0.0	45.9	31.9	18.2	4.6	51.2	38.0	25.1	12.3	59.7
28	13.0	58.0	43.2	28.5	14.1	6 59.8	45.6	31.7	17.9	4.4	51.0	37.8	24.8	12.1	59.5
29	12.7	57.7	42.9	28.3	13.8	59.5	45.4	31.5	17.7	4.1	50.8	37.6	24.6	11.9	59.3
30	8 12.5	7 57.5	7 42.7	7 28.1	7 13.6	6 59.3	6 45.2	6 31.2	6 17.5	6 3.9	5 50.6	5 37.4	5 24.4	5 11.6	4 59.1
31	12.2	57.3	42.5	27.8	13.4	59.1	44.9	31.0	17.3	3.7	50.3	37.2	24.2	11.4	58.9
32	12.0	57.0	42.2	27.6	13.1	58.8	44.7	30.8	17.0	3.5	50.1	36.9	24.0	11.2	58.7
33	11.7	56.8	42.0	27.3	12.9	58.6	44.5	30.5	16.8	3.2	49.9	36.7	23.8	11.0	58.5
34	11.5	56.5	41.7	27.1	12.6	58.4	44.2	30.3	16.6	3.0	49.7	36.5	23.6	10.8	58.3
35	8 11.2	7 56.3	7 41.5	7 26.9	7 12.4	6 58.1	6 44.0	6 30.1	6 16.3	6 2.8	5 49.4	5 36.3	5 23.3	5 10.6	4 58.1
36	11.0	56.0	41.2	26.6	12.2	57.9	43.8	29.9	16.1	2.6	49.2	36.1	23.1	10.4	57.8
37	10.7	55.8	41.0	26.4	11.9	57.6	43.5	29.6	15.9	2.4	49.0	35.9	22.9	10.2	57.6
38	10.5	55.5	40.7	26.1	11.7	57.4	43.3	29.4	15.7	2.1	48.8	35.6	22.7	10.0	57.4
39	10.2	55.3	40.5	25.9	11.4	57.2	43.1	29.2	15.4	1.9	48.6	35.4	22.5	9.7	57.2
40	8 10.0	7 55.0	7 40.2	7 25.6	7 11.2	6 56.9	6 42.8	6 28.9	6 15.2	6 1.7	5 48.3	5 35.2	5 22.3	5 9.5	4 57.0
41	9.7	54.8	40.0	25.4	11.0	56.7	42.6	28.7	15.0	1.5	48.1	35.0	22.1	9.3	56.8
42	9.5	54.5	39.8	25.2	10.7	56.5	42.4	28.5	14.8	1.2	47.9	34.8	21.8	9.1	56.6
43	9.2	54.3	39.5	24.9	10.5	56.2	42.1	28.2	14.5	1.0	47.7	34.6	21.6	8.9	56.4
44	9.0	54.0	39.3	24.7	10.2	56.0	41.9	28.0	14.3	0.8	47.5	34.3	21.4	8.7	56.2
45	8 8.7	7 53.8	7 39.0	7 24.4	7 10.0	6 55.8	6 41.7	6 27.8	6 14.1	6 0.6	5 47.2	5 34.1	5 21.2	5 8.5	4 56.0
46	8.5	53.5	38.8	24.2	9.8	55.5	41.4	27.6	13.8	0.3	47.0	33.9	21.0	8.3	55.8
47	8.2	53.3	38.5	23.9	9.5	55.3	41.2	27.3	13.6	0.1	46.8	33.7	20.8	8.1	55.6
48	8.0	53.0	38.3	23.7	9.3	55.0	41.0	27.1	13.4	5 59.9	46.6	33.5	20.6	7.9	55.4
49	7.7	52.8	38.0	23.5	9.0	54.8	40.7	26.9	13.2	59.7	46.4	33.3	20.3	7.6	55.2
50	8 7.5	7 52.5	7 37.8	7 23.2	7 8.8	6 54.6	6 40.5	6 26.6	6 12.9	5 59.4	5 46.1	5 33.0	5 20.1	5 7.4	4 55.0
51	7.2	52.3	37.6	23.0	8.6	54.3	40.3	26.4	12.7	59.2	45.9	32.8	19.9	7.2	54.7
52	7.0	52.1	37.3	22.7	8.3	54.1	40.0	26.2	12.5	59.0	45.7	32.6	19.7	7.0	54.5
53	6.7	51.8	37.1	22.5	8.1	53.9	39.8	25.9	12.3	58.8	45.5	32.4	19.5	6.8	54.3
54	6.5	51.6	36.8	22.3	7.9	53.6	39.6	25.7	12.0	58.6	45.3	32.2	19.3	6.6	54.1
55	8 6.2	7 51.3	7 36.6	7 22.0	7 7.6	6 53.4	6 39.3	6 25.5	6 11.8	5 58.3	5 45.0	5 32.0	5 19.1	5 6.4	4 53.9
56	6.0	51.1	36.3	21.8	7.4	53.2	39.1	25.3	11.6	58.1	44.8	31.7	18.9	6.2	53.7
57	5.7	50.8	36.1	21.5	7.1	52.9	38.9	25.0	11.4	57.9	44.6	31.5	18.6	6.0	53.5
58	5.5	50.6	35.8	21.3	6.9	52.7	38.6	24.8	11.1	57.7	44.4	31.3	18.4	5.8	53.3
59	5.2	50.3	35.6	21.0	6.7	52.5	38.4	24.6	10.9	57.4	44.2	31.1	18.2	5.6	53.1

Table III  
ANGLE OF ALTITUDE

Mn	45°	46°	47°	48°	49°	50°	51°	52°	53°	54°	55°	56°	57°	58°	59°
0	4'52"9	4'40"7	4'28"6	4'16"9	4' 5"3	3'54"0	3'42"9	3'32"0	3'21"4	3'11"0	3' 0"8	2'51"0	2'41"3	2'32"0	2'22"8
1	52.7	40.5	28.4	16.7	5.1	53.8	42.7	31.8	21.2	10.8	0.7	50.8	41.2	31.8	22.7
2	52.5	40.3	28.2	16.5	4.9	53.6	42.5	31.6	21.0	10.6	0.5	50.6	41.0	31.6	22.5
3	52.3	40.1	28.1	16.3	4.7	53.4	42.3	31.5	20.8	10.5	0.3	50.5	40.9	31.5	22.4
4	52.1	39.9	27.9	16.1	4.5	53.2	42.1	31.3	20.7	10.3	0.2	50.3	40.7	31.3	22.2
5	4 51.9	4 39.7	4 27.7	4 15.9	4 4.3	3 53.0	3 41.9	3 31.1	3 20.5	3 10.1	3 0.0	2 50.1	2 40.5	2 31.2	2 22.1
6	51.7	39.4	27.5	15.7	4.1	52.8	41.8	30.9	20.3	10.0	2 59.8	50.0	40.4	31.0	21.9
7	51.5	39.2	27.3	15.5	4.0	52.6	41.6	30.7	20.1	9.8	59.7	49.8	40.2	30.9	21.8
8	51.2	39.0	27.1	15.3	3.8	52.5	41.4	30.6	20.0	9.6	59.5	49.7	40.1	30.7	21.6
9	51.0	38.8	26.9	15.1	3.6	52.3	41.2	30.4	19.8	9.4	59.3	49.5	39.9	30.6	21.5
10	4 50.8	4 38.6	4 26.7	4 14.9	4 3.4	3 52.1	3 41.0	3 30.2	3 19.6	3 9.3	2 59.2	2 49.3	2 39.7	2 30.4	2 21.3
11	50.6	38.4	26.5	14.7	3.2	51.9	40.8	30.0	19.4	9.1	59.0	49.2	39.6	30.3	21.2
12	50.4	38.2	26.3	14.5	3.0	51.7	40.7	29.8	19.3	8.9	58.9	49.0	39.4	30.1	21.0
13	50.2	38.0	26.1	14.3	2.8	51.5	40.5	29.7	19.1	8.8	58.7	48.9	39.3	30.0	20.9
14	50.0	37.8	25.9	14.1	2.6	51.3	40.3	29.5	18.9	8.6	58.5	48.7	39.1	29.8	20.7
15	4 49.8	4 37.6	4 25.7	4 13.9	4 2.4	3 51.2	3 40.1	3 29.3	3 18.7	3 8.4	2 58.4	2 48.5	2 39.0	2 29.6	2 20.6
16	49.6	37.4	25.5	13.7	2.2	51.0	39.9	29.1	18.6	8.3	58.2	48.4	38.8	29.5	20.4
17	49.4	37.2	25.3	13.6	2.1	50.8	39.8	29.0	18.4	8.1	58.0	48.2	38.6	29.3	20.3
18	49.2	37.0	25.1	13.4	1.9	50.6	39.6	28.8	18.2	7.9	57.9	48.0	38.5	29.2	20.1
19	49.0	36.8	24.9	13.2	1.7	50.4	39.4	28.6	18.1	7.7	57.7	47.9	38.3	29.0	20.0
20	4 48.8	4 36.6	4 24.7	4 13.0	4 1.5	3 50.2	3 39.2	3 28.4	3 17.9	3 7.6	2 57.5	2 47.7	2 38.2	2 28.9	2 19.9
21	48.6	36.4	24.5	12.8	1.3	50.0	39.0	28.2	17.7	7.4	57.4	47.6	38.0	28.7	19.7
22	48.4	36.2	24.3	12.6	1.1	49.9	38.8	28.1	17.5	7.2	57.2	47.4	37.9	28.6	19.6
23	48.2	36.0	24.1	12.4	0.9	49.7	38.7	27.9	17.4	7.1	57.0	47.2	37.7	28.4	19.4
24	48.0	35.8	23.9	12.2	0.7	49.5	38.5	27.7	17.2	6.9	56.9	47.1	37.5	28.3	19.3
25	4 47.8	4 35.6	4 23.7	4 12.0	4 0.5	3 49.3	3 38.3	3 27.5	3 17.0	3 6.7	2 56.7	2 46.9	2 37.4	2 28.1	2 19.1
26	47.6	35.4	23.5	11.8	0.4	49.1	38.1	27.4	16.8	6.6	56.5	46.8	37.2	28.0	19.0
27	47.4	35.2	23.3	11.6	0.2	48.9	37.9	27.2	16.7	6.4	56.4	46.6	37.1	27.8	18.8
28	47.2	35.0	23.1	11.4	0.0	48.7	37.8	27.0	16.5	6.2	56.2	46.4	36.9	27.7	18.7
29	47.0	34.8	22.9	11.2	3 59.8	48.6	37.6	26.8	16.3	6.1	56.0	46.3	36.8	27.5	18.5
30	4 46.7	4 34.6	4 22.7	4 11.0	3 59.6	3 48.4	3 37.4	3 26.6	3 16.1	3 5.9	2 55.9	2 46.1	2 36.6	2 27.4	2 18.4
31	46.5	34.4	22.5	10.9	59.4	48.2	37.2	26.5	16.0	5.7	55.7	46.0	36.5	27.2	18.2
32	46.3	34.2	22.3	10.7	59.2	48.0	37.0	26.3	15.8	5.5	55.5	45.8	36.3	27.1	18.1
33	46.1	34.0	22.1	10.5	59.0	47.8	36.8	26.1	15.6	5.4	55.4	45.6	36.1	26.9	17.9
34	45.9	33.8	21.9	10.3	58.8	47.6	36.7	25.9	15.5	5.2	55.2	45.5	36.0	26.8	17.8
35	4 45.7	4 33.6	4 21.7	4 10.1	3 58.7	3 47.5	3 36.5	3 25.8	3 15.3	3 5.0	2 55.1	2 45.3	2 35.8	2 26.6	2 17.6
36	45.5	33.4	21.5	9.9	58.5	47.3	36.3	25.6	15.1	4.9	54.9	45.2	35.7	26.4	17.5
37	45.3	33.2	21.3	9.7	58.3	47.1	36.1	25.4	14.9	4.7	54.7	45.0	35.5	26.3	17.3
38	45.1	33.0	21.2	9.5	58.1	46.9	35.9	25.2	14.8	4.5	54.6	44.8	35.4	26.1	17.2
39	44.9	32.8	21.0	9.3	57.9	46.7	35.8	25.1	14.6	4.4	54.4	44.7	35.2	26.0	17.0
40	4 44.7	4 32.6	4 20.8	4 9.1	3 57.7	3 46.5	3 35.6	3 24.9	3 14.4	3 4.2	2 54.2	2 44.5	2 35.0	2 25.8	2 16.9
41	44.5	32.4	20.6	8.9	57.5	46.3	35.4	24.7	14.2	4.0	54.1	44.4	34.9	25.7	16.8
42	44.3	32.2	20.4	8.7	57.3	46.2	35.2	24.5	14.1	3.9	53.9	44.2	34.7	25.5	16.6
43	44.1	32.0	20.2	8.5	57.1	46.0	35.0	24.4	13.9	3.7	53.7	44.0	34.6	25.4	16.5
44	43.9	31.8	20.0	8.4	57.0	45.8	34.9	24.2	13.7	3.5	53.6	43.9	34.4	25.2	16.3
45	4 43.7	4 31.6	4 19.8	4 8.2	3 56.8	3 45.6	3 34.7	3 24.0	3 13.6	3 3.4	2 53.4	2 43.7	2 34.3	2 25.1	2 16.2
46	43.5	31.4	19.6	8.0	56.6	45.4	34.5	23.8	13.4	3.2	53.2	43.6	34.1	24.9	16.0
47	43.3	31.2	19.4	7.8	56.4	45.2	34.3	23.6	13.2	3.0	53.1	43.4	34.0	24.8	15.9
48	43.1	31.0	19.2	7.6	56.2	45.1	34.1	23.5	13.0	2.9	52.9	43.2	33.8	24.6	15.7
49	42.9	30.8	19.0	7.4	56.0	44.9	34.0	23.3	12.9	2.7	52.8	43.1	33.7	24.5	15.6
50	4 42.7	4 30.6	4 18.8	4 7.2	3 55.8	3 44.7	3 33.8	3 23.1	3 12.7	3 2.5	2 52.6	2 42.9	2 33.5	2 24.3	2 15.4
51	42.5	30.4	18.6	7.0	55.6	44.5	33.6	22.9	12.5	2.4	52.4	42.8	33.3	24.2	15.3
52	42.3	30.2	18.4	6.8	55.5	44.3	33.4	22.8	12.4	2.2	52.3	42.6	33.2	24.0	15.1
53	42.1	30.0	18.2	6.6	55.3	44.1	33.2	22.6	12.2	2.0	52.1	42.4	33.0	23.9	15.0
54	41.9	29.8	18.0	6.4	55.1	44.0	33.1	22.4	12.0	1.9	51.9	42.3	32.9	23.7	14.8
55	4 41.7	4 29.6	4 17.8	4 6.2	3 54.9	3 43.8	3 32.9	3 22.2	3 11.8	3 1.7	2 51.8	2 42.1	2 32.7	2 23.6	2 14.7
56	41.5	29.4	17.6	6.1	54.7	43.6	32.7	22.1	11.7	1.5	51.6	42.0	32.6	23.4	14.6
57	41.3	29.2	17.4	5.9	54.5	43.4	32.5	21.9	11.5	1.3	51.5	41.8	32.4	23.3	14.4
58	41.1	29.0	17.2	5.7	54.3	43.2	32.3	21.7	11.3	1.2	51.3	41.6	32.3	23.1	14.3
59	40.9	28.8	17.0	5.5	54.1	43.0	32.2	21.5	11.2	1.0	51.1	41.5	32.1	23.0	14.1

Table III

## ANGLE OF ALTITUDE

Mn	60°	61°	62°	63°	64°	65°	66°	67°	68°	69°	70°	71°	72°	73°	74°
0	2'14"0	2' 5"4	1'57"1	1'49"0	1'41"2	1'33"7	1'26"5	1'19"5	1'12"8	1' 6"4	1' 0"3	0'54"5	0'48"9	0'43"7	0'38"7
1	13.8	5.2	56.9	48.9	41.1	33.6	26.3	19.4	12.7	6.3	0.2	54.4	48.9	43.6	38.7
2	13.7	5.1	56.8	48.7	41.0	33.4	26.2	19.3	12.6	6.2	0.1	54.3	48.8	43.5	38.6
3	13.5	5.0	56.6	48.6	40.8	33.3	26.1	19.2	12.5	6.1	0.0	54.2	48.7	43.4	38.5
4	13.4	4.8	56.5	48.5	40.7	33.2	26.0	19.0	12.4	6.0	0 59.9	54.1	48.6	43.4	38.4
5	2 13.2	2 4.7	1 56.4	1 48.3	1 40.6	1 33.1	1 25.9	1 18.9	1 12.3	1 5.9	0 59.8	0 54.0	0 48.5	0 43.3	0 38.3
6	13.1	4.5	56.2	48.2	40.4	33.0	25.7	18.8	12.2	5.8	59.7	53.9	48.4	43.2	38.3
7	13.0	4.4	56.1	48.1	40.3	32.8	25.6	18.7	12.1	5.7	59.6	53.8	48.3	43.1	38.2
8	12.8	4.3	56.0	47.9	40.2	32.7	25.5	18.6	11.9	5.6	59.5	53.7	48.2	43.0	38.1
9	12.7	4.1	55.8	47.8	40.1	32.6	25.4	18.5	11.8	5.5	59.4	53.6	48.1	42.9	38.0
10	2 12.5	2 4.0	1 55.7	1 47.7	1 39.9	1 32.5	1 25.3	1 18.4	1 11.7	1 5.4	0 59.3	0 53.5	0 48.0	0 42.8	0 37.9
11	12.4	3.8	55.6	47.5	39.8	32.3	25.2	18.2	11.6	5.3	59.2	53.4	48.0	42.8	37.9
12	12.2	3.7	55.4	47.4	39.7	32.2	25.0	18.1	11.5	5.2	59.1	53.4	47.9	42.7	37.8
13	12.1	3.6	55.3	47.3	39.6	32.1	24.9	18.0	11.4	5.1	59.0	53.3	47.8	42.6	37.7
14	11.9	3.4	55.1	47.2	39.4	32.0	24.8	17.9	11.3	5.0	58.9	53.2	47.7	42.5	37.6
15	2 11.8	2 3.3	1 55.0	1 47.0	1 39.3	1 31.9	1 24.7	1 17.8	1 11.2	1 4.9	0 58.8	0 53.1	0 47.6	0 42.4	0 37.5
16	11.7	3.1	54.9	46.9	39.2	31.7	24.6	17.7	11.1	4.8	58.7	53.0	47.5	42.3	37.5
17	11.5	3.0	54.7	46.8	39.0	31.6	24.5	17.6	11.0	4.7	58.6	52.9	47.4	42.3	37.4
18	11.4	2.9	54.6	46.6	38.9	31.5	24.3	17.5	10.9	4.6	58.5	52.8	47.3	42.2	37.3
19	11.2	2.7	54.5	46.5	38.8	31.4	24.2	17.3	10.8	4.5	58.4	52.7	47.3	42.1	37.2
20	2 11.1	2 2.6	1 54.3	1 46.4	1 38.7	1 31.2	1 24.1	1 17.2	1 10.7	1 4.4	0 58.3	0 52.6	0 47.2	0 42.0	0 37.2
21	10.9	2.4	54.2	46.2	38.5	31.1	24.0	17.1	10.5	4.2	58.2	52.5	47.1	41.9	37.1
22	10.8	2.3	54.1	46.1	38.4	31.0	23.9	17.0	10.4	4.1	58.1	52.4	47.0	41.8	37.0
23	10.6	2.2	53.9	46.0	38.3	30.9	23.8	16.9	10.3	4.0	58.0	52.3	46.9	41.8	36.9
24	10.5	2.0	53.8	45.8	38.2	30.8	23.6	16.8	10.2	3.9	57.9	52.2	46.8	41.7	36.8
25	2 10.4	2 1.9	1 53.7	1 45.7	1 38.0	1 30.6	1 23.5	1 16.7	1 10.1	1 3.8	0 57.8	0 52.1	0 46.7	0 41.6	0 36.8
26	10.2	1.7	53.5	45.6	37.9	30.5	23.4	16.6	10.0	3.7	57.7	52.0	46.6	41.5	36.7
27	10.1	1.6	53.4	45.5	37.8	30.4	23.3	16.5	9.9	3.6	57.7	52.0	46.5	41.4	36.6
28	9.9	1.5	53.3	45.3	37.7	30.3	23.2	16.3	9.8	3.5	57.6	51.9	46.5	41.3	36.5
29	9.8	1.3	53.1	45.2	37.5	30.2	23.1	16.2	9.7	3.4	57.5	51.8	46.4	41.3	36.4
30	2 9.6	2 1.2	1 53.0	1 45.1	1 37.4	1 30.0	1 22.9	1 16.1	1 9.6	1 3.3	0 57.4	0 51.7	0 46.3	0 41.2	0 36.4
31	9.5	1.0	52.9	44.9	37.3	29.9	22.8	16.0	9.5	3.2	57.3	51.6	46.2	41.1	36.3
32	9.4	0.9	52.7	44.8	37.2	29.8	22.7	15.9	9.4	3.1	57.2	51.5	46.1	41.0	36.2
33	9.2	0.8	52.6	44.7	37.0	29.7	22.6	15.8	9.3	3.0	57.1	51.4	46.0	40.9	36.1
34	9.1	0.6	52.5	44.5	36.9	29.6	22.5	15.7	9.2	2.9	57.0	51.3	45.9	40.9	36.1
35	2 8.9	2 0.5	1 52.3	1 44.4	1 36.8	1 29.4	1 22.4	1 15.6	1 9.1	1 2.8	0 56.9	0 51.2	0 45.8	0 40.8	0 36.0
36	8.8	0.4	52.2	44.3	36.7	29.3	22.2	15.5	8.9	2.7	56.8	51.1	45.8	40.7	35.9
37	8.6	0.2	52.1	44.2	36.5	29.2	22.1	15.3	8.8	2.6	56.7	51.0	45.7	40.6	35.8
38	8.5	0.1	51.9	44.0	36.4	29.1	22.0	15.2	8.7	2.5	56.6	50.9	45.6	40.5	35.8
39	8.4	1 59.9	51.8	43.9	36.3	29.0	21.9	15.1	8.6	2.4	56.5	50.8	45.5	40.4	35.7
40	2 8.2	1 59.8	1 51.6	1 43.8	1 36.2	1 28.8	1 21.8	1 15.0	1 8.5	1 2.3	0 56.4	0 50.8	0 45.4	0 40.4	0 35.6
41	8.1	59.7	51.5	43.6	36.0	28.7	21.7	14.9	8.4	2.2	56.3	50.7	45.3	40.3	35.5
42	7.9	59.5	51.4	43.5	35.9	28.6	21.6	14.8	8.3	2.1	56.2	50.6	45.2	40.2	35.4
43	7.8	59.4	51.2	43.4	35.8	28.5	21.4	14.7	8.2	2.0	56.1	50.5	45.2	40.1	35.4
44	7.6	59.2	51.1	43.3	35.7	28.4	21.3	14.6	8.1	1.9	56.0	50.4	45.1	40.0	35.3
45	2 7.5	1 59.1	1 51.0	1 43.1	1 35.5	1 28.2	1 21.2	1 14.5	1 8.0	1 1.8	0 55.9	0 50.3	0 45.0	0 40.0	0 35.2
46	7.4	59.0	50.8	43.0	35.4	28.1	21.1	14.3	7.9	1.7	55.8	50.2	44.9	39.9	35.1
47	7.2	58.8	50.7	42.9	35.3	28.0	21.0	14.2	7.8	1.6	55.7	50.1	44.8	39.8	35.1
48	7.1	58.7	50.6	42.7	35.2	27.9	20.9	14.1	7.7	1.5	55.6	50.0	44.7	39.7	35.0
49	6.9	58.6	50.5	42.6	35.0	27.8	20.8	14.0	7.6	1.4	55.5	49.9	44.6	39.6	34.9
50	2 6.8	1 58.4	1 50.3	1 42.5	1 34.9	1 27.6	1 20.6	1 13.9	1 7.5	1 1.3	0 55.4	0 49.8	0 44.5	0 39.5	0 34.8
51	6.7	58.3	50.2	42.4	34.8	27.5	20.5	13.8	7.4	1.2	55.3	49.8	44.5	39.5	34.8
52	6.5	58.1	50.1	42.2	34.7	27.4	20.4	13.7	7.3	1.1	55.2	49.7	44.4	39.4	34.7
53	6.4	58.0	49.9	42.1	34.6	27.3	20.3	13.6	7.2	1.0	55.1	49.6	44.3	39.3	34.6
54	6.2	57.9	49.8	42.0	34.4	27.2	20.2	13.5	7.0	0.9	55.1	49.5	44.2	39.2	34.5
55	2 6.1	1 57.7	1 49.7	1 41.8	1 34.3	1 27.0	1 20.1	1 13.4	1 6.9	1 0.8	0 55.0	0 49.4	0 44.1	0 39.1	0 34.5
56	5.9	57.6	49.5	41.7	34.2	26.9	20.0	13.3	6.8	0.7	54.9	49.3	44.0	39.1	34.4
57	5.8	57.5	49.4	41.6	34.1	26.8	19.8	13.1	6.7	0.6	54.8	49.2	44.0	39.0	34.3
58	5.7	57.3	49.3	41.5	33.9	26.7	19.7	13.0	6.6	0.5	54.7	49.1	43.9	38.9	34.2
59	5.5	57.2	49.1	41.3	33.8	26.6	19.6	12.9	6.5	0.4	54.6	49.0	43.8	38.8	34.1

Table III  
ANGLE OF ALTITUDE

Mn	75°	76°	77°	78°	79°	80°	81°	82°	83°	84°	85°	86°	87°	88°	89°
0	0'34"1	0'29"7	0'25"6	0'21"9	0'18"4	0'15"2	0'12"3	0' 9"7	0' 7"5	0' 5"5	0' 3"8	0' 2"4	0' 1"4	0' 0"6	0' 0"2
1	34.0	29.6	25.6	21.8	18.3	15.1	12.3	9.7	7.4	5.4	3.8	2.4	1.4	0.6	0.1
2	33.9	29.6	25.5	21.7	18.3	15.1	12.2	9.7	7.4	5.4	3.8	2.4	1.3	0.6	0.1
3	33.8	29.5	25.4	21.7	18.2	15.0	12.2	9.6	7.3	5.4	3.7	2.4	1.3	0.6	0.1
4	33.8	29.4	25.4	21.6	18.2	15.0	12.1	9.6	7.3	5.4	3.7	2.4	1.3	0.6	0.1
5	0 33.7	0 29.4	0 25.3	0 21.6	0 18.1	0 14.9	0 12.1	0 9.5	0 7.3	0 5.3	0 3.7	0 2.3	0 1.3	0 0.6	0 0.1
6	33.6	29.3	25.2	21.5	18.0	14.9	12.0	9.5	7.2	5.3	3.7	2.3	1.3	0.5	0.1
7	33.5	29.2	25.2	21.4	18.0	14.8	12.0	9.5	7.2	5.3	3.6	2.3	1.3	0.5	0.1
8	33.5	29.1	25.1	21.4	17.9	14.8	12.0	9.4	7.2	5.2	3.6	2.3	1.3	0.5	0.1
9	33.4	29.1	25.0	21.3	17.9	14.7	11.9	9.4	7.1	5.2	3.6	2.3	1.2	0.5	0.1
10	0 33.3	0 29.0	0 25.0	0 21.3	0 17.8	0 14.7	0 11.9	0 9.3	0 7.1	0 5.2	0 3.6	0 2.2	0 1.2	0 0.5	0 0.1
11	33.3	28.9	24.9	21.2	17.8	14.6	11.8	9.3	7.1	5.1	3.5	2.2	1.2	0.5	0.1
12	33.2	28.9	24.9	21.1	17.7	14.6	11.8	9.3	7.0	5.1	3.5	2.2	1.2	0.5	0.1
13	33.1	28.8	24.8	21.1	17.7	14.5	11.7	9.2	7.0	5.1	3.5	2.2	1.2	0.5	0.1
14	33.0	28.7	24.7	21.0	17.6	14.5	11.7	9.2	7.0	5.1	3.5	2.2	1.2	0.5	0.1
15	0 33.0	0 28.7	0 24.7	0 21.0	0 17.5	0 14.4	0 11.6	0 9.1	0 6.9	0 5.0	0 3.4	0 2.1	0 1.2	0 0.5	0 0.1
16	32.9	28.6	24.6	20.9	17.5	14.4	11.6	9.1	6.9	5.0	3.4	2.1	1.1	0.5	0.1
17	32.8	28.5	24.5	20.8	17.4	14.3	11.6	9.1	6.9	5.0	3.4	2.1	1.1	0.4	0.1
18	32.7	28.5	24.5	20.8	17.4	14.3	11.5	9.0	6.8	4.9	3.4	2.1	1.1	0.4	0.1
19	32.7	28.4	24.4	20.7	17.3	14.2	11.5	9.0	6.8	4.9	3.3	2.1	1.1	0.4	0.1
20	0 32.6	0 28.3	0 24.3	0 20.7	0 17.3	0 14.2	0 11.4	0 8.9	0 6.8	0 4.9	0 3.3	0 2.0	0 1.1	0 0.4	0 0.1
21	32.5	28.2	24.3	20.6	17.2	14.1	11.4	8.9	6.7	4.9	3.3	2.0	1.1	0.4	0.1
22	32.4	28.2	24.2	20.5	17.2	14.1	11.3	8.9	6.7	4.8	3.3	2.0	1.1	0.4	0.1
23	32.4	28.1	24.1	20.5	17.1	14.1	11.3	8.8	6.7	4.8	3.2	2.0	1.0	0.4	0.1
24	32.3	28.0	24.1	20.4	17.1	14.0	11.2	8.8	6.6	4.8	3.2	2.0	1.0	0.4	0.1
25	0 32.2	0 28.0	0 24.0	0 20.4	0 17.0	0 14.0	0 11.2	0 8.7	0 6.6	0 4.7	0 3.2	0 2.0	0 1.0	0 0.4	0 0.1
26	32.1	27.9	24.0	20.3	17.0	13.9	11.2	8.7	6.6	4.7	3.2	1.9	1.0	0.4	0.0
27	32.1	27.8	23.9	20.2	16.9	13.9	11.1	8.7	6.5	4.7	3.2	1.9	1.0	0.4	0.0
28	32.0	27.8	23.8	20.2	16.9	13.8	11.1	8.6	6.5	4.7	3.1	1.9	1.0	0.4	0.0
29	31.9	27.7	23.8	20.1	16.8	13.8	11.0	8.6	6.5	4.6	3.1	1.9	1.0	0.4	0.0
30	0 31.9	0 27.6	0 23.7	0 20.1	0 16.7	0 13.7	0 11.0	0 8.6	0 6.4	0 4.6	0 3.1	0 1.9	0 1.0	0 0.3	0 0.0
31	31.8	27.6	23.6	20.0	16.7	13.7	10.9	8.5	6.4	4.6	3.1	1.8	0.9	0.3	0.0
32	31.7	27.5	23.6	20.0	16.6	13.6	10.9	8.5	6.4	4.5	3.0	1.8	0.9	0.3	0.0
33	31.6	27.4	23.5	19.9	16.6	13.6	10.9	8.4	6.3	4.5	3.0	1.8	0.9	0.3	0.0
34	31.6	27.4	23.5	19.8	16.5	13.5	10.8	8.4	6.3	4.5	3.0	1.8	0.9	0.3	0.0
35	0 31.5	0 27.3	0 23.4	0 19.8	0 16.5	0 13.5	0 10.8	0 8.4	0 6.3	0 4.5	0 3.0	0 1.8	0 0.9	0 0.3	0 0.0
36	31.4	27.2	23.3	19.7	16.4	13.4	10.7	8.3	6.2	4.4	2.9	1.8	0.9	0.3	0.0
37	31.3	27.2	23.3	19.7	16.4	13.4	10.7	8.3	6.2	4.4	2.9	1.7	0.9	0.3	0.0
38	31.3	27.1	23.2	19.6	16.3	13.3	10.6	8.3	6.2	4.4	2.9	1.7	0.9	0.3	0.0
39	31.2	27.0	23.1	19.6	16.3	13.3	10.6	8.2	6.1	4.4	2.9	1.7	0.8	0.3	0.0
40	0 31.1	0 27.0	0 23.1	0 19.5	0 16.2	0 13.2	0 10.6	0 8.2	0 6.1	0 4.3	0 2.9	0 1.7	0 0.8	0 0.3	0 0.0
41	31.1	26.9	23.0	19.4	16.2	13.2	10.5	8.1	6.1	4.3	2.8	1.7	0.8	0.3	0.0
42	31.0	26.8	23.0	19.4	16.1	13.1	10.5	8.1	6.0	4.3	2.8	1.7	0.8	0.3	0.0
43	30.9	26.8	22.9	19.3	16.1	13.1	10.4	8.1	6.0	4.2	2.8	1.6	0.8	0.3	0.0
44	30.8	26.7	22.8	19.3	16.0	13.1	10.4	8.0	6.0	4.2	2.8	1.6	0.8	0.2	0.0
45	0 30.8	0 26.6	0 22.8	0 19.2	0 16.0	0 13.0	0 10.3	0 8.0	0 5.9	0 4.2	0 2.7	0 1.6	0 0.8	0 0.2	0 0.0
46	30.7	26.6	22.7	19.2	15.9	13.0	10.3	8.0	5.9	4.2	2.7	1.6	0.8	0.2	0.0
47	30.6	26.5	22.6	19.1	15.9	12.9	10.3	7.9	5.9	4.1	2.7	1.6	0.7	0.2	0.0
48	30.6	26.4	22.6	19.0	15.8	12.9	10.2	7.9	5.8	4.1	2.7	1.6	0.7	0.2	0.0
49	30.5	26.4	22.5	19.0	15.8	12.8	10.2	7.8	5.8	4.1	2.7	1.5	0.7	0.2	0.0
50	0 30.4	0 26.3	0 22.5	0 18.9	0 15.7	0 12.8	0 10.1	0 7.8	0 5.8	0 4.1	0 2.6	0 1.5	0 0.7	0 0.2	0 0.0
51	30.3	26.2	22.4	18.9	15.7	12.7	10.1	7.8	5.8	4.0	2.6	1.5	0.7	0.2	0.0
52	30.3	26.2	22.3	18.8	15.6	12.7	10.1	7.7	5.7	4.0	2.6	1.5	0.7	0.2	0.0
53	30.2	26.1	22.3	18.8	15.5	12.6	10.0	7.7	5.7	4.0	2.6	1.5	0.7	0.2	0.0
54	30.1	26.0	22.2	18.7	15.5	12.6	10.0	7.7	5.7	4.0	2.6	1.5	0.7	0.2	0.0
55	0 30.1	0 26.0	0 22.2	0 18.7	0 15.4	0 12.5	0 9.9	0 7.6	0 5.6	0 3.9	0 2.5	0 1.4	0 0.7	0 0.2	0 0.0
56	30.0	25.9	22.1	18.6	15.4	12.5	9.9	7.6	5.6	3.9	2.5	1.4	0.7	0.2	0.0
57	29.9	25.8	22.0	18.5	15.3	12.4	9.9	7.6	5.6	3.9	2.5	1.4	0.6	0.2	0.0
58	29.8	25.8	22.0	18.5	15.3	12.4	9.8	7.5	5.5	3.9	2.5	1.4	0.6	0.2	0.0
59	29.8	25.7	21.9	18.4	15.2	12.4	9.8	7.5	5.5	3.8	2.5	1.4	0.6	0.2	0.0



## AUXILIARY LOGARITHM

20'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	5-0000	4-3345	4-0334	3-8573	3-7324	3-6354	3-5563	3-4894	3-4314	3-3802
1	3-3345	3-2931	3-2553	2205	1883	1584	1303	1040	0792	0557
2	0334	0121	2-9920	2-9727	2-9542	2-9365	2-9195	2-9031	2-8873	2-8721
3	2-8573	2-8431	8293	8159	8029	7904	7782	7663	7547	7434
4	7324	7217	7112	7010	6910	6812	6717	6624	6532	6443
5	2-6354	2-6269	2-6185	2-6102	2-6021	2-5941	2-5863	2-5786	2-5710	2-5636
6	5563	5491	5421	5350	5283	5215	5148	5084	5019	4956
7	4894	4832	4771	4711	4652	4594	4536	4479	4424	4368
8	4314	4260	4206	4154	4102	4050	3999	3949	3900	3851
9	3802	3753	3707	3660	3612	3567	3522	3477	3431	3388
10	2-3345	2-3301	2-3259	2-3216	2-3174	2-3132	2-3090	2-3050	2-3010	2-2970
11	2930	2890	2852	2814	2775	2738	2700	2663	2625	2589
12	2553	2517	2481	2444	2410	2375	2341	2307	2272	2239
13	2204	2172	2139	2105	2073	2040	2009	1977	1945	1914
14	1882	1852	1821	1791	1760	1731	1701	1671	1642	1613
15	2-1584	2-1554	2-1526	2-1497	2-1469	2-1440	2-1413	2-1386	2-1358	2-1331
16	1303	1276	1249	1223	1196	1170	1143	1116	1091	1066
17	1040	1015	0988	0964	0939	0914	0889	0865	0840	0815
18	0792	0767	0744	0720	0695	0672	0649	0626	0603	0580
19	0557	0533	0512	0489	0466	0443	0422	0400	0378	0356
20	2-0334	2-0312	2-0291	2-0270	2-0247	2-0226	2-0205	2-0184	2-0163	2-0142
21	0121	0102	0081	0060	0040	0020	0000	1-9980	1-9960	1-9940
22	1-9920	1-9901	1-9881	1-9861	1-9842	1-9823	1-9803	9784	9765	9746
23	9727	9708	9690	9671	9652	9634	9615	9597	9579	9561
24	9542	9524	9506	9488	9471	9453	9435	9418	9400	9383
25	1-9365	1-9348	1-9331	1-9313	1-9296	1-9279	1-9262	1-9245	1-9228	1-9212
26	9195	9178	9162	9145	9128	9112	9096	9079	9063	9047
27	9031	9015	8999	8983	8967	8951	8935	8920	8904	8888
28	8873	8857	8842	8827	8811	8796	8781	8766	8751	8736
29	8721	8706	8691	8676	8661	8646	8632	8617	8602	8588
30	1-8573	1-8559	1-8544	1-8530	1-8516	1-8502	1-8487	1-8473	1-8459	1-8445
31	8431	8417	8403	8389	8375	8361	8348	8334	8320	8307
32	8293	8279	8266	8253	8239	8226	8212	8199	8186	8173
33	8159	8146	8133	8120	8107	8094	8081	8068	8055	8043
34	8030	8017	8004	7992	7979	7966	7954	7941	7929	7916
35	1-7904	1-7891	1-7879	1-7867	1-7855	1-7842	1-7830	1-7818	1-7806	1-7794
36	7782	7769	7757	7745	7734	7722	7710	7698	7686	7674
37	7663	7651	7639	7627	7616	7604	7593	7581	7570	7558
38	7547	7535	7524	7513	7501	7490	7479	7467	7456	7445
39	7434	7423	7412	7401	7390	7379	7368	7357	7346	7335
40	1-7324	1-7313	1-7302	1-7291	1-7281	1-7270	1-7259	1-7249	1-7238	1-7227
41	7217	7206	7196	7185	7175	7164	7154	7143	7133	7122
42	7112	7102	7091	7081	7071	7061	7050	7040	7030	7020
43	7010	7000	6990	6980	6970	6960	6950	6940	6930	6920
44	6910	6900	6890	6881	6871	6861	6851	6841	6832	6822
45	1-6812	1-6803	1-6793	1-6784	1-6774	1-6764	1-6755	1-6745	1-6736	1-6726
46	6717	6708	6698	6689	6679	6670	6661	6651	6642	6633
47	6624	6614	6605	6596	6587	6578	6568	6559	6550	6541
48	6532	6523	6514	6505	6496	6487	6478	6469	6460	6451
49	6443	6434	6425	6416	6407	6398	6390	6381	6372	6364
50	1-6355	1-6346	1-6338	1-6329	1-6320	1-6312	1-6303	1-6294	1-6286	1-6277
51	6269	6260	6252	6243	6235	6226	6218	6210	6201	6193
52	6185	6176	6168	6160	6151	6143	6135	6126	6118	6110
53	6102	6094	6085	6077	6069	6061	6053	6045	6037	6029
54	6021	6013	6005	5997	5989	5981	5973	5965	5957	5949
55	1-5941	1-5933	1-5925	1-5917	1-5909	1-5902	1-5894	1-5886	1-5878	1-5870
56	5863	5855	5847	5839	5832	5824	5816	5809	5801	5793
57	5786	5778	5771	5763	5755	5748	5740	5733	5725	5718
58	5710	5703	5695	5688	5680	5673	5666	5658	5651	5643
59	5636	5629	5621	5614	5607	5599	5592	5585	5578	5570

Table IV  
AUXILIARY LOGARITHM

21'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	1-5563	1-5556	1-5549	1-5541	1-5534	1-5527	1-5520	1-5513	1-5506	1-5498
1	5491	5484	5477	5470	5463	5456	5449	5442	5435	5428
2	5421	5414	5407	5400	5393	5386	5379	5372	5365	5358
3	5351	5344	5337	5331	5324	5317	5310	5303	5296	5290
4	5283	5276	5269	5262	5256	5249	5242	5235	5229	5222
5	1-5215	1-5209	1-5202	1-5195	1-5189	1-5182	1-5175	1-5169	1-5162	1-5156
6	5149	5143	5136	5129	5123	5116	5110	5103	5097	5090
7	5084	5077	5071	5064	5058	5051	5045	5039	5032	5026
8	5019	5013	5007	5000	4994	4988	4981	4975	4969	4962
9	4956	4950	4943	4937	4931	4925	4918	4912	4906	4900
10	1-4894	1-4887	1-4881	1-4875	1-4869	1-4863	1-4856	1-4850	1-4844	1-4838
11	4832	4826	4820	4814	4808	4801	4795	4789	4783	4777
12	4771	4765	4759	4753	4747	4741	4735	4729	4723	4717
13	4711	4705	4699	4693	4688	4682	4676	4670	4664	4658
14	4652	4646	4640	4635	4629	4623	4617	4611	4606	4600
15	1-4594	1-4588	1-4582	1-4577	1-4571	1-4565	1-4559	1-4554	1-4548	1-4542
16	4536	4531	4525	4519	4514	4508	4502	4497	4491	4485
17	4480	4474	4468	4463	4457	4452	4446	4440	4435	4429
18	4424	4418	4412	4407	4401	4396	4390	4385	4379	4374
19	4368	4363	4357	4352	4346	4341	4335	4330	4325	4319
20	1-4314	1-4308	1-4303	1-4297	1-4292	1-4287	1-4281	1-4276	1-4270	1-4265
21	4260	4254	4249	4244	4238	4233	4228	4222	4217	4212
22	4206	4201	4196	4191	4185	4180	4175	4169	4164	4159
23	4154	4149	4143	4138	4133	4128	4122	4117	4112	4107
24	4102	4097	4091	4086	4081	4075	4071	4066	4061	4054
25	1-4050	1-4045	1-4040	1-4034	1-4030	1-4025	1-4020	1-4014	1-4010	1-4005
26	4000	3994	3989	3984	3979	3973	3969	3964	3959	3953
27	3949	3944	3939	3933	3929	3924	3919	3914	3910	3905
28	3900	3894	3890	3885	3880	3874	3870	3865	3860	3856
29	3851	3846	3841	3836	3831	3826	3821	3817	3812	3807
30	1-3802	1-3797	1-3792	1-3788	1-3783	1-3778	1-3772	1-3768	1-3764	1-3759
31	3753	3749	3745	3740	3735	3730	3726	3721	3716	3711
32	3707	3702	3697	3692	3688	3683	3678	3674	3669	3664
33	3660	3655	3650	3646	3641	3636	3631	3627	3623	3618
34	3612	3609	3604	3599	3595	3590	3586	3581	3576	3571
35	1-3567	1-3563	1-3558	1-3554	1-3549	1-3545	1-3540	1-3535	1-3530	1-3526
36	3522	3517	3513	3508	3504	3499	3495	3489	3486	3481
37	3477	3472	3468	3463	3459	3454	3449	3446	3441	3437
38	3432	3428	3423	3419	3415	3409	3406	3401	3397	3393
39	3388	3384	3379	3375	3370	3366	3362	3358	3353	3348
40	1-3345	1-3340	1-3336	1-3332	1-3327	1-3323	1-3319	1-3314	1-3309	1-3306
41	3301	3297	3293	3288	3284	3280	3276	3271	3267	3263
42	3259	3254	3249	3246	3242	3237	3233	3228	3225	3220
43	3216	3212	3207	3204	3199	3195	3191	3187	3183	3178
44	3174	3170	3166	3162	3158	3153	3148	3145	3141	3137
45	1-3133	1-3128	1-3124	1-3120	1-3116	1-3112	1-3107	1-3104	1-3100	1-3096
46	3091	3086	3083	3079	3075	3071	3066	3063	3059	3055
47	3051	3046	3043	3039	3034	3030	3026	3022	3018	3014
48	3010	3006	3002	2998	2994	2990	2985	2982	2978	2974
49	2970	2965	2962	2958	2954	2950	2945	2942	2939	2935
50	1-2931	1-2926	1-2923	1-2919	1-2915	1-2911	1-2906	1-2903	1-2899	1-2895
51	2891	2886	2883	2880	2876	2872	2868	2864	2860	2856
52	2852	2848	2844	2841	2837	2833	2829	2824	2821	2818
53	2814	2810	2805	2802	2798	2795	2791	2787	2783	2779
54	2775	2772	2768	2764	2760	2756	2753	2749	2744	2741
55	1-2738	1-2734	1-2730	1-2725	1-2722	1-2719	1-2715	1-2711	1-2707	1-2703
56	2700	2696	2692	2689	2684	2681	2678	2674	2670	2666
57	2663	2659	2655	2652	2648	2643	2640	2637	2633	2629
58	2626	2622	2618	2615	2611	2607	2603	2600	2596	2593
59	2589	2584	2582	2578	2574	2571	2567	2563	2560	2556

## AUXILIARY LOGARITHM

22'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	1-2553	1-2549	1-2545	1-2542	1-2538	1-2535	1-2531	1-2527	1-2523	1-2520
1	2517	2513	2510	2506	2502	2499	2495	2492	2488	2485
2	2481	2477	2474	2470	2467	2462	2460	2456	2453	2449
3	2445	2441	2438	2435	2431	2428	2423	2421	2417	2414
4	2410	2407	2402	2400	2396	2393	2389	2386	2381	2379
5	1-2375	1-2372	1-2368	1-2365	1-2361	1-2358	1-2355	1-2351	1-2348	1-2344
6	2340	2337	2334	2331	2327	2324	2320	2317	2313	2310
7	2307	2302	2300	2296	2293	2289	2286	2283	2279	2276
8	2272	2269	2266	2261	2259	2256	2252	2249	2245	2241
9	2239	2235	2232	2229	2225	2221	2218	2215	2212	2208
10	1-2205	1-2201	1-2198	1-2195	1-2192	1-2188	1-2185	1-2181	1-2178	1-2175
11	2172	2169	2165	2161	2159	2155	2152	2149	2145	2142
12	2139	2136	2132	2129	2126	2122	2119	2116	2113	2109
13	2106	2103	2098	2096	2093	2090	2086	2083	2079	2077
14	2073	2070	2067	2064	2060	2057	2054	2051	2048	2044
15	1-2040	1-2037	1-2035	1-2032	1-2028	1-2025	1-2022	1-2018	1-2016	1-2012
16	2009	2006	2003	1999	1996	1993	1990	1987	1984	1981
17	1976	1974	1971	1968	1965	1962	1957	1955	1952	1949
18	1946	1943	1938	1936	1933	1930	1927	1924	1921	1917
19	1914	1911	1908	1905	1902	1898	1896	1893	1889	1886
20	1-1883	1-1880	1-1876	1-1874	1-1871	1-1868	1-1865	1-1862	1-1858	1-1855
21	1852	1849	1846	1843	1840	1836	1834	1831	1828	1825
22	1822	1818	1815	1812	1809	1806	1803	1800	1796	1794
23	1791	1788	1785	1782	1778	1775	1773	1770	1767	1764
24	1761	1757	1755	1752	1749	1746	1743	1740	1736	1734
25	1-1731	1-1728	1-1725	1-1722	1-1719	1-1715	1-1713	1-1710	1-1707	1-1704
26	1701	1697	1694	1692	1689	1686	1683	1680	1676	1674
27	1671	1668	1665	1663	1660	1656	1654	1651	1648	1645
28	1642	1639	1635	1633	1630	1627	1624	1621	1619	1615
29	1613	1610	1607	1604	1601	1598	1594	1592	1589	1587
30	1-1584	1-1581	1-1578	1-1574	1-1572	1-1569	1-1566	1-1563	1-1561	1-1558
31	1554	1552	1549	1546	1543	1540	1538	1534	1532	1529
32	1526	1523	1520	1518	1514	1512	1509	1506	1503	1500
33	1498	1494	1492	1489	1486	1483	1481	1478	1474	1472
34	1469	1467	1464	1461	1458	1454	1452	1450	1447	1444
35	1-1441	1-1438	1-1435	1-1432	1-1430	1-1427	1-1424	1-1422	1-1419	1-1415
36	1412	1411	1408	1405	1402	1399	1397	1393	1391	1388
37	1386	1383	1380	1377	1373	1372	1369	1366	1363	1361
38	1358	1354	1351	1350	1347	1344	1342	1339	1336	1332
39	1331	1328	1325	1322	1320	1317	1313	1311	1309	1306
40	1-1303	1-1301	1-1298	1-1294	1-1291	1-1290	1-1287	1-1284	1-1282	1-1279
41	1276	1273	1271	1268	1266	1263	1260	1257	1254	1251
42	1249	1247	1244	1241	1239	1236	1232	1230	1228	1225
43	1223	1220	1217	1215	1211	1209	1207	1204	1201	1199
44	1196	1192	1190	1188	1186	1183	1180	1178	1175	1171
45	1-1170	1-1167	1-1164	1-1162	1-1159	1-1157	1-1153	1-1150	1-1149	1-1146
46	1143	1141	1138	1136	1132	1130	1128	1125	1123	1120
47	1117	1115	1111	1109	1107	1104	1102	1099	1097	1094
48	1090	1089	1086	1084	1081	1079	1076	1072	1070	1068
49	1066	1063	1061	1058	1055	1052	1049	1048	1045	1043
50	1-1040	1-1037	1-1035	1-1031	1-1029	1-1027	1-1025	1-1022	1-1020	1-1017
51	1015	1011	1008	1007	1004	1002	0999	0997	0994	0991
52	0988	0987	0984	0982	0979	0977	0974	0971	0968	0967
53	0964	0962	0959	0957	0954	0951	0948	0947	0944	0942
54	0939	0937	0934	0931	0928	0927	0924	0922	0919	0917
55	1-0914	1-0911	1-0908	1-0907	1-0904	1-0902	1-0899	1-0897	1-0894	1-0891
56	0888	0887	0884	0882	0880	0877	0875	0871	0869	0867
57	0865	0862	0860	0857	0855	0853	0849	0847	0845	0843
58	0840	0838	0835	0833	0830	0827	0826	0823	0821	0818
59	0816	0814	0810	0808	0806	0804	0801	0799	0797	0794

Table IV  
AUXILIARY LOGARITHM

23'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	1-0792	1-0788	1-0786	1-0785	1-0782	1-0780	1-0777	1-0775	1-0773	1-0769
1	0767	0765	0763	0761	0758	0756	0753	0750	0748	0746
2	0744	0741	0739	0737	0734	0732	0729	0726	0725	0722
3	0720	0718	0715	0713	0710	0707	0706	0703	0701	0699
4	0696	0694	0692	0688	0686	0685	0682	0680	0678	0675
5	1-0673	1-0669	1-0667	1-0665	1-0663	1-0661	1-0659	1-0656	1-0654	1-0652
6	0648	0646	0645	0642	0640	0638	0635	0633	0631	0627
7	0625	0624	0621	0619	0617	0615	0612	0609	0607	0605
8	0603	0601	0598	0596	0594	0591	0588	0586	0585	0582
9	0580	0578	0575	0573	0571	0567	0565	0564	0562	0559
10	1-0557	1-0555	1-0552	1-0550	1-0547	1-0545	1-0543	1-0541	1-0539	1-0536
11	0534	0532	0530	0526	0524	0523	0521	0518	0516	0514
12	0512	0508	0506	0504	0502	0500	0498	0496	0493	0491
13	0488	0486	0484	0482	0480	0478	0475	0473	0471	0468
14	0466	0463	0462	0460	0458	0455	0453	0451	0448	0445
15	1-0443	1-0442	1-0440	1-0438	1-0435	1-0433	1-0431	1-0429	1-0425	1-0423
16	0422	0420	0418	0415	0413	0411	0409	0405	0403	0402
17	0400	0398	0395	0393	0391	0389	0386	0383	0382	0380
18	0378	0376	0374	0371	0369	0366	0364	0363	0360	0358
19	0356	0354	0352	0349	0346	0344	0343	0341	0339	0336
20	1-0334	1-0332	1-0330	1-0327	1-0325	1-0322	1-0321	1-0319	1-0317	1-0315
21	0313	0310	0307	0305	0303	0302	0300	0297	0295	0293
22	0291	0289	0286	0284	0282	0280	0278	0276	0274	0272
23	0270	0266	0264	0262	0261	0259	0257	0255	0252	0250
24	0248	0245	0243	0242	0240	0238	0235	0233	0231	0229
25	1-0226	1-0224	1-0222	1-0221	1-0219	1-0216	1-0214	1-0212	1-0210	1-0208
26	0205	0203	0201	0200	0197	0195	0193	0191	0189	0186
27	0184	0182	0181	0179	0176	0174	0172	0170	0168	0165
28	0163	0161	0160	0158	0156	0153	0151	0149	0147	0144
29	0142	0141	0139	0137	0135	0133	0131	0129	0125	0123
30	1-0121	1-0120	1-0118	1-0116	1-0114	1-0112	1-0110	1-0108	1-0105	1-0103
31	0101	0100	0098	0096	0093	0091	0089	0087	0084	0082
32	0080	0079	0077	0075	0073	0071	0069	0067	0064	0062
33	0060	0059	0057	0055	0053	0051	0049	0045	0043	0041
34	0040	0038	0036	0034	0032	0030	0028	0026	0023	0021
35	1-0020	1-0018	1-0016	1-0014	1-0012	1-0010	1-0008	1-0006	1-0003	1-0001
36	0000	0-9998	0-9996	0-9994	0-9992	0-9990	0-9988	0-9986	0-9984	0-9982
37	0-9980	9978	9976	9974	9972	9970	9968	9966	9964	9962
38	9960	9958	9956	9954	9952	9950	9948	9946	9944	9942
39	9940	9938	9936	9934	9932	9930	9928	9926	9924	9922
40	0-9920	0-9918	0-9916	0-9914	0-9912	0-9910	0-9908	0-9907	0-9905	0-9903
41	9901	9899	9897	9895	9893	9891	9889	9887	9885	9883
42	9881	9879	9877	9875	9873	9871	9869	9867	9865	9863
43	9861	9860	9858	9856	9854	9852	9850	9848	9846	9844
44	9842	9840	9838	9836	9834	9832	9830	9829	9827	9825
45	0-9823	0-9821	0-9819	0-9817	0-9815	0-9813	0-9811	0-9809	0-9807	0-9805
46	9803	9802	9800	9798	9796	9794	9792	9790	9788	9786
47	9784	9782	9780	9779	9777	9775	9773	9771	9769	9767
48	9765	9763	9761	9759	9758	9756	9754	9752	9750	9748
49	9746	9744	9742	9740	9739	9737	9735	9733	9731	9729
50	0-9727	0-9725	0-9723	0-9722	0-9720	0-9718	0-9716	0-9714	0-9712	0-9710
51	9708	9707	9705	9703	9701	9699	9697	9695	9693	9692
52	9690	9688	9686	9684	9682	9680	9678	9677	9675	9673
53	9671	9669	9667	9665	9664	9662	9660	9658	9656	9654
54	9652	9651	9649	9647	9645	9643	9641	9639	9638	9636
55	0-9634	0-9632	0-9630	0-9628	0-9626	0-9625	0-9623	0-9621	0-9619	0-9617
56	9615	9614	9612	9610	9608	9606	9604	9603	9601	9599
57	9597	9595	9593	9592	9590	9588	9586	9584	9582	9581
58	9579	9577	9575	9573	9571	9570	9568	9566	9564	9562
59	9561	9559	9557	9555	9553	9551	9550	9548	9546	9544

## AUXILIARY LOGARITHM

24'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	9542	9541	9539	9537	9535	9533	9532	9530	9528	9526
1	9524	9523	9521	9519	9517	9515	9514	9512	9510	9508
2	9506	9505	9503	9501	9499	9497	9496	9494	9492	9490
3	9488	9487	9485	9483	9481	9480	9478	9476	9474	9472
4	9471	9469	9467	9465	9464	9462	9460	9458	9456	9455
5	9453	9451	9449	9448	9446	9444	9442	9440	9439	9437
6	9435	9433	9432	9430	9428	9426	9425	9423	9421	9419
7	9418	9416	9414	9412	9411	9409	9407	9405	9404	9402
8	9400	9398	9397	9395	9393	9391	9390	9388	9386	9384
9	9383	9381	9379	9377	9376	9374	9372	9370	9369	9367
10	9365	9363	9362	9360	9358	9356	9355	9353	9351	9350
11	9348	9346	9344	9343	9341	9339	9337	9336	9334	9332
12	9331	9329	9327	9325	9324	9322	9320	9318	9317	9315
13	9313	9312	9310	9308	9306	9305	9303	9301	9300	9298
14	9296	9294	9293	9291	9289	9288	9286	9284	9283	9281
15	9279	9277	9276	9274	9272	9271	9269	9267	9266	9264
16	9262	9260	9259	9257	9255	9254	9252	9250	9249	9247
17	9245	9244	9242	9240	9238	9237	9235	9233	9232	9230
18	9228	9227	9225	9223	9222	9220	9218	9217	9215	9213
19	9212	9210	9208	9207	9205	9203	9201	9200	9198	9196
20	9195	9193	9191	9190	9188	9186	9185	9183	9181	9180
21	9178	9176	9175	9173	9171	9170	9168	9167	9165	9163
22	9162	9160	9158	9157	9155	9153	9152	9150	9148	9147
23	9145	9143	9142	9140	9138	9137	9135	9133	9132	9130
24	9128	9127	9125	9124	9122	9120	9119	9117	9115	9114
25	9112	9110	9109	9107	9106	9104	9102	9101	9099	9097
26	9096	9094	9092	9091	9089	9088	9086	9084	9083	9081
27	9079	9078	9076	9075	9073	9071	9070	9068	9066	9065
28	9063	9062	9060	9058	9057	9055	9053	9052	9050	9049
29	9047	9045	9044	9042	9041	9039	9037	9036	9034	9033
30	9031	9029	9028	9026	9024	9023	9021	9020	9018	9016
31	9015	9013	9012	9010	9008	9007	9005	9004	9002	9000
32	8999	8997	8996	8994	8992	8991	8989	8988	8986	8985
33	8983	8981	8980	8978	8977	8975	8973	8972	8970	8969
34	8967	8965	8964	8962	8961	8959	8958	8956	8954	8953
35	8951	8950	8948	8946	8945	8943	8942	8940	8939	8937
36	8935	8934	8932	8931	8929	8928	8926	8924	8923	8921
37	8920	8918	8917	8915	8913	8912	8910	8909	8907	8906
38	8904	8903	8901	8899	8898	8896	8895	8893	8892	8890
39	8888	8887	8885	8884	8882	8881	8879	8878	8876	8875
40	8873	8871	8870	8868	8867	8865	8864	8862	8861	8859
41	8857	8856	8854	8853	8851	8850	8848	8847	8845	8844
42	8842	8841	8839	8837	8836	8834	8833	8831	8830	8828
43	8827	8825	8824	8822	8821	8819	8817	8816	8814	8813
44	8811	8810	8808	8807	8805	8804	8802	8801	8799	8798
45	8796	8795	8793	8792	8790	8788	8787	8785	8784	8782
46	8781	8779	8778	8776	8775	8773	8772	8770	8769	8767
47	8766	8764	8763	8761	8760	8758	8757	8755	8754	8752
48	8751	8749	8748	8746	8745	8743	8742	8740	8739	8737
49	8736	8734	8733	8731	8730	8728	8727	8725	8724	8722
50	8721	8719	8718	8716	8715	8713	8712	8710	8709	8707
51	8706	8704	8703	8701	8700	8698	8697	8695	8694	8692
52	8691	8689	8688	8686	8685	8683	8682	8680	8679	8677
53	8676	8674	8673	8671	8670	8668	8667	8665	8664	8663
54	8661	8660	8658	8657	8655	8654	8652	8651	8649	8648
55	8646	8645	8643	8642	8640	8639	8637	8636	8635	8633
56	8632	8630	8629	8627	8626	8624	8623	8621	8620	8618
57	8617	8616	8614	8613	8611	8610	8608	8607	8605	8604
58	8602	8601	8599	8598	8597	8595	8594	8592	8591	8589
59	8588	8586	8585	8583	8582	8581	8579	8578	8576	8575

Table IV  
AUXILIARY LOGARITHM

25'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	8573	8572	8570	8569	8568	8566	8565	8563	8562	8560
1	8559	8557	8556	8555	8553	8552	8550	8549	8547	8546
2	8544	8543	8542	8540	8539	8537	8536	8534	8533	8532
3	8530	8529	8527	8526	8524	8523	8522	8520	8519	8517
4	8516	8514	8513	8512	8510	8509	8507	8506	8504	8503
5	8502	8500	8499	8497	8496	8494	8493	8492	8490	8489
6	8487	8486	8484	8483	8482	8480	8479	8477	8476	8475
7	8473	8472	8470	8469	8467	8466	8465	8463	8462	8460
8	8459	8458	8456	8455	8453	8452	8451	8449	8448	8446
9	8445	8444	8442	8441	8439	8438	8437	8435	8434	8432
10	8431	8430	8428	8427	8425	8424	8423	8421	8420	8418
11	8417	8416	8414	8413	8411	8410	8409	8407	8406	8404
12	8403	8402	8400	8399	8397	8396	8395	8393	8392	8390
13	8389	8388	8386	8385	8384	8382	8381	8379	8378	8377
14	8375	8374	8372	8371	8370	8368	8367	8366	8364	8363
15	8361	8360	8359	8357	8356	8355	8353	8352	8350	8349
16	8348	8346	8345	8344	8342	8341	8339	8338	8337	8335
17	8334	8333	8331	8330	8328	8327	8326	8324	8323	8322
18	8320	8319	8318	8316	8315	8313	8312	8311	8309	8308
19	8307	8305	8304	8303	8301	8300	8298	8297	8296	8294
20	8293	8292	8290	8289	8288	8286	8285	8284	8282	8281
21	8279	8278	8277	8275	8274	8273	8271	8270	8269	8267
22	8266	8265	8263	8262	8261	8259	8258	8257	8255	8254
23	8253	8251	8250	8248	8247	8246	8244	8243	8242	8240
24	8239	8238	8236	8235	8234	8232	8231	8230	8228	8227
25	8226	8224	8223	8222	8220	8219	8218	8216	8215	8214
26	8212	8211	8210	8208	8207	8206	8204	8203	8202	8200
27	8199	8198	8196	8195	8194	8192	8191	8190	8188	8187
28	8186	8184	8183	8182	8181	8179	8178	8177	8175	8174
29	8173	8171	8170	8169	8167	8166	8165	8163	8162	8161
30	8159	8158	8157	8155	8154	8153	8152	8150	8149	8148
31	8146	8145	8144	8142	8141	8140	8138	8137	8136	8134
32	8133	8132	8131	8129	8128	8127	8125	8124	8123	8121
33	8120	8119	8117	8116	8115	8114	8112	8111	8110	8108
34	8107	8106	8104	8103	8102	8101	8099	8098	8097	8095
35	8094	8093	8091	8090	8089	8088	8086	8085	8084	8082
36	8081	8080	8079	8077	8076	8075	8073	8072	8071	8070
37	8068	8067	8066	8064	8063	8062	8061	8059	8058	8057
38	8055	8054	8053	8052	8050	8049	8048	8046	8045	8044
39	8043	8041	8040	8039	8037	8036	8035	8034	8032	8031
40	8030	8028	8027	8026	8025	8023	8022	8021	8020	8018
41	8017	8016	8014	8013	8012	8011	8009	8008	8007	8006
42	8004	8003	8002	8000	7999	7998	7997	7995	7994	7993
43	7992	7990	7989	7988	7987	7985	7984	7983	7981	7980
44	7979	7978	7976	7975	7974	7973	7971	7970	7969	7968
45	7966	7965	7964	7963	7961	7960	7959	7958	7956	7955
46	7954	7953	7951	7950	7949	7948	7946	7945	7944	7942
47	7941	7940	7939	7937	7936	7935	7934	7932	7931	7930
48	7929	7927	7926	7925	7923	7923	7921	7920	7919	7918
49	7916	7915	7914	7913	7911	7910	7909	7908	7906	7905
50	7904	7903	7901	7900	7899	7898	7896	7895	7894	7893
51	7891	7890	7889	7888	7887	7885	7884	7883	7882	7880
52	7879	7878	7877	7875	7874	7873	7872	7870	7869	7868
53	7867	7866	7864	7863	7862	7861	7859	7858	7857	7856
54	7855	7853	7852	7851	7850	7848	7847	7846	7845	7843
55	7842	7841	7840	7839	7837	7836	7835	7834	7832	7831
56	7830	7829	7828	7826	7825	7824	7823	7822	7820	7819
57	7818	7817	7815	7814	7813	7812	7811	7809	7808	7807
58	7806	7804	7803	7802	7801	7800	7798	7797	7796	7795
59	7794	7792	7791	7790	7789	7788	7786	7785	7784	7783

## AUXILIARY LOGARITHM

26'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	7782	7780	7779	7778	7777	7775	7774	7773	7772	7771
1	7769	7768	7767	7766	7765	7763	7762	7761	7760	7759
2	7757	7756	7755	7754	7753	7751	7750	7749	7748	7747
3	7745	7744	7743	7742	7741	7739	7738	7737	7736	7735
4	7734	7732	7731	7730	7729	7728	7726	7725	7724	7723
5	7722	7720	7719	7718	7717	7716	7714	7713	7712	7711
6	7710	7709	7707	7706	7705	7704	7703	7701	7700	7699
7	7698	7697	7696	7694	7693	7692	7691	7690	7688	7687
8	7686	7685	7684	7683	7681	7680	7679	7678	7677	7675
9	7674	7673	7672	7671	7670	7668	7667	7666	7665	7664
10	7663	7661	7660	7659	7658	7657	7655	7654	7653	7652
11	7651	7650	7648	7647	7646	7645	7644	7643	7641	7640
12	7639	7638	7637	7636	7634	7633	7632	7631	7630	7629
13	7627	7626	7625	7624	7623	7622	7620	7619	7618	7617
14	7616	7615	7613	7612	7611	7610	7609	7608	7607	7605
15	7604	7603	7602	7601	7600	7598	7597	7596	7595	7594
16	7593	7592	7590	7589	7588	7587	7586	7585	7583	7582
17	7581	7580	7579	7578	7577	7575	7574	7573	7572	7571
18	7570	7568	7567	7566	7565	7564	7563	7562	7560	7559
19	7558	7557	7556	7555	7554	7552	7551	7550	7549	7548
20	7547	7546	7544	7543	7542	7541	7540	7539	7538	7536
21	7535	7534	7533	7532	7531	7530	7528	7527	7526	7525
22	7524	7523	7522	7520	7519	7518	7517	7516	7515	7514
23	7513	7511	7510	7509	7508	7507	7506	7505	7503	7502
24	7501	7500	7499	7498	7497	7496	7494	7493	7492	7491
25	7490	7489	7488	7487	7485	7484	7483	7482	7481	7480
26	7479	7478	7476	7475	7474	7473	7472	7471	7470	7469
27	7467	7466	7465	7464	7463	7462	7461	7460	7458	7457
28	7456	7455	7454	7453	7452	7451	7450	7448	7447	7446
29	7445	7444	7443	7442	7441	7439	7438	7437	7436	7435
30	7434	7433	7432	7431	7429	7428	7427	7426	7425	7424
31	7423	7422	7421	7419	7418	7417	7416	7415	7414	7413
32	7412	7411	7409	7408	7407	7406	7405	7404	7403	7402
33	7401	7400	7398	7397	7396	7395	7394	7393	7392	7391
34	7390	7388	7387	7386	7385	7384	7383	7382	7381	7380
35	7379	7377	7376	7375	7374	7373	7372	7371	7370	7369
36	7368	7366	7365	7364	7363	7362	7361	7360	7359	7358
37	7357	7356	7354	7353	7352	7351	7350	7349	7348	7347
38	7346	7345	7344	7342	7341	7340	7339	7338	7337	7336
39	7335	7334	7333	7332	7330	7329	7328	7327	7326	7325
40	7324	7323	7322	7321	7320	7319	7317	7316	7315	7314
41	7313	7312	7311	7310	7309	7308	7307	7306	7304	7303
42	7302	7301	7300	7299	7298	7297	7296	7295	7294	7293
43	7291	7290	7289	7288	7287	7286	7285	7284	7283	7282
44	7281	7280	7279	7278	7276	7275	7274	7273	7272	7271
45	7270	7269	7268	7267	7266	7265	7264	7262	7261	7260
46	7259	7258	7257	7256	7255	7254	7253	7252	7251	7250
47	7249	7248	7246	7245	7244	7243	7242	7241	7240	7239
48	7238	7237	7236	7235	7234	7233	7232	7230	7229	7228
49	7227	7226	7225	7224	7223	7222	7221	7220	7219	7218
50	7217	7216	7215	7214	7212	7211	7210	7209	7208	7207
51	7206	7205	7204	7203	7202	7201	7200	7199	7198	7197
52	7196	7195	7193	7192	7191	7190	7189	7188	7187	7186
53	7185	7184	7183	7182	7181	7180	7179	7178	7177	7176
54	7175	7173	7172	7171	7170	7169	7168	7167	7166	7165
55	7164	7163	7162	7161	7160	7159	7158	7157	7156	7155
56	7154	7153	7152	7150	7149	7148	7147	7146	7145	7144
57	7143	7142	7141	7140	7139	7138	7137	7136	7135	7134
58	7133	7132	7131	7130	7129	7128	7127	7126	7124	7123
59	7122	7121	7120	7119	7118	7117	7116	7115	7114	7113

Table IV  
AUXILIARY LOGARITHM

27'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	7112	7111	7110	7109	7108	7107	7106	7105	7104	7103
1	7102	7101	7100	7099	7098	7097	7096	7095	7093	7092
2	7091	7090	7089	7088	7087	7086	7085	7084	7083	7082
3	7081	7080	7079	7078	7077	7076	7075	7074	7073	7072
4	7071	7070	7069	7068	7067	7066	7065	7064	7063	7062
5	7061	7060	7059	7058	7057	7056	7055	7054	7052	7051
6	7050	7049	7048	7047	7046	7045	7044	7043	7042	7041
7	7040	7039	7038	7037	7036	7035	7034	7033	7032	7031
8	7030	7029	7028	7027	7026	7025	7024	7023	7022	7021
9	7020	7019	7018	7017	7016	7015	7014	7013	7012	7011
10	7010	7009	7008	7007	7006	7005	7004	7003	7002	7001
11	7000	6999	6998	6997	6996	6995	6994	6993	6992	6991
12	6990	6989	6988	6987	6986	6985	6984	6983	6982	6981
13	6980	6979	6978	6977	6976	6975	6974	6973	6972	6971
14	6970	6969	6968	6967	6966	6965	6964	6963	6962	6961
15	6960	6959	6958	6957	6956	6955	6954	6953	6952	6951
16	6950	6949	6948	6947	6946	6945	6944	6943	6942	6941
17	6940	6939	6938	6937	6936	6935	6934	6933	6932	6931
18	6930	6929	6928	6927	6926	6925	6924	6923	6922	6921
19	6920	6919	6918	6917	6916	6915	6914	6913	6912	6911
20	6910	6909	6908	6907	6906	6905	6904	6903	6902	6901
21	6900	6899	6898	6897	6896	6895	6894	6893	6892	6891
22	6890	6889	6888	6887	6886	6885	6884	6883	6882	6881
23	6881	6880	6879	6878	6877	6876	6875	6874	6873	6872
24	6871	6870	6869	6868	6867	6866	6865	6864	6863	6862
25	6861	6860	6859	6858	6857	6856	6855	6854	6853	6852
26	6851	6850	6849	6848	6847	6846	6845	6844	6843	6842
27	6841	6840	6840	6839	6838	6837	6836	6835	6834	6833
28	6832	6831	6830	6829	6828	6827	6826	6825	6824	6823
29	6822	6821	6820	6819	6818	6817	6816	6815	6814	6813
30	6812	6811	6810	6810	6809	6808	6807	6806	6805	6804
31	6803	6802	6801	6800	6799	6798	6797	6796	6795	6794
32	6793	6792	6791	6790	6789	6788	6787	6786	6785	6785
33	6784	6783	6782	6781	6780	6779	6778	6777	6776	6775
34	6774	6773	6772	6771	6770	6769	6768	6767	6766	6765
35	6764	6763	6763	6762	6761	6760	6759	6758	6757	6756
36	6755	6754	6753	6752	6751	6750	6749	6748	6747	6746
37	6745	6744	6743	6743	6742	6741	6740	6739	6738	6737
38	6736	6735	6734	6733	6732	6731	6730	6729	6728	6727
39	6726	6725	6725	6724	6723	6722	6721	6720	6719	6718
40	6717	6716	6715	6714	6713	6712	6711	6710	6709	6708
41	6708	6707	6706	6705	6704	6703	6702	6701	6700	6699
42	6698	6697	6696	6695	6694	6693	6692	6692	6691	6690
43	6689	6688	6687	6686	6685	6684	6683	6682	6681	6680
44	6679	6678	6677	6677	6676	6675	6674	6673	6672	6671
45	6670	6669	6668	6667	6666	6665	6664	6663	6663	6662
46	6661	6660	6659	6658	6657	6656	6655	6654	6653	6652
47	6651	6650	6650	6649	6648	6647	6646	6645	6644	6643
48	6642	6641	6640	6639	6638	6637	6636	6635	6634	6634
49	6633	6632	6631	6630	6629	6628	6627	6626	6625	6624
50	6624	6623	6622	6621	6620	6619	6618	6617	6616	6615
51	6614	6613	6612	6612	6611	6610	6609	6608	6607	6606
52	6605	6604	6603	6602	6601	6601	6600	6599	6598	6597
53	6596	6595	6594	6593	6592	6591	6590	6590	6589	6588
54	6587	6586	6585	6584	6583	6582	6581	6580	6579	6579
55	6578	6577	6576	6575	6574	6573	6572	6571	6570	6569
56	6568	6568	6567	6566	6565	6564	6563	6562	6561	6560
57	6559	6558	6558	6557	6556	6555	6554	6553	6552	6551
58	6550	6549	6548	6548	6547	6546	6545	6544	6543	6542
59	6541	6540	6539	6538	6538	6537	6536	6535	6534	6533



## AUXILIARY LOGARITHM

28'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	6532	6531	6530	6529	6529	6528	6527	6526	6525	6524
1	6523	6522	6521	6520	6519	6519	6518	6517	6516	6515
2	6514	6513	6512	6511	6510	6510	6509	6508	6507	6506
3	6505	6504	6503	6502	6501	6501	6500	6499	6498	6497
4	6496	6495	6494	6493	6492	6492	6491	6490	6489	6488
5	6487	6486	6485	6484	6484	6483	6482	6481	6480	6479
6	6478	6477	6476	6475	6475	6474	6473	6472	6471	6470
7	6469	6468	6467	6467	6466	6465	6464	6463	6462	6461
8	6460	6459	6459	6458	6457	6456	6455	6454	6453	6452
9	6451	6451	6450	6449	6448	6447	6446	6445	6444	6443
10	6443	6442	6441	6440	6439	6438	6437	6436	6435	6435
11	6434	6433	6432	6431	6430	6429	6428	6428	6427	6426
12	6425	6424	6423	6422	6421	6420	6420	6419	6418	6417
13	6416	6415	6414	6413	6413	6412	6411	6410	6409	6408
14	6407	6406	6406	6405	6404	6403	6402	6401	6400	6399
15	6398	6398	6397	6396	6395	6394	6393	6392	6391	6391
16	6390	6389	6388	6387	6386	6385	6384	6384	6383	6382
17	6381	6380	6379	6378	6377	6377	6376	6375	6374	6373
18	6372	6371	6371	6370	6369	6368	6367	6366	6365	6364
19	6364	6363	6362	6361	6360	6359	6358	6357	6357	6356
20	6355	6354	6353	6352	6351	6350	6350	6349	6348	6347
21	6346	6345	6344	6344	6343	6342	6341	6340	6339	6338
22	6338	6337	6336	6335	6334	6333	6332	6331	6331	6330
23	6329	6328	6327	6326	6325	6325	6324	6323	6322	6321
24	6320	6319	6319	6318	6317	6316	6315	6314	6313	6312
25	6312	6311	6310	6309	6308	6307	6306	6306	6305	6304
26	6303	6302	6301	6300	6300	6299	6298	6297	6296	6295
27	6294	6294	6293	6292	6291	6290	6289	6288	6288	6287
28	6286	6285	6284	6283	6282	6282	6281	6280	6279	6278
29	6277	6277	6276	6275	6274	6273	6272	6271	6271	6270
30	6269	6268	6267	6266	6265	6265	6264	6263	6262	6261
31	6260	6259	6259	6258	6257	6256	6255	6254	6254	6253
32	6252	6251	6250	6249	6248	6248	6247	6246	6245	6244
33	6243	6243	6242	6241	6240	6239	6238	6237	6237	6236
34	6235	6234	6233	6232	6232	6231	6230	6229	6228	6227
35	6226	6226	6225	6224	6223	6222	6221	6221	6220	6219
36	6218	6217	6216	6216	6215	6214	6213	6212	6211	6210
37	6210	6209	6208	6207	6206	6205	6205	6204	6203	6202
38	6201	6200	6200	6199	6198	6197	6196	6195	6195	6194
39	6193	6192	6191	6190	6190	6189	6188	6187	6186	6185
40	6185	6184	6183	6182	6181	6180	6179	6179	6178	6177
41	6176	6175	6174	6174	6173	6172	6171	6170	6169	6169
42	6168	6167	6166	6165	6165	6164	6163	6162	6161	6160
43	6160	6159	6158	6157	6156	6155	6155	6154	6153	6152
44	6151	6150	6150	6149	6148	6147	6146	6145	6145	6144
45	6143	6142	6141	6140	6140	6139	6138	6137	6136	6136
46	6135	6134	6133	6132	6131	6131	6130	6129	6128	6127
47	6126	6126	6125	6124	6123	6122	6121	6121	6120	6119
48	6118	6117	6117	6116	6115	6114	6113	6112	6112	6111
49	6110	6109	6108	6108	6107	6106	6105	6104	6103	6103
50	6102	6101	6100	6099	6099	6098	6097	6096	6095	6094
51	6094	6093	6092	6091	6090	6090	6089	6088	6087	6086
52	6085	6085	6084	6083	6082	6081	6081	6080	6079	6078
53	6077	6076	6076	6075	6074	6073	6072	6072	6071	6070
54	6069	6068	6067	6067	6066	6065	6064	6063	6063	6062
55	6061	6060	6059	6059	6058	6057	6056	6055	6055	6054
56	6053	6052	6051	6050	6050	6049	6048	6047	6046	6046
57	6045	6044	6043	6042	6042	6041	6040	6039	6038	6038
58	6037	6036	6035	6034	6033	6033	6032	6031	6030	6029
59	6029	6028	6027	6026	6025	6025	6024	6023	6022	6021

Table IV  
AUXILIARY LOGARITHM

29'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	6021	6020	6019	6018	6017	6017	6016	6015	6014	6013
1	6013	6012	6011	6010	6009	6009	6008	6007	6006	6005
2	6005	6004	6003	6002	6001	6001	6000	5999	5998	5997
3	5997	5996	5995	5994	5993	5993	5992	5991	5990	5989
4	5989	5988	5987	5986	5985	5985	5984	5983	5982	5981
5	5981	5980	5979	5978	5977	5977	5976	5975	5974	5973
6	5973	5972	5971	5970	5969	5969	5968	5967	5966	5965
7	5965	5964	5963	5962	5961	5961	5960	5959	5958	5958
8	5957	5956	5955	5954	5954	5953	5952	5951	5950	5950
9	5949	5948	5947	5946	5946	5945	5944	5943	5942	5942
10	5941	5940	5939	5939	5938	5937	5936	5935	5935	5934
11	5933	5932	5931	5931	5930	5929	5928	5928	5927	5926
12	5925	5924	5924	5923	5922	5921	5920	5920	5919	5918
13	5917	5917	5916	5915	5914	5913	5913	5912	5911	5910
14	5909	5909	5908	5907	5906	5906	5905	5904	5903	5902
15	5902	5901	5900	5899	5898	5898	5897	5896	5895	5895
16	5894	5893	5892	5891	5891	5890	5889	5888	5888	5887
17	5886	5885	5884	5884	5883	5882	5881	5881	5880	5879
18	5878	5877	5877	5876	5875	5874	5873	5873	5872	5871
19	5870	5870	5869	5868	5867	5867	5866	5865	5864	5863
20	5863	5862	5861	5860	5860	5859	5858	5857	5856	5856
21	5855	5854	5853	5853	5852	5851	5850	5849	5849	5848
22	5847	5846	5846	5845	5844	5843	5843	5842	5841	5840
23	5839	5839	5838	5837	5836	5836	5835	5834	5833	5833
24	5832	5831	5830	5829	5829	5828	5827	5826	5826	5825
25	5824	5823	5823	5822	5821	5820	5819	5819	5818	5817
26	5816	5816	5815	5814	5813	5813	5812	5811	5810	5809
27	5809	5808	5807	5806	5806	5805	5804	5803	5803	5802
28	5801	5800	5800	5799	5798	5797	5796	5796	5795	5794
29	5793	5793	5792	5791	5790	5790	5789	5788	5787	5787
30	5786	5785	5784	5784	5783	5782	5781	5780	5780	5779
31	5778	5777	5777	5776	5775	5774	5774	5773	5772	5771
32	5771	5770	5769	5768	5768	5767	5766	5765	5765	5764
33	5763	5762	5761	5761	5760	5759	5758	5758	5757	5756
34	5755	5755	5754	5753	5752	5752	5751	5750	5749	5749
35	5748	5747	5746	5746	5745	5744	5743	5743	5742	5741
36	5740	5740	5739	5738	5737	5737	5736	5735	5734	5734
37	5733	5732	5731	5731	5730	5729	5728	5728	5727	5726
38	5725	5725	5724	5723	5722	5722	5721	5720	5719	5719
39	5718	5717	5716	5716	5715	5714	5713	5713	5712	5711
40	5710	5710	5709	5708	5707	5707	5706	5705	5704	5704
41	5703	5702	5701	5701	5700	5699	5698	5698	5697	5696
42	5695	5695	5694	5693	5692	5692	5691	5690	5689	5689
43	5688	5687	5686	5686	5685	5684	5683	5683	5682	5681
44	5680	5680	5679	5678	5677	5677	5676	5675	5674	5674
45	5673	5672	5671	5671	5670	5669	5669	5668	5667	5666
46	5666	5665	5664	5663	5663	5662	5661	5660	5660	5659
47	5658	5657	5657	5656	5655	5654	5654	5653	5652	5652
48	5651	5650	5649	5649	5648	5647	5646	5646	5645	5644
49	5643	5643	5642	5641	5640	5640	5639	5638	5637	5637
50	5636	5635	5635	5634	5633	5632	5632	5631	5630	5629
51	5629	5628	5627	5626	5626	5625	5624	5624	5623	5622
52	5621	5621	5620	5619	5618	5618	5617	5616	5615	5615
53	5614	5613	5613	5612	5611	5610	5610	5609	5608	5607
54	5607	5606	5605	5604	5604	5603	5602	5602	5601	5600
55	5599	5599	5598	5597	5596	5596	5595	5594	5594	5593
56	5592	5591	5591	5590	5589	5588	5588	5587	5586	5586
57	5585	5584	5583	5583	5582	5581	5580	5580	5579	5578
58	5578	5577	5576	5575	5575	5574	5573	5572	5572	5571
59	5570	5570	5569	5568	5567	5567	5566	5565	5564	5564

## AUXILIARY LOGARITHM

30'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	5563	5562	5562	5561	5560	5559	5559	5558	5557	5557
1	5556	5555	5554	5554	5553	5552	5551	5551	5550	5549
2	5549	5548	5547	5546	5546	5545	5544	5544	5543	5542
3	5541	5541	5540	5539	5538	5538	5537	5536	5536	5535
4	5534	5533	5533	5532	5531	5531	5530	5529	5528	5528
5	5527	5526	5526	5525	5524	5523	5523	5522	5521	5521
6	5520	5519	5518	5518	5517	5516	5516	5515	5514	5513
7	5513	5512	5511	5511	5510	5509	5508	5508	5507	5506
8	5506	5505	5504	5503	5503	5502	5501	5501	5500	5499
9	5498	5498	5497	5496	5496	5495	5494	5493	5493	5492
10	5491	5491	5490	5489	5488	5488	5487	5486	5486	5485
11	5484	5483	5483	5482	5481	5481	5480	5479	5478	5478
12	5477	5476	5476	5475	5474	5473	5473	5472	5471	5471
13	5470	5469	5469	5468	5467	5466	5466	5465	5464	5464
14	5463	5462	5461	5461	5460	5459	5459	5458	5457	5456
15	5456	5455	5454	5454	5453	5452	5452	5451	5450	5449
16	5449	5448	5447	5447	5446	5445	5445	5444	5443	5442
17	5442	5441	5440	5440	5439	5438	5437	5437	5436	5435
18	5435	5434	5433	5433	5432	5431	5430	5430	5429	5428
19	5428	5427	5426	5426	5425	5424	5423	5423	5422	5421
20	5421	5420	5419	5419	5418	5417	5416	5416	5415	5414
21	5414	5413	5412	5412	5411	5410	5409	5409	5408	5407
22	5407	5406	5405	5405	5404	5403	5402	5402	5401	5400
23	5400	5399	5398	5398	5397	5396	5395	5395	5394	5393
24	5393	5392	5391	5391	5390	5389	5389	5388	5387	5386
25	5386	5385	5384	5384	5383	5382	5382	5381	5380	5379
26	5379	5378	5377	5377	5376	5375	5375	5374	5373	5373
27	5372	5371	5370	5370	5369	5368	5368	5367	5366	5366
28	5365	5364	5364	5363	5362	5361	5361	5360	5359	5359
29	5358	5357	5357	5356	5355	5355	5354	5353	5353	5352
30	5351	5350	5350	5349	5348	5348	5347	5346	5346	5345
31	5344	5344	5343	5342	5341	5341	5340	5339	5339	5338
32	5337	5337	5336	5335	5335	5334	5333	5333	5332	5331
33	5331	5330	5329	5328	5328	5327	5326	5326	5325	5324
34	5324	5323	5322	5322	5321	5320	5320	5319	5318	5317
35	5317	5316	5315	5315	5314	5313	5313	5312	5311	5311
36	5310	5309	5309	5308	5307	5307	5306	5305	5305	5304
37	5303	5302	5302	5301	5300	5300	5299	5298	5298	5297
38	5296	5296	5295	5294	5294	5293	5292	5292	5291	5290
39	5290	5289	5288	5287	5287	5286	5285	5285	5284	5283
40	5283	5282	5281	5281	5280	5279	5279	5278	5277	5277
41	5276	5275	5275	5274	5273	5273	5272	5271	5271	5270
42	5269	5269	5268	5267	5266	5266	5265	5264	5264	5263
43	5262	5262	5261	5260	5260	5259	5258	5258	5257	5256
44	5256	5255	5254	5254	5253	5252	5252	5251	5250	5250
45	5249	5248	5248	5247	5246	5246	5245	5244	5244	5243
46	5242	5242	5241	5240	5240	5239	5238	5238	5237	5236
47	5235	5235	5234	5233	5233	5232	5231	5231	5230	5229
48	5229	5228	5227	5227	5226	5225	5225	5224	5223	5223
49	5222	5221	5221	5220	5219	5219	5218	5217	5217	5216
50	5215	5215	5214	5213	5213	5212	5211	5211	5210	5209
51	5209	5208	5207	5207	5206	5205	5205	5204	5203	5203
52	5202	5201	5201	5200	5199	5199	5198	5197	5197	5196
53	5195	5195	5194	5193	5193	5192	5191	5191	5190	5189
54	5189	5188	5187	5187	5186	5185	5185	5184	5183	5183
55	5182	5181	5181	5180	5179	5179	5178	5177	5177	5176
56	5175	5175	5174	5174	5173	5172	5172	5171	5170	5170
57	5169	5168	5168	5167	5166	5166	5165	5164	5164	5163
58	5162	5162	5161	5160	5160	5159	5158	5158	5157	5156
59	5156	5155	5154	5154	5153	5152	5152	5151	5150	5150

Table IV  
AUXILIARY LOGARITHM

31'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	5149	5148	5148	5147	5146	5146	5145	5144	5144	5143
1	5143	5142	5141	5141	5140	5139	5139	5138	5137	5137
2	5136	5135	5135	5134	5133	5133	5132	5131	5131	5130
3	5129	5129	5128	5127	5127	5126	5125	5125	5124	5124
4	5123	5122	5122	5121	5120	5120	5119	5118	5118	5117
5	5116	5116	5115	5114	5114	5113	5112	5112	5111	5110
6	5110	5109	5108	5108	5107	5107	5106	5105	5105	5104
7	5103	5103	5102	5101	5101	5100	5099	5099	5098	5097
8	5097	5096	5095	5095	5094	5094	5093	5092	5092	5091
9	5090	5090	5089	5088	5088	5087	5086	5086	5085	5084
10	5084	5083	5082	5082	5081	5081	5080	5079	5079	5078
11	5077	5077	5076	5075	5075	5074	5073	5073	5072	5071
12	5071	5070	5070	5069	5068	5068	5067	5066	5066	5065
13	5064	5064	5063	5062	5062	5061	5061	5060	5059	5059
14	5058	5057	5057	5056	5055	5055	5054	5053	5053	5052
15	5051	5051	5050	5050	5049	5048	5048	5047	5046	5046
16	5045	5044	5044	5043	5043	5042	5041	5041	5040	5039
17	5039	5038	5037	5037	5036	5035	5035	5034	5034	5033
18	5032	5032	5031	5030	5030	5029	5028	5028	5027	5026
19	5026	5025	5025	5024	5023	5023	5022	5021	5021	5020
20	5019	5019	5018	5018	5017	5016	5016	5015	5014	5014
21	5013	5012	5012	5011	5011	5010	5009	5009	5008	5007
22	5007	5006	5005	5005	5004	5004	5003	5002	5002	5001
23	5000	5000	4999	4998	4998	4997	4997	4996	4995	4995
24	4994	4993	4993	4992	4991	4991	4990	4990	4989	4988
25	4988	4987	4986	4986	4985	4984	4984	4983	4983	4982
26	4981	4981	4980	4979	4979	4978	4977	4977	4976	4976
27	4975	4974	4974	4973	4972	4972	4971	4971	4970	4969
28	4969	4968	4967	4967	4966	4965	4965	4964	4964	4963
29	4962	4962	4961	4960	4960	4959	4959	4958	4957	4957
30	4956	4955	4955	4954	4954	4953	4952	4952	4951	4950
31	4950	4949	4949	4948	4947	4947	4946	4945	4945	4944
32	4943	4943	4942	4942	4941	4940	4940	4939	4938	4938
33	4937	4937	4936	4935	4935	4934	4933	4933	4932	4932
34	4931	4930	4930	4929	4928	4928	4927	4927	4926	4925
35	4925	4924	4923	4923	4922	4922	4921	4920	4920	4919
36	4918	4918	4917	4917	4916	4915	4915	4914	4913	4913
37	4912	4912	4911	4910	4910	4909	4908	4908	4907	4907
38	4906	4905	4905	4904	4903	4903	4902	4902	4901	4900
39	4900	4899	4899	4898	4897	4897	4896	4895	4895	4894
40	4894	4893	4892	4892	4891	4890	4890	4889	4889	4888
41	4887	4887	4886	4885	4885	4884	4884	4883	4882	4882
42	4881	4881	4880	4879	4879	4878	4877	4877	4876	4876
43	4875	4874	4874	4873	4873	4872	4871	4871	4870	4869
44	4869	4868	4868	4867	4866	4866	4865	4864	4864	4863
45	4863	4862	4861	4861	4860	4860	4859	4858	4858	4857
46	4856	4856	4855	4855	4854	4853	4853	4852	4852	4851
47	4850	4850	4849	4849	4848	4847	4847	4846	4845	4845
48	4844	4844	4843	4842	4842	4841	4841	4840	4839	4839
49	4838	4837	4837	4836	4836	4835	4834	4834	4833	4833
50	4832	4831	4831	4830	4830	4829	4828	4828	4827	4826
51	4826	4825	4825	4824	4823	4823	4822	4822	4821	4820
52	4820	4819	4819	4818	4817	4817	4816	4815	4815	4814
53	4814	4813	4812	4812	4811	4811	4810	4809	4809	4808
54	4808	4807	4806	4806	4805	4805	4804	4803	4803	4802
55	4801	4801	4800	4800	4799	4798	4798	4797	4797	4796
56	4795	4795	4794	4794	4793	4792	4792	4791	4791	4790
57	4789	4789	4788	4788	4787	4786	4786	4785	4785	4784
58	4783	4783	4782	4781	4781	4780	4780	4779	4778	4778
59	4777	4777	4776	4775	4775	4774	4774	4773	4772	4772

## AUXILIARY LOGARITHM

32'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	4771	4771	4770	4769	4769	4768	4768	4767	4766	4766
1	4765	4765	4764	4763	4763	4762	4762	4761	4760	4760
2	4759	4759	4758	4757	4757	4756	4756	4755	4754	4754
3	4753	4753	4752	4751	4751	4750	4750	4749	4748	4748
4	4747	4747	4746	4745	4745	4744	4744	4743	4742	4742
5	4741	4741	4740	4739	4739	4738	4738	4737	4736	4736
6	4735	4735	4734	4733	4733	4732	4732	4731	4730	4730
7	4729	4729	4728	4727	4727	4726	4726	4725	4724	4724
8	4723	4723	4722	4721	4721	4720	4720	4719	4718	4718
9	4717	4717	4716	4715	4715	4714	4714	4713	4712	4712
10	4711	4711	4710	4710	4709	4708	4708	4707	4707	4706
11	4705	4705	4704	4704	4703	4702	4702	4701	4701	4700
12	4699	4699	4698	4698	4697	4696	4696	4695	4695	4694
13	4693	4693	4692	4692	4691	4691	4690	4689	4689	4688
14	4688	4687	4686	4686	4685	4685	4684	4683	4683	4682
15	4682	4681	4680	4680	4679	4679	4678	4678	4677	4676
16	4676	4675	4675	4674	4673	4673	4672	4672	4671	4670
17	4670	4669	4669	4668	4668	4667	4666	4666	4665	4665
18	4664	4663	4663	4662	4662	4661	4660	4660	4659	4659
19	4658	4658	4657	4656	4656	4655	4655	4654	4653	4653
20	4652	4652	4651	4650	4650	4649	4649	4648	4648	4647
21	4646	4646	4645	4645	4644	4643	4643	4642	4642	4641
22	4640	4640	4639	4639	4638	4638	4637	4636	4636	4635
23	4635	4634	4633	4633	4632	4632	4631	4631	4630	4629
24	4629	4628	4628	4627	4626	4626	4625	4625	4624	4624
25	4623	4622	4622	4621	4621	4620	4619	4619	4618	4618
26	4617	4617	4616	4615	4615	4614	4614	4613	4612	4612
27	4611	4611	4610	4610	4609	4608	4608	4607	4607	4606
28	4606	4605	4604	4604	4603	4603	4602	4601	4601	4600
29	4600	4599	4599	4598	4597	4597	4596	4596	4595	4595
30	4594	4593	4593	4592	4592	4591	4590	4590	4589	4589
31	4588	4588	4587	4586	4586	4585	4585	4584	4584	4583
32	4582	4582	4581	4581	4580	4579	4579	4578	4578	4577
33	4577	4576	4575	4575	4574	4574	4573	4573	4572	4571
34	4571	4570	4570	4569	4569	4568	4567	4567	4566	4566
35	4565	4564	4564	4563	4563	4562	4562	4561	4560	4560
36	4559	4559	4558	4558	4557	4556	4556	4555	4555	4554
37	4554	4553	4552	4552	4551	4551	4550	4550	4549	4548
38	4548	4547	4547	4546	4546	4545	4544	4544	4543	4543
39	4542	4542	4541	4540	4540	4539	4539	4538	4538	4537
40	4536	4536	4535	4535	4534	4534	4533	4532	4532	4531
41	4531	4530	4530	4529	4528	4528	4527	4527	4526	4526
42	4525	4524	4524	4523	4523	4522	4522	4521	4520	4520
43	4519	4519	4518	4518	4517	4516	4516	4515	4515	4514
44	4514	4513	4512	4512	4511	4511	4510	4510	4509	4508
45	4508	4507	4507	4506	4506	4505	4505	4504	4503	4503
46	4502	4502	4501	4501	4500	4499	4499	4498	4498	4497
47	4497	4496	4495	4495	4494	4494	4493	4493	4492	4491
48	4491	4490	4490	4489	4489	4488	4488	4487	4486	4486
49	4485	4485	4484	4484	4483	4482	4482	4481	4481	4480
50	4480	4479	4479	4478	4477	4477	4476	4476	4475	4475
51	4474	4473	4473	4472	4472	4471	4471	4470	4469	4469
52	4468	4468	4467	4467	4466	4466	4465	4464	4464	4463
53	4463	4462	4462	4461	4460	4460	4459	4459	4458	4458
54	4457	4457	4456	4455	4455	4454	4454	4453	4453	4452
55	4452	4451	4450	4450	4449	4449	4448	4448	4447	4446
56	4446	4445	4445	4444	4444	4443	4443	4442	4441	4441
57	4440	4440	4439	4439	4438	4438	4437	4436	4436	4435
58	4435	4434	4434	4433	4433	4432	4431	4431	4430	4430
59	4429	4429	4428	4427	4427	4426	4426	4425	4425	4424

Table IV  
AUXILIARY LOGARITHM

33'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	4424	4423	4422	4422	4421	4421	4420	4420	4419	4419
1	4418	4417	4417	4416	4416	4415	4415	4414	4414	4413
2	4412	4412	4411	4411	4410	4410	4409	4409	4408	4407
3	4407	4406	4406	4405	4405	4404	4404	4403	4402	4402
4	4401	4401	4400	4400	4399	4399	4398	4398	4397	4396
5	4396	4395	4395	4394	4394	4393	4393	4392	4391	4391
6	4390	4390	4389	4389	4388	4388	4387	4386	4386	4385
7	4385	4384	4384	4383	4383	4382	4381	4381	4380	4380
8	4379	4379	4378	4378	4377	4377	4376	4375	4375	4374
9	4374	4373	4373	4372	4372	4371	4370	4370	4369	4369
10	4368	4368	4367	4367	4366	4366	4365	4364	4364	4363
11	4363	4362	4362	4361	4361	4360	4359	4359	4358	4358
12	4357	4357	4356	4356	4355	4355	4354	4353	4353	4352
13	4352	4351	4351	4350	4350	4349	4349	4348	4347	4347
14	4346	4346	4345	4345	4344	4344	4343	4343	4342	4341
15	4341	4340	4340	4339	4339	4338	4338	4337	4336	4336
16	4335	4335	4334	4334	4333	4333	4332	4332	4331	4330
17	4330	4329	4329	4328	4328	4327	4327	4326	4326	4325
18	4325	4324	4323	4323	4322	4322	4321	4321	4320	4320
19	4319	4319	4318	4317	4317	4316	4316	4315	4315	4314
20	4314	4313	4313	4312	4311	4311	4310	4310	4309	4309
21	4308	4308	4307	4307	4306	4306	4305	4304	4304	4303
22	4303	4302	4302	4301	4301	4300	4300	4299	4298	4298
23	4297	4297	4296	4296	4295	4295	4294	4294	4293	4293
24	4292	4291	4291	4290	4290	4289	4289	4288	4288	4287
25	4287	4286	4285	4285	4284	4284	4283	4283	4282	4282
26	4281	4281	4280	4280	4279	4278	4278	4277	4277	4276
27	4276	4275	4275	4274	4274	4273	4273	4272	4271	4271
28	4270	4270	4269	4269	4268	4268	4267	4267	4266	4266
29	4265	4265	4264	4263	4263	4262	4262	4261	4261	4260
30	4260	4259	4259	4258	4258	4257	4256	4256	4255	4255
31	4254	4254	4253	4253	4252	4252	4251	4251	4250	4250
32	4249	4248	4248	4247	4247	4246	4246	4245	4245	4244
33	4244	4243	4243	4242	4241	4241	4240	4240	4239	4239
34	4238	4238	4237	4237	4236	4236	4235	4235	4234	4233
35	4233	4232	4232	4231	4231	4230	4230	4229	4229	4228
36	4228	4227	4227	4226	4226	4225	4224	4224	4223	4223
37	4222	4222	4221	4221	4220	4220	4219	4219	4218	4218
38	4217	4216	4216	4215	4215	4214	4214	4213	4213	4212
39	4212	4211	4211	4210	4210	4209	4209	4208	4207	4207
40	4206	4206	4205	4205	4204	4204	4203	4203	4202	4202
41	4201	4201	4200	4200	4199	4198	4198	4197	4197	4196
42	4196	4195	4195	4194	4194	4193	4193	4192	4192	4191
43	4191	4190	4189	4189	4188	4188	4187	4187	4186	4186
44	4185	4185	4184	4184	4183	4183	4182	4182	4181	4181
45	4180	4179	4179	4178	4178	4177	4177	4176	4176	4175
46	4175	4174	4174	4173	4173	4172	4172	4171	4171	4170
47	4169	4169	4168	4168	4167	4167	4166	4166	4165	4165
48	4164	4164	4163	4163	4162	4162	4161	4161	4160	4160
49	4159	4158	4158	4157	4157	4156	4156	4155	4155	4154
50	4154	4153	4153	4152	4152	4151	4151	4150	4150	4149
51	4149	4148	4147	4147	4146	4146	4145	4145	4144	4144
52	4143	4143	4142	4142	4141	4141	4140	4140	4139	4139
53	4138	4138	4137	4137	4136	4135	4135	4134	4134	4133
54	4133	4132	4132	4131	4131	4130	4130	4129	4129	4128
55	4128	4127	4127	4126	4126	4125	4125	4124	4124	4123
56	4122	4122	4121	4121	4120	4120	4119	4119	4118	4118
57	4117	4117	4116	4116	4115	4115	4114	4114	4113	4113
58	4112	4112	4111	4111	4110	4110	4109	4108	4108	4107
59	4107	4106	4106	4105	4105	4104	4104	4103	4103	4102

## AUXILIARY LOGARITHM

34'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	4102	4101	4101	4100	4100	4099	4099	4098	4098	4097
1	4097	4096	4096	4095	4095	4094	4093	4093	4092	4092
2	4091	4091	4090	4090	4089	4089	4088	4088	4087	4087
3	4086	4086	4085	4085	4084	4084	4083	4083	4082	4082
4	4081	4081	4080	4080	4079	4079	4078	4078	4077	4076
5	4076	4075	4075	4074	4074	4073	4073	4072	4072	4071
6	4071	4070	4070	4069	4069	4068	4068	4067	4067	4066
7	4066	4065	4065	4064	4064	4063	4063	4062	4062	4061
8	4061	4060	4060	4059	4059	4058	4058	4057	4056	4056
9	4055	4055	4054	4054	4053	4053	4052	4052	4051	4051
10	4050	4050	4049	4049	4048	4048	4047	4047	4046	4046
11	4045	4045	4044	4044	4043	4043	4042	4042	4041	4041
12	4040	4040	4039	4039	4038	4038	4037	4037	4036	4036
13	4035	4035	4034	4034	4033	4033	4032	4031	4031	4030
14	4030	4029	4029	4028	4028	4027	4027	4026	4026	4025
15	4025	4024	4024	4023	4023	4022	4022	4021	4021	4020
16	4020	4019	4019	4018	4018	4017	4017	4016	4016	4015
17	4015	4014	4014	4013	4013	4012	4012	4011	4011	4010
18	4010	4009	4009	4008	4008	4007	4007	4006	4006	4005
19	4005	4004	4004	4003	4003	4002	4002	4001	4001	4000
20	4000	3999	3999	3998	3998	3997	3997	3996	3996	3995
21	3995	3994	3993	3993	3992	3992	3991	3991	3990	3990
22	3989	3989	3988	3988	3987	3987	3986	3986	3985	3985
23	3984	3984	3983	3983	3982	3982	3981	3981	3980	3980
24	3979	3979	3978	3978	3977	3977	3976	3976	3975	3975
25	3974	3974	3973	3973	3972	3972	3971	3971	3970	3970
26	3969	3969	3968	3968	3967	3967	3966	3966	3965	3965
27	3964	3964	3963	3963	3962	3962	3961	3961	3960	3960
28	3959	3959	3958	3958	3957	3957	3956	3956	3955	3955
29	3954	3954	3953	3953	3952	3952	3951	3951	3950	3950
30	3949	3949	3948	3948	3947	3947	3946	3946	3945	3945
31	3944	3944	3943	3943	3942	3942	3941	3941	3940	3940
32	3939	3939	3938	3938	3937	3937	3936	3936	3935	3935
33	3934	3934	3933	3933	3932	3932	3931	3931	3930	3930
34	3929	3929	3928	3928	3927	3927	3926	3926	3925	3925
35	3924	3924	3923	3923	3922	3922	3921	3921	3920	3920
36	3919	3919	3919	3918	3918	3917	3917	3916	3916	3915
37	3915	3914	3914	3913	3913	3912	3912	3911	3911	3910
38	3910	3909	3909	3908	3908	3907	3907	3906	3906	3905
39	3905	3904	3904	3903	3903	3902	3902	3901	3901	3900
40	3900	3899	3899	3898	3898	3897	3897	3896	3896	3895
41	3895	3894	3894	3893	3893	3892	3892	3891	3891	3890
42	3890	3889	3889	3888	3888	3887	3887	3886	3886	3885
43	3885	3884	3884	3883	3883	3882	3882	3881	3881	3881
44	3880	3880	3879	3879	3878	3878	3877	3877	3876	3876
45	3875	3875	3874	3874	3873	3873	3872	3872	3871	3871
46	3870	3870	3869	3869	3868	3868	3867	3867	3866	3866
47	3865	3865	3864	3864	3863	3863	3862	3862	3861	3861
48	3860	3860	3859	3859	3858	3858	3857	3857	3856	3856
49	3856	3855	3855	3854	3854	3853	3853	3852	3852	3851
50	3851	3850	3850	3849	3849	3848	3848	3847	3847	3846
51	3846	3845	3845	3844	3844	3843	3843	3842	3842	3841
52	3841	3840	3840	3839	3839	3838	3838	3837	3837	3837
53	3836	3836	3835	3835	3834	3834	3833	3833	3832	3832
54	3831	3831	3830	3830	3829	3829	3828	3828	3827	3827
55	3826	3826	3825	3825	3824	3824	3823	3823	3822	3822
56	3821	3821	3820	3820	3820	3819	3819	3818	3818	3817
57	3817	3816	3816	3815	3815	3814	3814	3813	3813	3812
58	3812	3811	3811	3810	3810	3809	3809	3808	3808	3807
59	3807	3806	3806	3805	3805	3805	3804	3804	3803	3803

Table IV  
AUXILIARY LOGARITHM

35'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	3802	3802	3801	3801	3800	3800	3799	3799	3798	3798
1	3797	3797	3796	3796	3795	3795	3794	3794	3793	3793
2	3792	3792	3792	3791	3791	3790	3790	3789	3789	3788
3	3788	3787	3787	3786	3786	3785	3785	3784	3784	3783
4	3783	3782	3782	3781	3781	3780	3780	3779	3779	3779
5	3778	3778	3777	3777	3776	3776	3775	3775	3774	3774
6	3773	3773	3772	3772	3771	3771	3770	3770	3769	3769
7	3768	3768	3768	3767	3767	3766	3766	3765	3765	3764
8	3764	3763	3763	3762	3762	3761	3761	3760	3760	3759
9	3759	3758	3758	3757	3757	3756	3756	3755	3755	3755
10	3754	3754	3753	3753	3752	3752	3751	3751	3750	3750
11	3749	3749	3748	3748	3747	3747	3746	3746	3746	3745
12	3745	3744	3744	3743	3743	3742	3742	3741	3741	3740
13	3740	3739	3739	3738	3738	3737	3737	3737	3736	3736
14	3735	3735	3734	3734	3733	3733	3732	3732	3731	3731
15	3730	3730	3729	3729	3728	3728	3727	3727	3727	3726
16	3726	3725	3725	3724	3724	3723	3723	3722	3722	3721
17	3721	3720	3720	3719	3719	3718	3718	3718	3717	3717
18	3716	3716	3715	3715	3714	3714	3713	3713	3712	3712
19	3711	3711	3710	3710	3709	3709	3709	3708	3708	3707
20	3707	3706	3706	3705	3705	3704	3704	3703	3703	3702
21	3702	3701	3701	3701	3700	3700	3699	3699	3698	3698
22	3697	3697	3696	3696	3695	3695	3694	3694	3693	3693
23	3693	3692	3692	3691	3691	3690	3690	3689	3689	3688
24	3688	3687	3687	3686	3686	3685	3685	3685	3684	3684
25	3683	3683	3682	3682	3681	3681	3680	3680	3679	3679
26	3678	3678	3677	3677	3677	3676	3676	3675	3675	3674
27	3674	3673	3673	3672	3672	3671	3671	3670	3670	3670
28	3669	3669	3668	3668	3667	3667	3666	3666	3665	3665
29	3664	3664	3663	3663	3663	3662	3662	3661	3661	3660
30	3660	3659	3659	3658	3658	3657	3657	3656	3656	3656
31	3655	3655	3654	3654	3653	3653	3652	3652	3651	3651
32	3650	3650	3649	3649	3649	3648	3648	3647	3647	3646
33	3646	3645	3645	3644	3644	3643	3643	3642	3642	3642
34	3641	3641	3640	3640	3639	3639	3638	3638	3637	3637
35	3636	3636	3635	3635	3635	3634	3634	3633	3633	3632
36	3632	3631	3631	3630	3630	3629	3629	3629	3628	3628
37	3627	3627	3626	3626	3625	3625	3624	3624	3623	3623
38	3623	3622	3622	3621	3621	3620	3620	3619	3619	3618
39	3618	3617	3617	3616	3616	3616	3615	3615	3614	3614
40	3613	3613	3612	3612	3611	3611	3610	3610	3610	3609
41	3609	3608	3608	3607	3607	3606	3606	3605	3605	3604
42	3604	3604	3603	3603	3602	3602	3601	3601	3600	3600
43	3599	3599	3598	3598	3598	3597	3597	3596	3596	3595
44	3595	3594	3594	3593	3593	3593	3592	3592	3591	3591
45	3590	3590	3589	3589	3588	3588	3587	3587	3587	3586
46	3586	3585	3585	3584	3584	3583	3583	3582	3582	3581
47	3581	3581	3580	3580	3579	3579	3578	3578	3577	3577
48	3576	3576	3576	3575	3575	3574	3574	3573	3573	3572
49	3572	3571	3571	3571	3570	3570	3569	3569	3568	3568
50	3567	3567	3566	3566	3565	3565	3565	3564	3564	3563
51	3563	3562	3562	3561	3561	3560	3560	3560	3559	3559
52	3558	3558	3557	3557	3556	3556	3555	3555	3555	3554
53	3554	3553	3553	3552	3552	3551	3551	3550	3550	3550
54	3549	3549	3548	3548	3547	3547	3546	3546	3545	3545
55	3545	3544	3544	3543	3543	3542	3542	3541	3541	3540
56	3540	3540	3539	3539	3538	3538	3537	3537	3536	3536
57	3535	3535	3535	3534	3534	3533	3533	3532	3532	3531
58	3531	3530	3530	3530	3529	3529	3528	3528	3527	3527
59	3526	3526	3525	3525	3525	3524	3524	3523	3523	3522



## AUXILIARY LOGARITHM

36'

Sc	.0"	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"
0	3522	3521	3521	3520	3520	3520	3519	3519	3518	3518
1	3517	3517	3516	3516	3515	3515	3515	3514	3514	3513
2	3513	3512	3512	3511	3511	3511	3510	3510	3509	3509
3	3508	3508	3507	3507	3506	3506	3506	3505	3505	3504
4	3504	3503	3503	3502	3502	3502	3501	3501	3500	3500
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7	3490	3490	3489	3489	3488	3488	3488	3487	3487	3486
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9	3481	3481	3480	3480	3480	3479	3479	3478	3478	3477
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15	3454	3454	3454	3453	3453	3452	3452	3451	3451	3450
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17	3446	3445	3445	3444	3444	3443	3443	3442	3442	3442
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22	3423	3423	3423	3422	3422	3421	3421	3420	3420	3419
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25	3410	3410	3409	3409	3408	3408	3408	3407	3407	3406
26	3406	3405	3405	3404	3404	3404	3403	3403	3402	3402
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42	3336	3335	3335	3335	3334	3334	3333	3333	3332	3332
43	3332	3331	3331	3330	3330	3329	3329	3328	3328	3328
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46	3319	3318	3318	3317	3317	3316	3316	3316	3315	3315
47	3314	3314	3313	3313	3313	3312	3312	3311	3311	3310
48	3310	3310	3309	3309	3308	3308	3307	3307	3306	3306
49	3306	3305	3305	3304	3304	3303	3303	3303	3302	3302
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56	3276	3275	3275	3274	3274	3273	3273	3273	3272	3272
57	3271	3271	3270	3270	3270	3269	3269	3268	3268	3267
58	3267	3267	3266	3266	3265	3265	3265	3264	3264	3263
59	3263	3262	3262	3262	3261	3261	3260	3260	3259	3259

Table V  
LOCAL HOUR ANGLE

Mn	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°
0	9-0000	5-1516	4-5497	4-1976	3-9478	3-7541	3-5958	3-4621	3-3463	3-2441	3-1528	3-0703	2-9950	2-9257	2-8616
1	8-7080	1374	5425	1928	9442	7512	5934	4600	3444	2425	1514	0689	9938	9246	8606
2	1059	1233	5354	1880	9406	7483	5910	4580	3426	2409	1499	0677	9926	9235	8596
3	7-7538	1093	5283	1832	9370	7454	5886	4559	3409	2393	1485	0664	9914	9224	8586
4	5039	0956	5212	1785	9334	7426	5862	4539	3391	2377	1471	0649	9902	9213	8575
5	7-3101	5-0822	4-5143	4-1737	3-9299	3-7397	3-5839	3-4518	3-3373	3-2360	3-1455	3-0637	2-9890	2-9202	2-8565
6	1516	0689	5072	1691	9263	7369	5815	4498	3355	2346	1442	0624	9878	9191	8555
7	0178	0559	5005	1645	9228	7340	5791	4477	3337	2330	1428	0611	9866	9180	8545
8	6-9019	0430	4937	1598	9193	7312	5768	4457	3319	2314	1413	0598	9854	9169	8534
9	7995	0303	4869	1551	9158	7284	5744	4437	3301	2298	1399	0586	9842	9158	8524
10	6-7080	5-0179	4-4802	4-1505	3-9123	3-7256	3-5720	3-4417	3-3284	3-2282	3-1385	3-0573	2-9830	2-9147	2-8514
11	6252	0055	4735	1461	9089	7228	5697	4396	3266	2267	1371	0560	9818	9136	8504
12	5497	4-9934	4668	1415	9054	7200	5674	4376	3248	2251	1356	0546	9807	9125	8494
13	4801	9813	4603	1370	9020	7172	5650	4356	3231	2235	1343	0534	9795	9114	8484
14	4157	9695	4539	1325	8986	7145	5627	4336	3213	2219	1328	0521	9783	9103	8474
15	6-3558	4-9579	4-4474	4-1280	3-8952	3-7117	3-5604	3-4316	3-3196	3-2204	3-1314	3-0508	2-9771	2-9092	2-8463
16	2998	9464	4409	1236	8918	7090	5581	4296	3178	2188	1300	0495	9759	9081	8453
17	2471	9351	4346	1192	8884	7062	5558	4277	3161	2173	1286	0483	9748	9071	8443
18	1975	9239	4283	1147	8850	7035	5535	4257	3143	2157	1272	0470	9736	9060	8433
19	1505	9127	4221	1104	8816	7008	5512	4237	3126	2141	1258	0457	9724	9049	8423
20	6-1059	4-9019	4-4157	4-1061	3-8783	3-6980	3-5489	3-4217	3-3109	3-2126	3-1244	3-0443	2-9712	2-9038	2-8413
21	0636	8911	4096	1017	8750	6953	5466	4197	3091	2111	1230	0432	9701	9027	8403
22	0232	8803	4035	0975	8716	6926	5444	4178	3074	2095	1215	0419	9689	9017	8393
23	5-9846	8699	3974	0932	8683	6899	5421	4157	3057	2080	1202	0405	9677	9006	8383
24	9476	8595	3913	0888	8650	6873	5398	4139	3039	2064	1189	0394	9666	8995	8373
25	5-9122	4-8492	4-3854	4-0846	3-8618	3-6846	3-5376	3-4119	3-3022	3-2049	3-1175	3-0381	2-9654	2-8984	2-8363
26	8780	8391	3794	0804	8585	6819	5353	4100	3005	2034	1161	0367	9643	8974	8353
27	8453	8290	3734	0762	8552	6793	5331	4080	2987	2019	1147	0356	9631	8963	8343
28	8136	8191	3676	0720	8520	6766	5308	4061	2971	2003	1133	0343	9619	8952	8333
29	7831	8093	3616	0678	8487	6740	5286	4042	2954	1988	1119	0330	9608	8941	8323
30	5-7538	4-7995	4-3559	4-0636	3-8455	3-6713	3-5264	3-4022	3-2937	3-1973	3-1106	3-0318	2-9596	2-8931	2-8313
31	7252	7900	3501	0596	8423	6687	5241	4003	2920	1958	1091	0304	9585	8920	8303
32	6977	7805	3444	0555	8391	6661	5219	3984	2903	1942	1078	0293	9573	8909	8293
33	6710	7711	3387	0514	8359	6635	5197	3965	2886	1927	1065	0280	9562	8899	8283
34	6451	7618	3330	0472	8328	6609	5175	3946	2869	1912	1051	0268	9550	8888	8273
35	5-6199	4-7526	4-3273	4-0433	3-8296	3-6583	3-5153	3-3926	3-2852	3-1897	3-1037	3-0255	2-9539	2-8878	2-8264
36	5954	7435	3219	0392	8264	6557	5131	3907	2835	1882	1024	0243	9527	8867	8254
37	5716	7345	3163	0353	8233	6531	5109	3888	2819	1867	1009	0231	9516	8856	8244
38	5485	7256	3108	0312	8202	6505	5088	3869	2802	1852	0996	0218	9505	8846	8234
39	5259	7168	3052	0273	8171	6480	5066	3851	2785	1836	0983	0205	9493	8835	8224
40	5-5039	4-7080	4-2999	4-0232	3-8140	3-6454	3-5044	3-3832	3-2769	3-1822	3-0969	3-0193	2-9482	2-8825	2-8214
41	4824	6993	2945	0194	8109	6429	5022	3812	2752	1807	0956	0181	9470	8814	8205
42	4615	6909	2891	0155	8078	6403	5001	3793	2735	1792	0942	0169	9459	8804	8195
43	4411	6824	2837	0116	8047	6378	4979	3774	2719	1777	0929	0156	9448	8793	8185
44	4211	6740	2784	0076	8016	6353	4958	3757	2702	1763	0915	0144	9436	8783	8175
45	5-4016	4-6657	4-2731	4-0038	3-7986	3-6328	3-4936	3-3738	3-2686	3-1748	3-0902	3-0132	2-9425	2-8772	2-8165
46	3825	6575	2679	0000	7955	6302	4915	3719	2669	1733	0887	0119	9414	8762	8156
47	3638	6493	2627	3-9961	7925	6277	4894	3701	2653	1718	0875	0106	9402	8751	8146
48	3456	6412	2575	9923	7895	6252	4872	3682	2636	1703	0862	0095	9391	8741	8136
49	3276	6332	2522	9885	7865	6228	4851	3664	2620	1689	0847	0083	9380	8730	8126
50	5-3101	4-6253	4-2472	3-9847	3-7835	3-6203	3-4830	3-3645	3-2602	3-1674	3-0835	3-0071	2-9369	2-8720	2-8117
51	2929	6173	2420	9810	7805	6178	4809	3627	2587	1659	0822	0058	9357	8709	8107
52	2760	6096	2370	9772	7775	6153	4788	3608	2571	1645	0807	0045	9346	8699	8097
53	2595	6019	2320	9735	7746	6129	4767	3590	2554	1630	0795	0034	9335	8689	8088
54	2433	5943	2270	9698	7716	6104	4746	3572	2538	1615	0782	0022	9324	8678	8078
55	5-2273	4-5867	4-2220	3-9661	3-7687	3-6080	3-4725	3-3553	3-2522	3-1601	3-0769	3-0010	2-9313	2-8668	2-8068
56	2117	5792	2171	9624	7657	6055	4704	3535	2505	1586	0755	2-9998	9302	8658	8059
57	1962	5716	2122	9587	7628	6031	4683	3517	2490	1572	0742	9986	9290	8647	8048
58	1812	5643	2073	9551	7599	6007	4662	3499	2474	1556	0729	9974	9279	8637	8039
59	1663	5570	2023	9514	7570	5982	4641	3481	2457	1543	0716	9962	9268	8627	8029

Table V

## LOCAL HOUR ANGLE

Mn	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°
0	2:8020	2:7463	2:6939	2:6448	2:5982	2:5541	2:5122	2:4721	2:4340	2:3976	2:3628	2:3292	2:2970	2:2661	2:2362
1	8010	7454	6932	6440	5975	5534	5115	4716	4335	3971	3622	3287	2965	2656	2357
2	8001	7444	6922	6432	5967	5527	5108	4709	4329	3965	3616	3282	2960	2650	2352
3	7992	7436	6915	6424	5959	5519	5101	4702	4323	3959	3610	3275	2955	2646	2347
4	7982	7427	6906	6415	5952	5512	5094	4696	4316	3953	3605	3271	2949	2640	2343
5	2:7972	2:7418	2:6898	2:6408	2:5944	2:5505	2:5087	2:4690	2:4310	2:3947	2:3599	2:3265	2:2944	2:2635	2:2338
6	7963	7409	6890	6400	5937	5498	5081	4683	4304	3940	3593	3260	2939	2629	2333
7	7953	7400	6880	6392	5929	5491	5074	4677	4298	3934	3588	3254	2934	2625	2328
8	7944	7392	6873	6384	5922	5484	5066	4670	4292	3929	3582	3248	2928	2620	2322
9	7934	7383	6864	6375	5914	5477	5060	4664	4285	3923	3576	3243	2923	2615	2318
10	2:7925	2:7374	2:6856	2:6368	2:5907	2:5468	2:5054	2:4658	2:4279	2:3917	2:3570	2:3238	2:2918	2:2610	2:2314
11	7915	7364	6848	6360	5899	5462	5047	4651	4273	3912	3565	3233	2913	2604	2309
12	7906	7356	6838	6352	5891	5455	5040	4645	4267	3906	3559	3227	2907	2600	2303
13	7896	7347	6831	6345	5884	5447	5033	4638	4260	3900	3553	3222	2902	2595	2299
14	7887	7338	6823	6337	5877	5441	5026	4632	4255	3894	3548	3216	2897	2589	2294
15	2:7878	2:7329	2:6814	2:6329	2:5870	2:5434	2:5020	2:4624	2:4249	2:3888	2:3542	2:3210	2:2892	2:2585	2:2289
16	7867	7321	6806	6321	5862	5427	5013	4619	4241	3882	3536	3205	2886	2580	2284
17	7859	7312	6798	6313	5855	5420	5005	4612	4236	3875	3530	3200	2882	2575	2280
18	7848	7303	6789	6305	5847	5413	5000	4605	4230	3870	3526	3195	2876	2570	2275
19	7840	7294	6781	6297	5840	5406	4993	4600	4224	3864	3520	3189	2871	2564	2270
20	2:7829	2:7284	2:6773	2:6290	2:5832	2:5399	2:4986	2:4593	2:4218	2:3858	2:3513	2:3184	2:2865	2:2560	2:2265
21	7821	7276	6765	6282	5825	5392	4980	4587	4212	3852	3509	3178	2861	2555	2260
22	7812	7268	6756	6274	5818	5385	4973	4580	4206	3847	3503	3172	2856	2549	2255
23	7802	7259	6748	6266	5810	5378	4965	4574	4199	3841	3496	3168	2850	2545	2251
24	7793	7250	6739	6257	5803	5371	4960	4568	4193	3835	3492	3162	2844	2540	2246
25	2:7784	2:7241	2:6731	2:6250	2:5794	2:5364	2:4953	2:4561	2:4187	2:3829	2:3486	2:3157	2:2840	2:2535	2:2240
26	7774	7233	6723	6243	5788	5357	4946	4555	4180	3824	3481	3151	2835	2530	2236
27	7765	7223	6715	6234	5781	5350	4940	4549	4175	3818	3475	3146	2829	2524	2231
28	7756	7215	6707	6227	5773	5343	4933	4542	4169	3812	3469	3141	2825	2520	2227
29	7746	7206	6699	6219	5766	5336	4925	4536	4163	3806	3464	3134	2819	2515	2221
30	2:7737	2:7198	2:6690	2:6212	2:5759	2:5329	2:4920	2:4530	2:4157	2:3799	2:3458	2:3130	2:2814	2:2509	2:2217
31	7728	7189	6682	6204	5750	5322	4913	4523	4151	3793	3452	3125	2808	2505	2212
32	7719	7180	6674	6196	5744	5315	4906	4517	4145	3789	3447	3119	2804	2500	2206
33	7709	7172	6666	6188	5737	5308	4900	4510	4138	3783	3442	3113	2799	2495	2202
34	7700	7162	6657	6181	5729	5301	4893	4504	4133	3776	3435	3107	2794	2490	2198
35	2:7691	2:7154	2:6649	2:6173	2:5722	2:5294	2:4885	2:4498	2:4127	2:3771	2:3429	2:3103	2:2787	2:2484	2:2193
36	7682	7146	6640	6165	5715	5287	4880	4492	4121	3765	3425	3098	2783	2480	2188
37	7672	7137	6633	6156	5707	5280	4873	4485	4114	3760	3419	3092	2778	2475	2183
38	7663	7128	6625	6150	5700	5273	4866	4479	4108	3753	3414	3086	2773	2469	2179
39	7654	7120	6617	6142	5693	5266	4860	4473	4102	3748	3408	3082	2768	2465	2174
40	2:7645	2:7111	2:6609	2:6133	2:5685	2:5259	2:4853	2:4466	2:4096	2:3742	2:3403	2:3076	2:2763	2:2461	2:2169
41	7636	7101	6600	6127	5678	5252	4847	4460	4090	3736	3397	3071	2758	2456	2164
42	7625	7094	6592	6119	5670	5245	4840	4454	4084	3731	3391	3066	2751	2451	2160
43	7617	7085	6584	6111	5664	5238	4833	4447	4077	3725	3386	3060	2747	2446	2155
44	7608	7077	6576	6104	5656	5231	4826	4441	4072	3719	3380	3055	2742	2441	2150
45	2:7599	2:7068	2:6568	2:6095	2:5649	2:5224	2:4820	2:4435	2:4066	2:3713	2:3374	2:3050	2:2737	2:2436	2:2145
46	7590	7059	6560	6088	5642	5218	4814	4429	4060	3708	3369	3045	2732	2431	2141
47	7581	7051	6552	6081	5634	5211	4807	4422	4054	3702	3364	3039	2726	2425	2136
48	7572	7042	6544	6072	5627	5204	4801	4416	4048	3696	3358	3033	2722	2421	2131
49	7563	7034	6536	6066	5620	5197	4794	4410	4042	3690	3353	3029	2717	2416	2126
50	2:7553	2:7025	2:6528	2:6058	2:5613	2:5190	2:4788	2:4403	2:4035	2:3685	2:3347	2:3023	2:2712	2:2411	2:2122
51	7544	7017	6520	6050	5606	5183	4781	4397	4030	3679	3342	3018	2705	2406	2117
52	7535	7008	6512	6043	5598	5176	4774	4391	4024	3673	3336	3012	2701	2401	2112
53	7526	7000	6504	6034	5590	5169	4768	4385	4018	3667	3330	3006	2696	2397	2107
54	7517	6991	6496	6027	5584	5163	4761	4378	4012	3662	3325	3002	2690	2392	2103
55	2:7507	2:6983	2:6488	2:6020	2:5577	2:5156	2:4755	2:4372	2:4006	2:3656	2:3320	2:2997	2:2686	2:2387	2:2098
56	7499	6974	6480	6012	5569	5148	4748	4366	3999	3650	3313	2991	2681	2381	2093
57	7490	6966	6472	6005	5562	5142	4742	4359	3995	3645	3309	2985	2676	2377	2088
58	7481	6957	6464	5997	5555	5135	4735	4354	3989	3639	3303	2981	2671	2372	2084
59	7472	6949	6455	5990	5548	5127	4729	4347	3983	3633	3298	2976	2665	2366	2078

Table V  
LOCAL HOUR ANGLE

Mn	30°	31°	32°	33°	34°	35°	36°	37°	38°	39°	40°	41°	42°	43°	44°
0	2:2074	2:1796	2:1527	2:1267	2:1015	2:0771	2:0535	2:0304	2:0081	1:9864	1:9653	1:9448	1:9248	1:9053	1:8863
1	2070	1792	1523	1263	1011	0767	0531	0301	0078	9861	9650	9444	9244	9050	8860
2	2065	1787	1518	1259	1007	0763	0527	0297	0074	9857	9646	9441	9241	9046	8856
3	2059	1783	1514	1255	1003	0759	0523	0293	0070	9854	9643	9438	9238	9043	8853
4	2055	1777	1510	1250	0999	0754	0519	0289	0066	9850	9639	9434	9235	9040	8850
5	2:2051	2:1774	2:1505	2:1246	2:0994	2:0750	2:0514	2:0285	2:0062	1:9847	1:9636	1:9431	1:9231	1:9037	1:8847
6	2046	1769	1501	1242	0990	0746	0510	0282	0059	9843	9632	9427	9228	9034	8844
7	2040	1764	1497	1238	0987	0743	0506	0278	0056	9839	9629	9424	9225	9030	8841
8	2037	1760	1492	1232	0983	0739	0504	0275	0052	9836	9625	9421	9221	9027	8838
9	2032	1755	1488	1229	0977	0735	0500	0270	0047	9832	9622	9417	9218	9024	8835
10	2:2027	2:1751	2:1484	2:1225	2:0973	2:0731	2:0496	2:0266	2:0045	1:9829	1:9619	1:9414	1:9215	1:9021	1:8832
11	2023	1746	1478	1221	0969	0727	0491	0262	0041	9825	9615	9411	9212	9018	8828
12	2017	1741	1474	1215	0966	0723	0487	0260	0037	9822	9612	9407	9208	9014	8825
13	2013	1737	1470	1211	0962	0719	0484	0256	0034	9818	9608	9404	9205	9011	8822
14	2009	1733	1466	1208	0958	0716	0480	0251	0030	9815	9605	9401	9202	9008	8819
15	2:2004	2:1728	2:1461	2:1204	2:0954	2:0712	2:0476	2:0247	2:0026	1:9811	1:9601	1:9397	1:9198	1:9005	1:8816
16	1998	1724	1457	1198	0950	0708	0472	0245	0022	9807	9598	9394	9195	9002	8813
17	1995	1718	1453	1194	0946	0704	0468	0241	0019	9804	9594	9391	9192	8998	8810
18	1990	1714	1449	1190	0941	0700	0464	0237	0016	9800	9591	9387	9189	8995	8807
19	1985	1710	1444	1187	0937	0695	0461	0232	0012	9797	9588	9384	9185	8992	8804
20	2:1981	2:1706	2:1440	2:1183	2:0933	2:0691	2:0457	2:0230	2:0007	1:9793	1:9584	1:9380	1:9182	1:8989	1:8800
21	1976	1701	1434	1177	0929	0687	0453	0226	0005	9790	9581	9377	9179	8986	8797
22	1971	1697	1431	1173	0925	0684	0449	0222	0001	9786	9577	9374	9176	8983	8794
23	1967	1692	1427	1170	0921	0680	0445	0218	1:9997	9783	9574	9370	9172	8979	8791
24	1962	1688	1421	1166	0916	0676	0442	0215	9994	9779	9570	9367	9169	8976	8788
25	2:1956	2:1682	2:1417	2:1161	2:0912	2:0672	2:0438	2:0211	1:9990	1:9776	1:9567	1:9364	1:9166	1:8973	1:8785
26	1953	1678	1413	1156	0908	0668	0434	0207	9987	9772	9563	9360	9163	8970	8782
27	1948	1674	1409	1152	0905	0664	0430	0203	9983	9769	9560	9357	9159	8967	8779
28	1943	1670	1405	1149	0901	0660	0426	0200	9979	9765	9557	9354	9156	8963	8776
29	1939	1665	1400	1145	0897	0655	0423	0196	9976	9762	9553	9350	9153	8960	8773
30	2:1934	2:1661	2:1396	2:1140	2:0893	2:0651	2:0419	2:0192	1:9972	1:9758	1:9550	1:9347	1:9150	1:8957	1:8770
31	1929	1655	1392	1135	0887	0647	0415	0188	9968	9755	9546	9344	9146	8954	8766
32	1924	1652	1388	1131	0884	0644	0411	0184	9965	9751	9543	9340	9143	8951	8763
33	1920	1647	1383	1128	0880	0640	0407	0181	9961	9747	9540	9337	9140	8948	8760
34	1916	1642	1379	1124	0876	0636	0403	0177	9958	9744	9536	9334	9137	8944	8757
35	2:1911	2:1638	2:1375	2:1120	2:0872	2:0632	2:0400	2:0174	1:9954	1:9740	1:9533	1:9330	1:9133	1:8941	1:8754
36	1906	1634	1370	1114	0868	0628	0396	0169	9950	9737	9529	9327	9130	8938	8751
37	1901	1629	1366	1110	0864	0625	0392	0165	9947	9733	9526	9324	9127	8935	8748
38	1897	1625	1362	1107	0860	0621	0388	0163	9943	9730	9522	9320	9124	8932	8745
39	1892	1621	1356	1103	0855	0617	0384	0159	9940	9726	9519	9317	9120	8929	8742
40	2:1888	2:1615	2:1352	2:1099	2:0851	2:0613	2:0381	2:0155	1:9936	1:9723	1:9516	1:9314	1:9117	1:8926	1:8739
41	1882	1612	1349	1093	0847	0609	0377	0150	9932	9719	9512	9310	9114	8922	8736
42	1878	1607	1345	1089	0844	0605	0373	0148	9929	9716	9509	9307	9111	8919	8733
43	1874	1602	1339	1086	0840	0601	0369	0144	9925	9712	9505	9304	9107	8916	8729
44	1869	1598	1335	1082	0836	0597	0365	0140	9922	9709	9502	9300	9104	8913	8726
45	2:1865	2:1594	2:1331	2:1078	2:0832	2:0592	2:0362	2:0137	1:9918	1:9705	1:9499	1:9297	1:9101	1:8910	1:8723
46	1859	1589	1327	1074	0828	0588	0358	0133	9914	9702	9495	9294	9098	8907	8720
47	1855	1585	1323	1069	0824	0585	0354	0129	9911	9698	9492	9291	9095	8903	8717
48	1851	1581	1318	1065	0820	0581	0350	0125	9907	9695	9488	9287	9091	8900	8714
49	1847	1575	1314	1061	0815	0577	0346	0121	9904	9691	9485	9284	9088	8897	8711
50	2:1842	2:1572	2:1310	2:1057	2:0811	2:0573	2:0343	2:0118	1:9900	1:9688	1:9482	1:9281	1:9085	1:8894	1:8708
51	1836	1567	1306	1053	0807	0569	0339	0114	9897	9685	9478	9277	9082	8891	8705
52	1833	1562	1302	1049	0804	0565	0335	0110	9893	9681	9475	9274	9078	8888	8702
53	1828	1558	1297	1045	0799	0562	0331	0106	9889	9678	9471	9271	9075	8885	8699
54	1823	1554	1293	1040	0794	0558	0327	0102	9886	9674	9468	9267	9072	8882	8696
55	2:1819	2:1550	2:1289	2:1036	2:0790	2:0554	2:0323	2:0100	1:9882	1:9671	1:9465	1:9264	1:9069	1:8878	1:8693
56	1815	1545	1284	1032	0786	0550	0320	0096	9879	9667	9461	9261	9066	8875	8690
57	1810	1541	1280	1028	0783	0546	0316	0091	9875	9664	9458	9258	9062	8872	8687
58	1804	1535	1276	1024	0779	0542	0312	0089	9871	9660	9454	9254	9059	8869	8684
59	1800	1532	1272	1020	0775	0538	0308	0085	9868	9657	9451	9251	9056	8866	8680

Table V

## LOCAL HOUR ANGLE

Mn	45°	46°	47°	48°	49°	50°	51°	52°	53°	54°	55°	56°	57°	58°	59°
0	1·8677	1·8497	1·8320	1·8148	1·7980	1·7815	1·7655	1·7497	1·7344	1·7193	1·7046	1·6902	1·6761	1·6623	1·6487
1	8674	8494	8317	8145	7977	7813	7652	7495	7341	7191	7044	6900	6759	6621	6485
2	8671	8491	8314	8142	7974	7810	7649	7492	7339	7188	7041	6897	6756	6618	6483
3	8668	8488	8312	8139	7971	7807	7647	7490	7336	7186	7039	6895	6754	6616	6481
4	8665	8485	8309	8137	7969	7804	7644	7487	7334	7183	7036	6893	6752	6614	6479
5	1·8662	1·8482	1·8306	1·8134	1·7966	1·7802	1·7641	1·7484	1·7331	1·7181	1·7034	1·6890	1·6749	1·6611	1·6476
6	8659	8479	8303	8131	7963	7799	7639	7482	7329	7178	7032	6888	6747	6609	6474
7	8656	8476	8300	8128	7960	7796	7636	7479	7326	7176	7029	6885	6745	6607	6472
8	8653	8473	8297	8125	7958	7794	7633	7477	7323	7173	7027	6883	6742	6605	6470
9	8650	8470	8294	8122	7955	7791	7631	7474	7321	7171	7024	6881	6740	6602	6467
10	1·8647	1·8467	1·8291	1·8120	1·7952	1·7788	1·7628	1·7472	1·7318	1·7169	1·7022	1·6878	1·6738	1·6600	1·6465
11	8644	8464	8288	8117	7949	7786	7625	7469	7316	7166	7019	6876	6735	6598	6463
12	8641	8461	8285	8114	7947	7783	7623	7466	7313	7164	7017	6874	6733	6596	6461
13	8638	8458	8283	8111	7944	7780	7620	7464	7311	7161	7015	6871	6731	6593	6458
14	8635	8455	8280	8108	7941	7777	7618	7461	7308	7159	7012	6869	6728	6591	6456
15	1·8632	1·8452	1·8277	1·8106	1·7938	1·7775	1·7615	1·7459	1·7306	1·7156	1·7010	1·6867	1·6726	1·6589	1·6454
16	8629	8449	8274	8103	7935	7772	7612	7456	7303	7154	7007	6864	6724	6586	6452
17	8626	8446	8271	8100	7933	7769	7610	7454	7301	7151	7005	6862	6722	6584	6450
18	8623	8443	8268	8097	7930	7767	7607	7451	7298	7149	7003	6859	6719	6582	6447
19	8620	8440	8265	8094	7927	7764	7604	7448	7296	7146	7000	6857	6717	6580	6445
20	1·8617	1·8437	1·8262	1·8091	1·7924	1·7761	1·7602	1·7446	1·7293	1·7144	1·6998	1·6855	1·6715	1·6577	1·6443
21	8614	8434	8259	8089	7922	7759	7599	7443	7291	7141	6995	6852	6712	6575	6441
22	8611	8431	8257	8086	7919	7756	7597	7441	7288	7139	6993	6850	6710	6573	6439
23	8608	8429	8254	8083	7916	7753	7594	7438	7286	7137	6991	6848	6708	6571	6436
24	8605	8426	8251	8080	7913	7751	7591	7436	7283	7134	6988	6845	6705	6568	6434
25	1·8602	1·8423	1·8248	1·8077	1·7911	1·7748	1·7589	1·7433	1·7281	1·7132	1·6986	1·6843	1·6703	1·6566	1·6432
26	8599	8420	8245	8075	7908	7745	7586	7430	7278	7129	6983	6841	6701	6564	6430
27	8596	8417	8242	8072	7905	7742	7583	7428	7276	7127	6981	6838	6698	6562	6427
28	8593	8414	8239	8069	7902	7740	7581	7425	7273	7124	6979	6836	6696	6559	6425
29	8590	8411	8236	8066	7900	7737	7578	7423	7271	7122	6976	6833	6694	6557	6423
30	1·8587	1·8408	1·8234	1·8063	1·7897	1·7734	1·7576	1·7420	1·7268	1·7119	1·6974	1·6831	1·6692	1·6555	1·6421
31	8583	8405	8231	8061	7894	7732	7573	7418	7266	7117	6971	6829	6689	6553	6419
32	8580	8402	8228	8058	7892	7729	7570	7415	7263	7114	6969	6826	6687	6550	6416
33	8577	8399	8225	8055	7889	7726	7568	7412	7261	7112	6967	6824	6685	6548	6414
34	8574	8396	8222	8052	7886	7724	7565	7410	7258	7110	6964	6822	6682	6546	6412
35	1·8571	1·8393	1·8219	1·8049	1·7883	1·7721	1·7562	1·7407	1·7256	1·7107	1·6962	1·6819	1·6680	1·6544	1·6410
36	8568	8390	8216	8047	7881	7718	7560	7405	7253	7105	6959	6817	6678	6541	6408
37	8565	8387	8214	8044	7878	7716	7557	7402	7251	7102	6957	6815	6676	6539	6405
38	8562	8384	8211	8041	7875	7713	7555	7400	7248	7100	6955	6812	6673	6537	6403
39	8559	8382	8208	8038	7872	7710	7552	7397	7246	7097	6952	6810	6671	6535	6401
40	1·8556	1·8379	1·8205	1·8035	1·7870	1·7708	1·7549	1·7395	1·7243	1·7095	1·6950	1·6808	1·6669	1·6532	1·6399
41	8553	8376	8202	8033	7867	7705	7547	7392	7241	7092	6947	6805	6666	6530	6397
42	8550	8373	8199	8030	7864	7702	7544	7389	7238	7090	6945	6803	6664	6528	6394
43	8547	8370	8196	8027	7861	7700	7542	7387	7236	7088	6943	6801	6662	6526	6392
44	8544	8367	8194	8024	7859	7697	7539	7384	7233	7085	6940	6798	6659	6523	6390
45	1·8541	1·8364	1·8191	1·8021	1·7856	1·7694	1·7536	1·7382	1·7231	1·7083	1·6938	1·6796	1·6657	1·6521	1·6388
46	8538	8361	8188	8019	7853	7692	7534	7379	7228	7080	6935	6794	6655	6519	6386
47	8535	8358	8185	8016	7851	7689	7531	7377	7226	7078	6933	6791	6653	6517	6383
48	8532	8355	8182	8013	7848	7686	7529	7374	7223	7075	6931	6789	6650	6514	6381
49	8529	8352	8179	8010	7845	7684	7526	7372	7221	7073	6928	6787	6648	6512	6379
50	1·8526	1·8349	1·8176	1·8007	1·7842	1·7681	1·7523	1·7369	1·7218	1·7070	1·6926	1·6784	1·6646	1·6510	1·6377
51	8524	8346	8174	8005	7840	7678	7521	7367	7216	7068	6923	6782	6643	6508	6375
52	8521	8344	8171	8002	7837	7676	7518	7364	7213	7066	6921	6780	6641	6505	6372
53	8518	8341	8168	7999	7834	7673	7516	7361	7211	7063	6919	6777	6639	6503	6370
54	8515	8338	8165	7996	7832	7670	7513	7359	7208	7061	6916	6775	6637	6501	6368
55	1·8512	1·8335	1·8162	1·7994	1·7829	1·7668	1·7510	1·7356	1·7206	1·7058	1·6914	1·6773	1·6634	1·6499	1·6366
56	8509	8332	8159	7991	7826	7665	7508	7354	7203	7056	6912	6770	6632	6496	6364
57	8506	8329	8156	7988	7823	7663	7505	7351	7201	7053	6909	6768	6630	6494	6361
58	8503	8326	8154	7985	7821	7660	7503	7349	7198	7051	6907	6766	6627	6492	6359
59	8500	8323	8151	7982	7818	7657	7500	7346	7196	7049	6904	6763	6625	6490	6357

Table V  
LOCAL HOUR ANGLE

Mn	60°	61°	62°	63°	64°	65°	66°	67°	68°	69°	70°	71°	72°	73°	74°
0	1·6355	1·6225	1·6097	1·5973	1·5850	1·5730	1·5612	1·5496	1·5383	1·5272	1·5162	1·5055	1·4950	1·4846	1·4745
1	6353	6223	6095	5970	5848	5728	5610	5495	5381	5270	5161	5053	4948	4845	4743
2	6350	6221	6093	5968	5846	5726	5608	5493	5379	5268	5159	5052	4946	4843	4742
3	6348	6218	6091	5966	5844	5724	5606	5491	5377	5266	5157	5050	4945	4841	4740
4	6346	6216	6089	5964	5842	5722	5604	5489	5376	5264	5155	5048	4943	4840	4738
5	1·6344	1·6214	1·6087	1·5962	1·5840	1·5720	1·5602	1·5487	1·5374	1·5262	1·5153	1·5046	1·4941	1·4838	1·4737
6	6342	6212	6085	5960	5838	5718	5600	5485	5372	5261	5152	5045	4939	4836	4735
7	6340	6210	6083	5958	5836	5716	5598	5483	5370	5259	5150	5043	4938	4835	4733
8	6337	6208	6081	5956	5834	5714	5597	5481	5368	5257	5148	5041	4936	4833	4732
9	6335	6206	6079	5954	5832	5712	5595	5479	5366	5255	5146	5039	4934	4831	4730
10	1·6333	1·6203	1·6076	1·5952	1·5830	1·5710	1·5593	1·5477	1·5364	1·5253	1·5144	1·5037	1·4933	1·4829	1·4728
11	6331	6201	6074	5950	5828	5708	5591	5475	5362	5251	5143	5036	4931	4828	4727
12	6329	6199	6072	5948	5826	5706	5589	5474	5361	5250	5141	5034	4929	4826	4725
13	6326	6197	6070	5946	5824	5704	5587	5472	5359	5248	5139	5032	4927	4824	4723
14	6324	6195	6068	5944	5822	5702	5585	5470	5357	5246	5137	5030	4926	4823	4722
15	1·6322	1·6193	1·6066	1·5942	1·5820	1·5700	1·5583	1·5468	1·5355	1·5244	1·5135	1·5029	1·4924	1·4821	1·4720
16	6320	6191	6064	5940	5818	5698	5581	5466	5353	5242	5134	5027	4922	4819	4718
17	6318	6189	6062	5938	5816	5696	5579	5464	5351	5241	5132	5025	4920	4818	4717
18	6316	6186	6060	5936	5814	5694	5577	5462	5349	5239	5130	5023	4919	4816	4715
19	6313	6184	6058	5933	5812	5692	5575	5460	5348	5237	5128	5022	4917	4814	4713
20	1·6311	1·6182	1·6056	1·5931	1·5810	1·5690	1·5573	1·5458	1·5346	1·5235	1·5126	1·5020	1·4915	1·4812	1·4712
21	6309	6180	6053	5929	5808	5688	5571	5456	5344	5233	5125	5018	4913	4811	4710
22	6307	6178	6051	5927	5806	5686	5569	5455	5342	5231	5123	5016	4912	4809	4708
23	6305	6176	6049	5925	5804	5684	5567	5453	5340	5230	5121	5015	4910	4807	4707
24	6303	6174	6047	5923	5802	5682	5566	5451	5338	5228	5119	5013	4908	4806	4705
25	1·6300	1·6171	1·6045	1·5921	1·5800	1·5681	1·5564	1·5449	1·5336	1·5226	1·5117	1·5011	1·4907	1·4804	1·4703
26	6298	6169	6043	5919	5798	5679	5562	5447	5335	5224	5116	5009	4905	4802	4702
27	6296	6167	6041	5917	5796	5677	5560	5445	5333	5222	5114	5008	4903	4801	4700
28	6294	6165	6039	5915	5794	5675	5558	5443	5331	5220	5112	5006	4901	4799	4698
29	6292	6163	6037	5913	5792	5673	5556	5441	5329	5219	5110	5004	4900	4797	4697
30	1·6290	1·6161	1·6035	1·5911	1·5790	1·5671	1·5554	1·5439	1·5327	1·5217	1·5109	1·5002	1·4898	1·4796	1·4695
31	6287	6159	6033	5909	5788	5669	5552	5438	5325	5215	5107	5001	4896	4794	4693
32	6285	6157	6031	5907	5786	5667	5550	5436	5323	5213	5105	4999	4894	4792	4692
33	6283	6154	6028	5905	5784	5665	5548	5434	5322	5211	5103	4997	4893	4790	4690
34	6281	6152	6026	5903	5782	5663	5546	5432	5320	5210	5101	4995	4891	4789	4688
35	1·6279	1·6150	1·6024	1·5901	1·5780	1·5661	1·5544	1·5430	1·5318	1·5208	1·5100	1·4994	1·4889	1·4787	1·4687
36	6277	6148	6022	5899	5778	5659	5542	5428	5316	5206	5098	4992	4888	4785	4685
37	6274	6146	6020	5897	5776	5657	5541	5426	5314	5204	5096	4990	4886	4784	4683
38	6272	6144	6018	5895	5774	5655	5539	5424	5312	5202	5094	4988	4884	4782	4682
39	6270	6142	6016	5893	5772	5653	5537	5422	5310	5200	5092	4986	4882	4780	4680
40	1·6268	1·6140	1·6014	1·5891	1·5770	1·5651	1·5535	1·5421	1·5309	1·5199	1·5091	1·4985	1·4881	1·4779	1·4678
41	6266	6138	6012	5889	5768	5649	5533	5419	5307	5197	5089	4983	4879	4777	4677
42	6264	6135	6010	5887	5766	5647	5531	5417	5305	5195	5087	4981	4877	4775	4675
43	6261	6133	6008	5885	5764	5645	5529	5415	5303	5193	5085	4980	4876	4774	4673
44	6259	6131	6006	5882	5762	5643	5527	5413	5301	5191	5084	4978	4874	4772	4672
45	1·6257	1·6129	1·6004	1·5880	1·5760	1·5641	1·5525	1·5411	1·5299	1·5190	1·5082	1·4976	1·4872	1·4770	1·4670
46	6255	6127	6001	5878	5758	5639	5523	5409	5297	5188	5080	4974	4870	4768	4668
47	6253	6125	5999	5876	5756	5637	5521	5407	5296	5186	5078	4973	4869	4767	4667
48	6251	6123	5997	5874	5754	5635	5519	5406	5294	5184	5076	4971	4867	4765	4665
49	6248	6121	5995	5872	5752	5633	5517	5404	5292	5182	5075	4969	4865	4763	4663
50	1·6246	1·6119	1·5993	1·5870	1·5750	1·5632	1·5516	1·5402	1·5290	1·5180	1·5073	1·4967	1·4864	1·4762	1·4662
51	6244	6116	5991	5868	5748	5630	5514	5400	5288	5179	5071	4966	4862	4760	4660
52	6242	6114	5989	5866	5746	5628	5512	5398	5286	5177	5069	4964	4860	4758	4658
53	6240	6112	5987	5864	5744	5626	5510	5396	5285	5175	5068	4962	4858	4757	4657
54	6238	6110	5985	5862	5742	5624	5508	5394	5283	5173	5066	4960	4857	4755	4655
55	1·6236	1·6108	1·5983	1·5860	1·5740	1·5622	1·5506	1·5392	1·5281	1·5171	1·5064	1·4959	1·4855	1·4753	1·4654
56	6233	6106	5981	5858	5738	5620	5504	5391	5279	5170	5062	4957	4853	4752	4652
57	6231	6104	5979	5856	5736	5618	5502	5389	5277	5168	5060	4955	4852	4750	4650
58	6229	6102	5977	5854	5734	5616	5500	5387	5275	5166	5059	4953	4850	4748	4649
59	6227	6100	5975	5852	5732	5614	5498	5385	5274	5164	5057	4952	4848	4747	4647

Table V

## LOCAL HOUR ANGLE

Mn	75°	76°	77°	78°	79°	80°	81°	82°	83°	84°	85°	86°	87°	88°	89°
0	1·4645	1·4547	1·4451	1·4357	1·4264	1·4173	1·4083	1·3994	1·3909	1·3824	1·3741	1·3659	1·3578	1·3499	1·3421
1	4644	4546	4450	4355	4262	4171	4082	3994	3908	3823	3739	3657	3577	3498	3420
2	4642	4544	4448	4354	4261	4170	4080	3992	3906	3821	3738	3656	3575	3496	3418
3	4640	4543	4446	4352	4259	4168	4079	3991	3905	3820	3736	3655	3574	3495	3417
4	4639	4541	4445	4351	4258	4167	4077	3990	3903	3818	3735	3652	3573	3494	3416
5	1·4637	1·4539	1·4443	1·4349	1·4256	1·4165	1·4075	1·3988	1·3902	1·3817	1·3734	1·3651	1·3570	1·3491	1·3415
6	4635	4538	4442	4347	4255	4164	4074	3987	3900	3816	3731	3650	3570	3490	3413
7	4634	4536	4440	4346	4253	4162	4073	3985	3899	3813	3731	3649	3569	3489	3412
8	4632	4534	4439	4344	4252	4161	4072	3984	3898	3812	3730	3648	3567	3488	3410
9	4630	4533	4437	4343	4250	4159	4070	3982	3896	3811	3728	3646	3566	3487	3409
10	1·4629	1·4531	1·4435	1·4341	1·4249	1·4158	1·4069	1·3981	1·3894	1·3810	1·3727	1·3645	1·3565	1·3486	1·3408
11	4627	4530	4434	4340	4247	4156	4067	3979	3893	3809	3725	3644	3563	3484	3407
12	4626	4528	4432	4338	4246	4155	4066	3978	3892	3807	3724	3642	3562	3483	3406
13	4624	4526	4431	4337	4244	4153	4064	3977	3890	3806	3723	3641	3561	3482	3404
14	4622	4525	4429	4335	4243	4152	4063	3974	3889	3804	3721	3640	3559	3481	3403
15	1·4621	1·4523	1·4427	1·4333	1·4241	1·4150	1·4061	1·3973	1·3888	1·3803	1·3720	1·3638	1·3558	1·3479	1·3402
16	4619	4522	4426	4332	4240	4149	4060	3972	3886	3802	3719	3637	3557	3478	3400
17	4617	4520	4424	4330	4238	4147	4058	3971	3885	3800	3717	3636	3555	3477	3399
18	4616	4518	4423	4329	4237	4146	4057	3969	3883	3799	3716	3634	3554	3475	3398
19	4614	4517	4421	4327	4235	4144	4054	3968	3882	3797	3714	3632	3553	3474	3397
20	1·4612	1·4515	1·4420	1·4326	1·4233	1·4143	1·4054	1·3966	1·3880	1·3796	1·3712	1·3631	1·3550	1·3473	1·3395
21	4611	4514	4418	4324	4232	4141	4052	3965	3879	3795	3711	3630	3550	3470	3394
22	4609	4512	4416	4323	4230	4140	4051	3964	3878	3792	3710	3629	3549	3469	3393
23	4608	4510	4415	4321	4229	4138	4049	3962	3876	3792	3709	3628	3547	3469	3392
24	4606	4509	4413	4319	4227	4137	4048	3961	3874	3790	3708	3626	3546	3468	3389
25	1·4604	1·4507	1·4412	1·4318	1·4226	1·4135	1·4047	1·3959	1·3873	1·3789	1·3706	1·3625	1·3545	1·3466	1·3389
26	4603	4506	4410	4316	4224	4134	4045	3958	3872	3788	3705	3623	3544	3465	3388
27	4601	4504	4409	4315	4223	4132	4044	3956	3871	3786	3703	3622	3542	3464	3386
28	4599	4502	4407	4313	4221	4131	4042	3954	3869	3785	3702	3621	3541	3462	3385
29	4598	4501	4405	4312	4220	4129	4041	3953	3868	3784	3701	3619	3540	3461	3384
30	1·4596	1·4499	1·4404	1·4310	1·4218	1·4128	1·4039	1·3952	1·3866	1·3782	1·3699	1·3618	1·3538	1·3460	1·3383
31	4594	4498	4402	4309	4217	4126	4038	3951	3865	3781	3698	3617	3537	3458	3381
32	4593	4496	4401	4307	4215	4125	4035	3949	3863	3779	3697	3615	3536	3457	3380
33	4591	4494	4399	4306	4214	4123	4034	3948	3862	3778	3695	3614	3534	3456	3379
34	4590	4493	4398	4304	4212	4122	4033	3946	3861	3777	3694	3612	3533	3455	3378
35	1·4588	1·4491	1·4396	1·4302	1·4211	1·4120	1·4032	1·3945	1·3859	1·3775	1·3692	1·3610	1·3531	1·3453	1·3376
36	4586	4489	4394	4301	4209	4119	4030	3943	3858	3773	3691	3610	3530	3452	3375
37	4585	4488	4393	4299	4208	4117	4029	3942	3856	3772	3690	3609	3529	3450	3374
38	4583	4486	4391	4298	4206	4116	4027	3940	3855	3771	3688	3607	3528	3449	3372
39	4581	4485	4390	4296	4205	4115	4026	3939	3853	3770	3687	3606	3526	3448	3370
40	1·4580	1·4483	1·4388	1·4295	1·4203	1·4113	1·4025	1·3938	1·3852	1·3768	1·3686	1·3605	1·3525	1·3447	1·3369
41	4578	4482	4387	4293	4202	4112	4023	3936	3851	3767	3684	3603	3524	3445	3369
42	4577	4480	4385	4292	4200	4110	4022	3934	3849	3765	3683	3602	3522	3444	3367
43	4575	4478	4383	4290	4199	4109	4020	3933	3848	3764	3682	3601	3521	3443	3366
44	4573	4477	4382	4289	4197	4107	4019	3932	3847	3763	3680	3599	3520	3442	3365
45	1·4572	1·4475	1·4380	1·4287	1·4196	1·4106	1·4017	1·3930	1·3845	1·3761	1·3679	1·3598	1·3518	1·3440	1·3364
46	4570	4474	4379	4286	4194	4104	4015	3929	3844	3760	3678	3597	3517	3439	3362
47	4568	4472	4377	4284	4192	4103	4014	3928	3842	3759	3676	3595	3516	3438	3361
48	4567	4470	4376	4282	4191	4101	4013	3926	3841	3757	3675	3594	3515	3436	3360
49	4565	4469	4374	4281	4189	4100	4011	3925	3839	3756	3672	3593	3513	3435	3358
50	1·4564	1·4467	1·4372	1·4279	1·4188	1·4098	1·4010	1·3923	1·3838	1·3753	1·3671	1·3590	1·3511	1·3434	1·3357
51	4562	4466	4371	4278	4186	4097	4008	3922	3837	3752	3671	3590	3510	3433	3356
52	4560	4464	4369	4276	4185	4094	4007	3920	3835	3752	3669	3589	3509	3430	3355
53	4559	4462	4368	4275	4183	4094	4006	3919	3833	3750	3668	3587	3508	3429	3353
54	4557	4461	4366	4273	4182	4092	4004	3918	3832	3749	3667	3586	3507	3429	3352
55	1·4555	1·4459	1·4365	1·4272	1·4180	1·4091	1·4003	1·3916	1·3831	1·3747	1·3665	1·3585	1·3505	1·3427	1·3350
56	4554	4458	4363	4270	4179	4089	4001	3914	3830	3746	3664	3583	3504	3426	3349
57	4552	4456	4361	4269	4177	4088	4000	3913	3828	3745	3663	3582	3503	3425	3348
58	4551	4454	4360	4267	4176	4086	3998	3912	3827	3743	3661	3581	3501	3424	3347
59	4549	4453	4358	4266	4174	4085	3997	3910	3825	3742	3660	3579	3500	3422	3346

Table V  
LOCAL HOUR ANGLE

Mn	90°	91°	92°	93°	94°	95°	96°	97°	98°	99°	100°	101°	102°	103°	104°
0	1-3345	1-3268	1-3196	1-3123	1-3052	1-2982	1-2913	1-2844	1-2779	1-2713	1-2649	1-2586	1-2523	1-2462	1-2404
1	3343	3268	3194	3122	3051	2980	2912	2844	2778	2712	2648	2584	2522	2461	2402
2	3342	3267	3193	3121	3049	2979	2910	2843	2776	2711	2647	2583	2522	2461	2401
3	3341	3266	3192	3119	3047	2978	2909	2842	2775	2710	2646	2582	2521	2460	2401
4	3339	3264	3191	3118	3046	2977	2908	2841	2774	2709	2644	2582	2520	2459	2400
5	1-3338	1-3263	1-3188	1-3117	1-3046	1-2976	1-2906	1-2840	1-2773	1-2708	1-2643	1-2581	1-2519	1-2458	1-2399
6	3337	3262	3187	3116	3045	2975	2905	2838	2772	2707	2643	2580	2518	2457	2398
7	3336	3261	3187	3115	3043	2974	2905	2837	2771	2705	2642	2579	2517	2456	2397
8	3334	3259	3186	3113	3042	2972	2904	2836	2770	2704	2641	2578	2516	2455	2396
9	3333	3258	3185	3112	3041	2971	2903	2835	2769	2703	2640	2577	2515	2454	2395
10	1-3332	1-3257	1-3183	1-3111	1-3040	1-2970	1-2901	1-2834	1-2768	1-2703	1-2639	1-2576	1-2514	1-2453	1-2394
11	3331	3256	3182	3110	3039	2969	2900	2833	2767	2701	2638	2575	2513	2452	2393
12	3328	3255	3181	3108	3038	2967	2899	2832	2764	2700	2636	2574	2512	2451	2392
13	3328	3253	3180	3106	3036	2966	2898	2831	2764	2699	2635	2573	2511	2450	2391
14	3327	3252	3179	3106	3035	2965	2897	2829	2763	2698	2634	2572	2510	2449	2390
15	1-3326	1-3251	1-3177	1-3105	1-3034	1-2964	1-2896	1-2828	1-2762	1-2697	1-2633	1-2571	1-2509	1-2448	1-2389
16	3324	3249	3176	3104	3033	2963	2895	2826	2761	2696	2632	2569	2508	2447	2388
17	3323	3248	3175	3103	3032	2962	2893	2825	2760	2695	2631	2568	2507	2446	2387
18	3322	3247	3174	3101	3031	2961	2892	2824	2759	2694	2630	2567	2506	2445	2386
19	3321	3246	3172	3100	3029	2960	2891	2824	2758	2693	2629	2566	2505	2443	2385
20	1-3319	1-3245	1-3171	1-3099	1-3027	1-2959	1-2890	1-2823	1-2757	1-2692	1-2628	1-2564	1-2503	1-2442	1-2384
21	3318	3243	3170	3098	3026	2957	2889	2822	2756	2691	2627	2563	2502	2441	2382
22	3317	3242	3168	3097	3026	2956	2888	2821	2755	2690	2626	2562	2502	2441	2381
23	3316	3241	3167	3096	3025	2955	2886	2819	2753	2689	2624	2562	2501	2440	2381
24	3314	3240	3166	3094	3024	2954	2885	2818	2752	2688	2623	2561	2500	2439	2380
25	1-3313	1-3238	1-3165	1-3093	1-3022	1-2953	1-2884	1-2817	1-2751	1-2685	1-2623	1-2560	1-2499	1-2438	1-2379
26	3312	3237	3164	3092	3021	2952	2883	2816	2750	2684	2622	2559	2498	2437	2378
27	3311	3236	3163	3091	3020	2950	2882	2815	2749	2683	2621	2558	2497	2436	2377
28	3308	3235	3162	3090	3019	2949	2881	2814	2748	2683	2620	2557	2496	2435	2376
29	3308	3234	3160	3087	3018	2948	2880	2813	2747	2682	2619	2556	2495	2434	2375
30	1-3307	1-3232	1-3159	1-3086	1-3017	1-2946	1-2879	1-2812	1-2745	1-2681	1-2617	1-2555	1-2494	1-2433	1-2374
31	3306	3231	3158	3086	3015	2945	2878	2811	2744	2680	2616	2554	2493	2432	2373
32	3304	3229	3157	3085	3014	2945	2877	2810	2744	2679	2615	2553	2492	2431	2372
33	3303	3228	3155	3084	3013	2944	2875	2808	2743	2678	2614	2552	2491	2430	2371
34	3302	3227	3154	3082	3012	2942	2874	2807	2741	2677	2613	2551	2490	2429	2370
35	1-3301	1-3226	1-3153	1-3081	1-3011	1-2941	1-2873	1-2805	1-2740	1-2676	1-2612	1-2550	1-2489	1-2428	1-2369
36	3299	3225	3152	3080	3010	2940	2872	2804	2739	2675	2611	2549	2488	2427	2368
37	3298	3224	3151	3079	3007	2939	2871	2804	2738	2674	2610	2548	2487	2426	2367
38	3297	3222	3148	3078	3006	2938	2870	2803	2737	2673	2609	2547	2486	2425	2366
39	3296	3221	3147	3077	3006	2937	2869	2802	2736	2671	2608	2546	2485	2423	2365
40	1-3294	1-3220	1-3147	1-3075	1-3005	1-2936	1-2868	1-2801	1-2735	1-2670	1-2607	1-2545	1-2483	1-2422	1-2364
41	3293	3219	3146	3074	3004	2934	2865	2800	2734	2669	2606	2543	2481	2421	2362
42	3292	3218	3145	3073	3003	2933	2864	2798	2733	2668	2604	2542	2481	2421	2361
43	3291	3216	3143	3072	3001	2932	2864	2797	2732	2667	2603	2542	2480	2420	2360
44	3288	3215	3142	3071	3000	2931	2863	2796	2731	2666	2602	2541	2479	2419	2360
45	1-3288	1-3214	1-3141	1-3069	1-2999	1-2930	1-2862	1-2795	1-2730	1-2664	1-2602	1-2540	1-2478	1-2418	1-2359
46	3287	3213	3140	3067	2998	2929	2861	2794	2728	2663	2601	2539	2477	2417	2359
47	3286	3211	3139	3066	2997	2928	2860	2793	2727	2663	2600	2538	2476	2416	2358
48	3284	3210	3137	3066	2996	2925	2859	2792	2725	2662	2599	2536	2475	2415	2357
49	3283	3208	3136	3065	2994	2925	2857	2791	2724	2661	2598	2535	2474	2414	2356
50	1-3282	1-3207	1-3135	1-3063	1-2993	1-2924	1-2856	1-2790	1-2723	1-2660	1-2597	1-2534	1-2473	1-2413	1-2355
51	3281	3207	3134	3062	2992	2923	2855	2789	2723	2659	2596	2533	2472	2412	2354
52	3279	3205	3133	3061	2991	2922	2854	2787	2722	2658	2594	2532	2471	2412	2353
53	3278	3204	3131	3060	2990	2921	2853	2785	2721	2657	2593	2531	2470	2411	2352
54	3277	3203	3130	3059	2989	2920	2852	2784	2720	2656	2592	2530	2469	2410	2351
55	1-3276	1-3202	1-3128	1-3058	1-2986	1-2918	1-2851	1-2784	1-2719	1-2654	1-2591	1-2529	1-2468	1-2409	1-2350
56	3274	3200	3127	3056	2985	2917	2850	2783	2718	2653	2590	2528	2467	2408	2349
57	3273	3199	3127	3055	2985	2916	2848	2782	2717	2652	2589	2527	2466	2407	2348
58	3272	3198	3125	3054	2984	2915	2846	2781	2715	2651	2588	2526	2465	2406	2347
59	3271	3197	3124	3053	2983	2914	2845	2780	2714	2650	2587	2525	2463	2405	2346



Table V

## LOCAL HOUR ANGLE

Mn	105°	106°	107°	108°	109°	110°	111°	112°	113°	114°	115°	116°	117°	118°	119°
0	1·2345	1·2287	1·2231	1·2175	1·2120	1·2067	1·2014	1·1963	1·1912	1·1862	1·1814	1·1766	1·1719	1·1673	1·1628
1	2344	2286	2230	2174	2119	2066	2013	1962	1911	1862	1813	1765	1717	1672	1627
2	2342	2285	2229	2173	2119	2065	2013	1961	1910	1861	1812	1764	1716	1671	1626
3	2341	2284	2228	2172	2118	2064	2012	1959	1910	1860	1811	1763	1716	1671	1626
4	2340	2283	2227	2171	2117	2063	2011	1958	1909	1858	1810	1763	1715	1670	1625
5	1·2340	1·2283	1·2226	1·2170	1·2116	1·2063	1·2010	1·1957	1·1908	1·1857	1·1810	1·1762	1·1714	1·1669	1·1624
6	2339	2281	2225	2170	2115	2062	2009	1957	1907	1856	1809	1761	1714	1668	1623
7	2338	2280	2224	2169	2114	2060	2008	1956	1906	1856	1808	1760	1714	1668	1623
8	2337	2280	2223	2168	2113	2059	2007	1956	1905	1855	1807	1760	1713	1667	1622
9	2336	2279	2221	2167	2112	2058	2007	1955	1905	1855	1806	1759	1712	1666	1621
10	1·2335	1·2278	1·2220	1·2166	1·2112	1·2058	1·2006	1·1954	1·1904	1·1854	1·1806	1·1757	1·1711	1·1665	1·1620
11	2334	2277	2219	2165	2111	2057	2005	1953	1903	1853	1805	1756	1710	1665	1620
12	2333	2276	2219	2164	2110	2056	2004	1953	1902	1853	1804	1755	1710	1664	1619
13	2332	2275	2219	2163	2109	2055	2003	1952	1901	1852	1803	1755	1709	1663	1618
14	2331	2274	2218	2161	2108	2055	2002	1951	1899	1851	1802	1755	1708	1662	1616
15	1·2330	1·2273	1·2217	1·2160	1·2107	1·2054	1·2001	1·1950	1·1899	1·1850	1·1802	1·1754	1·1707	1·1662	1·1616
16	2329	2272	2216	2159	2106	2053	2001	1949	1898	1849	1801	1753	1707	1661	1615
17	2328	2271	2215	2159	2105	2052	1999	1948	1897	1849	1800	1752	1706	1660	1614
18	2328	2270	2214	2159	2104	2051	1998	1947	1896	1848	1798	1752	1705	1659	1613
19	2327	2269	2213	2158	2103	2050	1997	1947	1896	1847	1797	1751	1704	1659	1613
20	1·2326	1·2268	1·2212	1·2157	1·2103	1·2049	1·1997	1·1946	1·1895	1·1846	1·1797	1·1750	1·1703	1·1657	1·1613
21	2325	2267	2211	2156	2102	2048	1996	1945	1895	1845	1796	1749	1703	1656	1612
22	2324	2266	2210	2155	2100	2048	1995	1944	1894	1844	1795	1749	1702	1655	1612
23	2322	2265	2209	2154	2099	2047	1994	1943	1893	1844	1795	1748	1701	1655	1611
24	2321	2265	2208	2153	2098	2046	1994	1942	1892	1843	1794	1747	1700	1654	1610
25	1·2320	1·2264	1·2207	1·2152	1·2098	1·2045	1·1993	1·1942	1·1891	1·1842	1·1794	1·1746	1·1700	1·1654	1·1609
26	2320	2263	2206	2151	2097	2044	1992	1941	1890	1841	1793	1745	1699	1653	1609
27	2319	2261	2206	2150	2096	2043	1991	1939	1890	1840	1792	1745	1697	1653	1608
28	2318	2260	2205	2149	2095	2042	1990	1938	1889	1840	1791	1744	1696	1652	1607
29	2317	2260	2204	2149	2095	2040	1989	1937	1888	1838	1790	1743	1696	1651	1606
30	1·2316	1·2259	1·2203	1·2148	1·2094	1·2040	1·1988	1·1936	1·1887	1·1837	1·1790	1·1742	1·1695	1·1650	1·1606
31	2315	2258	2201	2147	2093	2039	1988	1936	1886	1836	1789	1741	1694	1650	1605
32	2314	2257	2200	2146	2092	2038	1987	1936	1885	1835	1788	1741	1694	1649	1604
33	2313	2256	2199	2145	2091	2037	1986	1935	1885	1835	1787	1740	1694	1648	1603
34	2312	2255	2199	2144	2090	2037	1985	1934	1884	1835	1786	1739	1693	1647	1603
35	1·2311	1·2254	1·2198	1·2143	1·2089	1·2036	1·1984	1·1933	1·1883	1·1834	1·1786	1·1737	1·1692	1·1647	1·1602
36	2310	2253	2197	2142	2088	2035	1983	1932	1882	1833	1785	1737	1691	1646	1601
37	2309	2252	2196	2140	2087	2034	1982	1931	1881	1832	1784	1736	1690	1645	1600
38	2308	2251	2195	2139	2086	2034	1982	1931	1881	1831	1783	1735	1690	1644	1600
39	2307	2250	2194	2139	2086	2033	1981	1930	1880	1831	1782	1734	1689	1644	1599
40	1·2306	1·2249	1·2193	1·2139	1·2085	1·2032	1·1979	1·1929	1·1878	1·1830	1·1782	1·1734	1·1688	1·1643	1·1598
41	2305	2248	2193	2138	2084	2031	1978	1928	1877	1829	1781	1734	1687	1642	1598
42	2304	2248	2192	2137	2083	2030	1977	1927	1876	1828	1780	1733	1687	1641	1596
43	2302	2247	2191	2136	2082	2029	1976	1926	1876	1827	1778	1732	1686	1641	1595
44	2302	2246	2190	2135	2080	2028	1976	1926	1876	1827	1777	1731	1685	1640	1594
45	1·2301	1·2245	1·2189	1·2134	1·2079	1·2027	1·1976	1·1925	1·1875	1·1826	1·1777	1·1731	1·1684	1·1639	1·1594
46	2300	2244	2188	2133	2078	2027	1975	1924	1874	1825	1776	1730	1684	1637	1593
47	2300	2243	2187	2132	2078	2026	1974	1923	1873	1824	1775	1729	1683	1637	1593
48	2299	2241	2186	2131	2078	2025	1973	1922	1872	1823	1775	1728	1682	1636	1592
49	2298	2240	2185	2130	2077	2024	1972	1921	1871	1823	1775	1727	1681	1635	1592
50	1·2297	1·2239	1·2184	1·2130	1·2076	1·2023	1·1971	1·1919	1·1871	1·1822	1·1774	1·1727	1·1681	1·1634	1·1591
51	2296	2239	2183	2129	2075	2022	1970	1919	1870	1821	1773	1726	1680	1634	1590
52	2295	2238	2181	2128	2074	2021	1970	1918	1869	1820	1772	1725	1679	1634	1589
53	2294	2237	2181	2127	2073	2019	1969	1917	1868	1818	1771	1724	1677	1633	1589
54	2293	2236	2180	2126	2072	2019	1968	1916	1867	1817	1771	1724	1676	1632	1588
55	1·2292	1·2235	1·2179	1·2125	1·2071	1·2018	1·1967	1·1916	1·1867	1·1817	1·1770	1·1723	1·1676	1·1632	1·1587
56	2291	2234	2179	2124	2070	2017	1966	1915	1866	1816	1769	1722	1675	1631	1587
57	2290	2233	2178	2123	2070	2017	1965	1915	1865	1815	1768	1721	1674	1630	1586
58	2289	2233	2177	2122	2069	2016	1964	1914	1864	1815	1767	1720	1674	1629	1585
59	2288	2232	2176	2120	2068	2015	1964	1913	1863	1814	1767	1720	1674	1629	1584

Table VI  
CONVERSION OF ARC TO TIME

0-59°		60-119°		120-179°		180-239°		240-299°		300-359°		0.00'	0.25'	0.50'	0.75'	
°	h m	°	h m	°	h m	°	h m	°	h m	°	h m	°	m s	m s	m s	m s
0	0 00	60	4 00	120	8 00	180	12 00	240	16 00	300	20 00	0	0 00	0 01	0 02	0 03
1	0 04	61	4 04	121	8 04	181	12 04	241	16 04	301	20 04	1	0 04	0 05	0 06	0 07
2	0 08	62	4 08	122	8 08	182	12 08	242	16 08	302	20 08	2	0 08	0 09	0 10	0 11
3	0 12	63	4 12	123	8 12	183	12 12	243	16 12	303	20 12	3	0 12	0 13	0 14	0 15
4	0 16	64	4 16	124	8 16	184	12 16	244	16 16	304	20 16	4	0 16	0 17	0 18	0 19
5	0 20	65	4 20	125	8 20	185	12 20	245	16 20	305	20 20	5	0 20	0 21	0 22	0 23
6	0 24	66	4 24	126	8 24	186	12 24	246	16 24	306	20 24	6	0 24	0 25	0 26	0 27
7	0 28	67	4 28	127	8 28	187	12 28	247	16 28	307	20 28	7	0 28	0 29	0 30	0 31
8	0 32	68	4 32	128	8 32	188	12 32	248	16 32	308	20 32	8	0 32	0 33	0 34	0 35
9	0 36	69	4 36	129	8 36	189	12 36	249	16 36	309	20 36	9	0 36	0 37	0 38	0 39
10	0 40	70	4 40	130	8 40	190	12 40	250	16 40	310	20 40	10	0 40	0 41	0 42	0 43
11	0 44	71	4 44	131	8 44	191	12 44	251	16 44	311	20 44	11	0 44	0 45	0 46	0 47
12	0 48	72	4 48	132	8 48	192	12 48	252	16 48	312	20 48	12	0 48	0 49	0 50	0 51
13	0 52	73	4 52	133	8 52	193	12 52	253	16 52	313	20 52	13	0 52	0 53	0 54	0 55
14	0 56	74	4 56	134	8 56	194	12 56	254	16 56	314	20 56	14	0 56	0 57	0 58	0 59
15	1 00	75	5 00	135	9 00	195	13 00	255	17 00	315	21 00	15	1 00	1 01	1 02	1 03
16	1 04	76	5 04	136	9 04	196	13 04	256	17 04	316	21 04	16	1 04	1 05	1 06	1 07
17	1 08	77	5 08	137	9 08	197	13 08	257	17 08	317	21 08	17	1 08	1 09	1 10	1 11
18	1 12	78	5 12	138	9 12	198	13 12	258	17 12	318	21 12	18	1 12	1 13	1 14	1 15
19	1 16	79	5 16	139	9 16	199	13 16	259	17 16	319	21 16	19	1 16	1 17	1 18	1 19
20	1 20	80	5 20	140	9 20	200	13 20	260	17 20	320	21 20	20	1 20	1 21	1 22	1 23
21	1 24	81	5 24	141	9 24	201	13 24	261	17 24	321	21 24	21	1 24	1 25	1 26	1 27
22	1 28	82	5 28	142	9 28	202	13 28	262	17 28	322	21 28	22	1 28	1 29	1 30	1 31
23	1 32	83	5 32	143	9 32	203	13 32	263	17 32	323	21 32	23	1 32	1 33	1 34	1 35
24	1 36	84	5 36	144	9 36	204	13 36	264	17 36	324	21 36	24	1 36	1 37	1 38	1 39
25	1 40	85	5 40	145	9 40	205	13 40	265	17 40	325	21 40	25	1 40	1 41	1 42	1 43
26	1 44	86	5 44	146	9 44	206	13 44	266	17 44	326	21 44	26	1 44	1 45	1 46	1 47
27	1 48	87	5 48	147	9 48	207	13 48	267	17 48	327	21 48	27	1 48	1 49	1 50	1 51
28	1 52	88	5 52	148	9 52	208	13 52	268	17 52	328	21 52	28	1 52	1 53	1 54	1 55
29	1 56	89	5 56	149	9 56	209	13 56	269	17 56	329	21 56	29	1 56	1 57	1 58	1 59
30	2 00	90	6 00	150	10 00	210	14 00	270	18 00	330	22 00	30	2 00	2 01	2 02	2 03
31	2 04	91	6 04	151	10 04	211	14 04	271	18 04	331	22 04	31	2 04	2 05	2 06	2 07
32	2 08	92	6 08	152	10 08	212	14 08	272	18 08	332	22 08	32	2 08	2 09	2 10	2 11
33	2 12	93	6 12	153	10 12	213	14 12	273	18 12	333	22 12	33	2 12	2 13	2 14	2 15
34	2 16	94	6 16	154	10 16	214	14 16	274	18 16	334	22 16	34	2 16	2 17	2 18	2 19
35	2 20	95	6 20	155	10 20	215	14 20	275	18 20	335	22 20	35	2 20	2 21	2 22	2 23
36	2 24	96	6 24	156	10 24	216	14 24	276	18 24	336	22 24	36	2 24	2 25	2 26	2 27
37	2 28	97	6 28	157	10 28	217	14 28	277	18 28	337	22 28	37	2 28	2 29	2 30	2 31
38	2 32	98	6 32	158	10 32	218	14 32	278	18 32	338	22 32	38	2 32	2 33	2 34	2 35
39	2 36	99	6 36	159	10 36	219	14 36	279	18 36	339	22 36	39	2 36	2 37	2 38	2 39
40	2 40	100	6 40	160	10 40	220	14 40	280	18 40	340	22 40	40	2 40	2 41	2 42	2 43
41	2 44	101	6 44	161	10 44	221	14 44	281	18 44	341	22 44	41	2 44	2 45	2 46	2 47
42	2 48	102	6 48	162	10 48	222	14 48	282	18 48	342	22 48	42	2 48	2 49	2 50	2 51
43	2 52	103	6 52	163	10 52	223	14 52	283	18 52	343	22 52	43	2 52	2 53	2 54	2 55
44	2 56	104	6 56	164	10 56	224	14 56	284	18 56	344	22 56	44	2 56	2 57	2 58	2 59
45	3 00	105	7 00	165	11 00	225	15 00	285	19 00	345	23 00	45	3 00	3 01	3 02	3 03
46	3 04	106	7 04	166	11 04	226	15 04	286	19 04	346	23 04	46	3 04	3 05	3 06	3 07
47	3 08	107	7 08	167	11 08	227	15 08	287	19 08	347	23 08	47	3 08	3 09	3 10	3 11
48	3 12	108	7 12	168	11 12	228	15 12	288	19 12	348	23 12	48	3 12	3 13	3 14	3 15
49	3 16	109	7 16	169	11 16	229	15 16	289	19 16	349	23 16	49	3 16	3 17	3 18	3 19
50	3 20	110	7 20	170	11 20	230	15 20	290	19 20	350	23 20	50	3 20	3 21	3 22	3 23
51	3 24	111	7 24	171	11 24	231	15 24	291	19 24	351	23 24	51	3 24	3 25	3 26	3 27
52	3 28	112	7 28	172	11 28	232	15 28	292	19 28	352	23 28	52	3 28	3 29	3 30	3 31
53	3 32	113	7 32	173	11 32	233	15 32	293	19 32	353	23 32	53	3 32	3 33	3 34	3 35
54	3 36	114	7 36	174	11 36	234	15 36	294	19 36	354	23 36	54	3 36	3 37	3 38	3 39
55	3 40	115	7 40	175	11 40	235	15 40	295	19 40	355	23 40	55	3 40	3 41	3 42	3 43
56	3 44	116	7 44	176	11 44	236	15 44	296	19 44	356	23 44	56	3 44	3 45	3 46	3 47
57	3 48	117	7 48	177	11 48	237	15 48	297	19 48	357	23 48	57	3 48	3 49	3 50	3 51
58	3 52	118	7 52	178	11 52	238	15 52	298	19 52	358	23 52	58	3 52	3 53	3 54	3 55
59	3 56	119	7 56	179	11 56	239	15 56	299	19 56	359	23 56	59	3 56	3 57	3 58	3 59