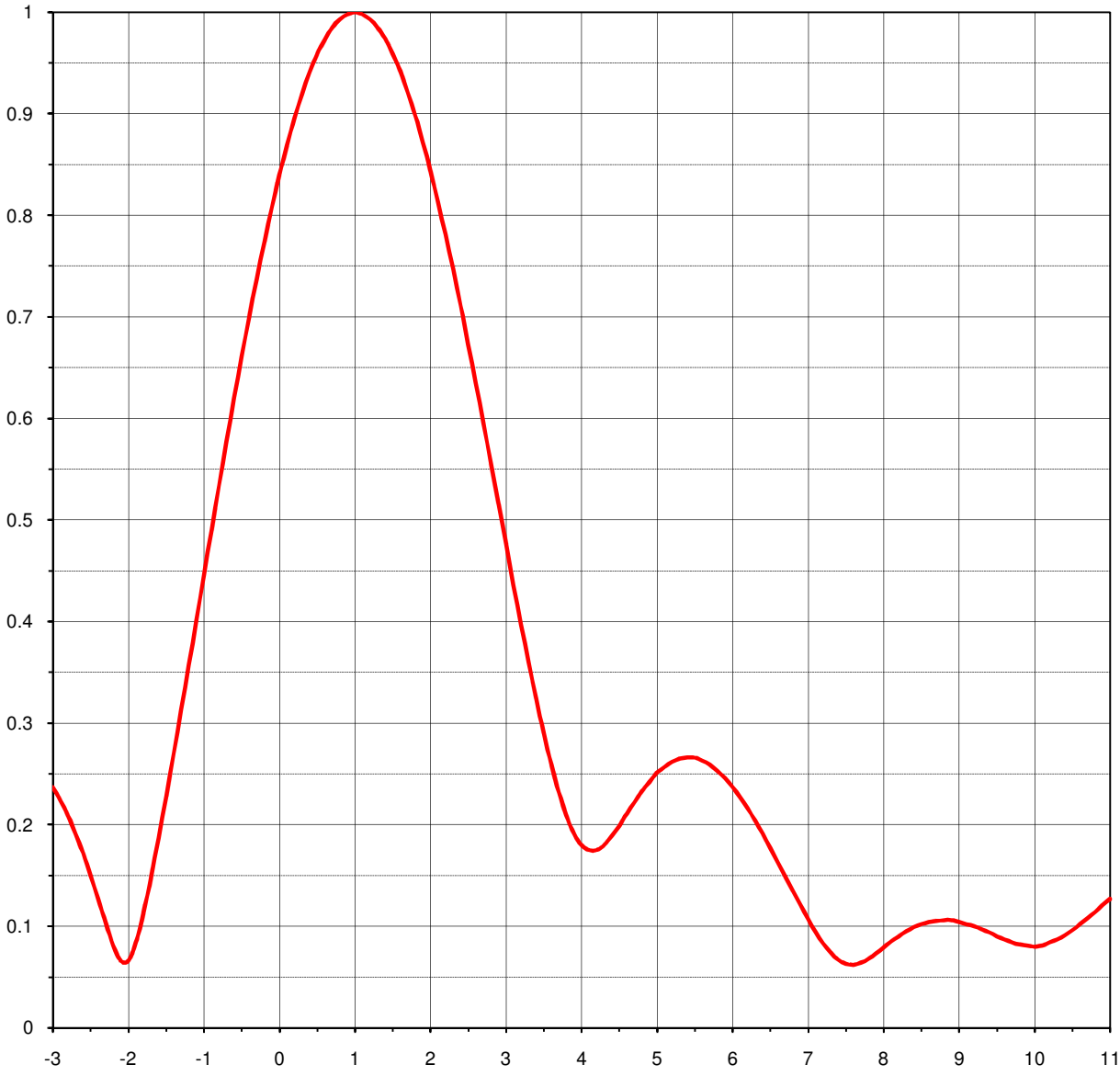
Dielectric

Proposal Number	**C-04015**		
Date	**11-Feb-10**		
Call Letters	**WKAR**	Channel	**40**
Location	**East Lansing, MI**		
Customer	**Michigan State**		
Antenna Type	**TLP-16B-R**		

ELEVATION PATTERN

RMS Gain at Main Lobe	**16.00 (12.04 dB)**	Beam Tilt	**1.00 deg**
RMS Gain at Horizontal	**11.30 (10.53 dB)**	Frequency	**629.00 MHz**
Calculated / Measured	**Calculated**	Drawing #	**16L160100**



Degrees Below Horizontal

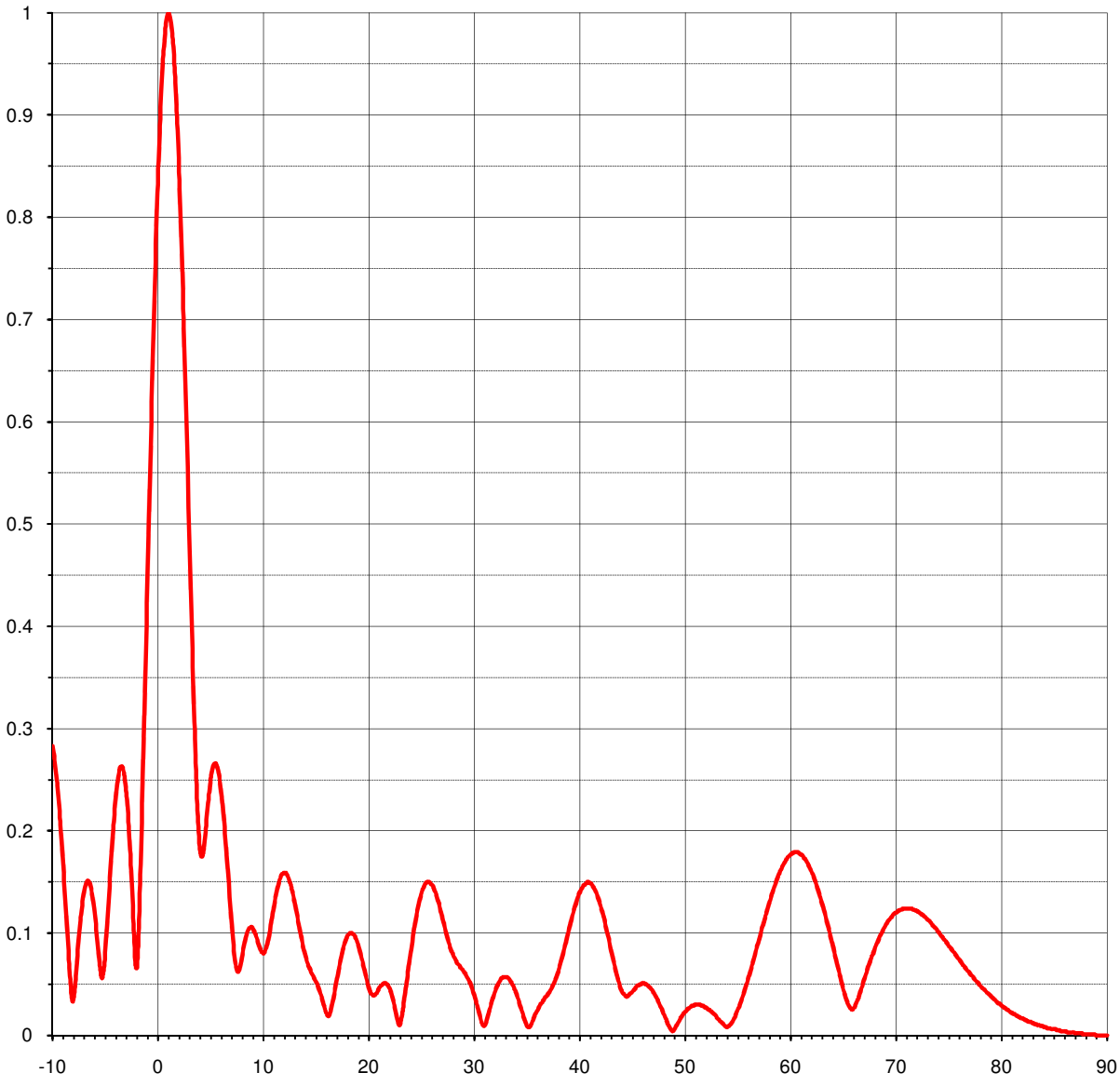
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Dielectric

Proposal Number	**C-04015**		
Date	**11-Feb-10**		
Call Letters	**WKAR**	Channel	**40**
Location	**East Lansing, MI**		
Customer	**Michigan State**		
Antenna Type	**TLP-16B-R**		

ELEVATION PATTERN

RMS Gain at Main Lobe	**16.00 (12.04 dB)**	Beam Tilt	**1.00 deg**
RMS Gain at Horizontal	**11.30 (10.53 dB)**	Frequency	**629.00 MHz**
Calculated / Measured	**Calculated**	Drawing #	**16L160100-90**



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Dielectric

Proposal Number	**C-04015**		
Date	**11-Feb-10**		
Call Letters	**WKAR**	Channel	**40**
Location	**East Lansing, MI**		
Customer	**Michigan State**		
Antenna Type	**TLP-16B-R**		

TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing #: **16L160100-90**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.283	2.4	0.711	10.6	0.096	30.5	0.024	51.0	0.030	71.5	0.124
-9.5	0.238	2.6	0.635	10.8	0.108	31.0	0.009	51.5	0.030	72.0	0.121
-9.0	0.167	2.8	0.556	11.0	0.121	31.5	0.024	52.0	0.027	72.5	0.118
-8.5	0.083	3.0	0.476	11.5	0.147	32.0	0.041	52.5	0.024	73.0	0.113
-8.0	0.036	3.2	0.397	12.0	0.159	32.5	0.053	53.0	0.019	73.5	0.107
-7.5	0.096	3.4	0.324	12.5	0.153	33.0	0.057	53.5	0.013	74.0	0.101
-7.0	0.141	3.6	0.259	13.0	0.133	33.5	0.053	54.0	0.008	74.5	0.094
-6.5	0.149	3.8	0.209	13.5	0.106	34.0	0.043	54.5	0.012	75.0	0.087
-6.0	0.119	4.0	0.180	14.0	0.081	34.5	0.027	55.0	0.023	75.5	0.081
-5.5	0.066	4.2	0.175	14.5	0.065	35.0	0.011	55.5	0.037	76.0	0.074
-5.0	0.081	4.4	0.189	15.0	0.054	35.5	0.011	56.0	0.053	76.5	0.067
-4.5	0.163	4.6	0.211	15.5	0.041	36.0	0.023	56.5	0.071	77.0	0.060
-4.0	0.233	4.8	0.233	16.0	0.023	36.5	0.032	57.0	0.090	77.5	0.054
-3.5	0.263	5.0	0.251	16.5	0.025	37.0	0.039	57.5	0.109	78.0	0.048
-3.0	0.237	5.2	0.262	17.0	0.052	37.5	0.048	58.0	0.128	78.5	0.043
-2.8	0.209	5.4	0.266	17.5	0.078	38.0	0.061	58.5	0.144	79.0	0.038
-2.6	0.172	5.6	0.263	18.0	0.096	38.5	0.080	59.0	0.158	79.5	0.033
-2.4	0.127	5.8	0.253	18.5	0.100	39.0	0.101	59.5	0.169	80.0	0.029
-2.2	0.081	6.0	0.237	19.0	0.091	39.5	0.121	60.0	0.176	80.5	0.025
-2.0	0.066	6.2	0.216	19.5	0.072	40.0	0.138	60.5	0.179	81.0	0.022
-1.8	0.113	6.4	0.191	20.0	0.050	40.5	0.147	61.0	0.177	81.5	0.019
-1.6	0.187	6.6	0.163	20.5	0.039	41.0	0.149	61.5	0.172	82.0	0.016
-1.4	0.270	6.8	0.135	21.0	0.045	41.5	0.143	62.0	0.162	82.5	0.014
-1.2	0.357	7.0	0.107	21.5	0.051	42.0	0.129	62.5	0.148	83.0	0.012
-1.0	0.446	7.2	0.083	22.0	0.047	42.5	0.109	63.0	0.131	83.5	0.010
-0.8	0.534	7.4	0.067	22.5	0.030	43.0	0.086	63.5	0.112	84.0	0.008
-0.6	0.620	7.6	0.062	23.0	0.010	43.5	0.063	64.0	0.091	84.5	0.007
-0.4	0.700	7.8	0.068	23.5	0.039	44.0	0.045	64.5	0.065	85.0	0.006
-0.2	0.774	8.0	0.079	24.0	0.077	44.5	0.038	65.0	0.044	85.5	0.005
0.0	0.840	8.2	0.090	24.5	0.111	45.0	0.042	65.5	0.029	86.0	0.004
0.2	0.896	8.4	0.099	25.0	0.136	45.5	0.048	66.0	0.027	86.5	0.003
0.4	0.941	8.6	0.104	25.5	0.149	46.0	0.051	66.5	0.040	87.0	0.002
0.6	0.973	8.8	0.106	26.0	0.148	46.5	0.049	67.0	0.056	87.5	0.002
0.8	0.993	9.0	0.104	26.5	0.137	47.0	0.043	67.5	0.072	88.0	0.001
1.0	1.000	9.2	0.100	27.0	0.118	47.5	0.034	68.0	0.086	88.5	0.001
1.2	0.993	9.4	0.094	27.5	0.097	48.0	0.022	68.5	0.098	89.0	0.000
1.4	0.974	9.6	0.087	28.0	0.081	48.5	0.010	69.0	0.108	89.5	0.000
1.6	0.942	9.8	0.084	28.5	0.070	49.0	0.005	69.5	0.115	90.0	0.000
1.8	0.898	10.0	0.081	29.0	0.064	49.5	0.014	70.0	0.120		
2.0	0.844	10.2	0.081	29.5	0.055	50.0	0.022	70.5	0.123		
2.2	0.781	10.4	0.087	30.0	0.042	50.5	0.027	71.0	0.124		

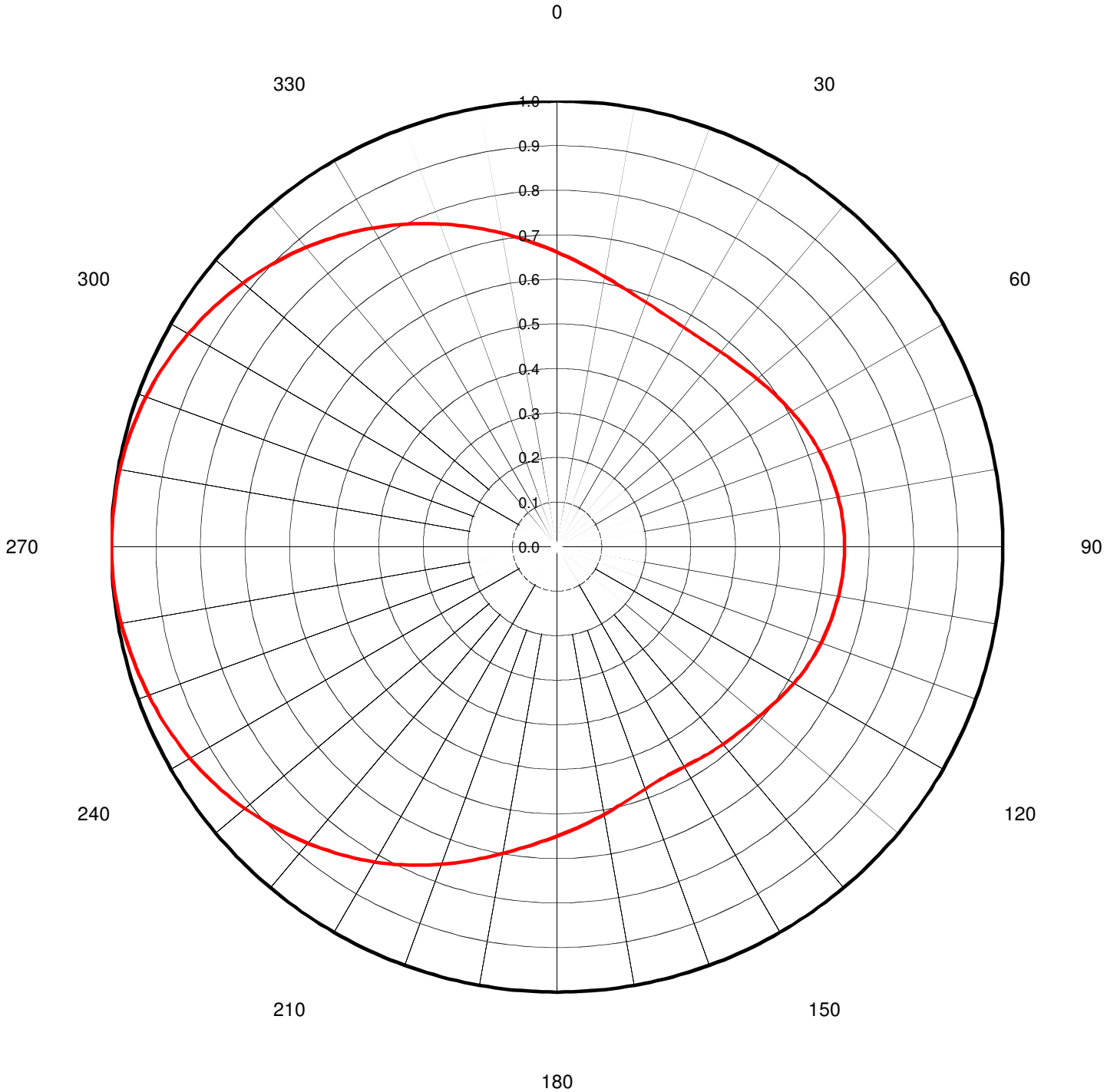
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Dielectric

Proposal Number	**C-04015**		
Date	**11-Feb-10**		
Call Letters	**WKAR**	Channel	**40**
Location	**East Lansing, MI**		
Customer	**Michigan State**		
Antenna Type	**TLP-16B-R**		

AZIMUTH PATTERN

Gain	**1.70**	**(2.30 dB)**	
Calculated / Measured	**Calculated**		
Frequency	**629.00 MHz**		
Drawing #	**TLP-B**		



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Dielectric

Proposal Number	**C-04015**
Date	**11-Feb-10**
Call Letters	**WKAR** Channel **40**
Location	**East Lansing, MI**
Customer	**Michigan State**
Antenna Type	**TLP-16B-R**

TABULATION OF AZIMUTH PATTERN

Azimuth Pattern Drawing #: **TLP-B**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
0	0.661	45	0.577	90	0.645	135	0.584	180	0.650	225	0.893	270	1.000	315	0.899
1	0.656	46	0.578	91	0.645	136	0.583	181	0.654	226	0.897	271	1.000	316	0.895
2	0.651	47	0.580	92	0.645	137	0.582	182	0.659	227	0.902	272	0.999	317	0.890
3	0.646	48	0.582	93	0.645	138	0.581	183	0.663	228	0.906	273	0.999	318	0.886
4	0.641	49	0.584	94	0.645	139	0.580	184	0.668	229	0.910	274	0.999	319	0.881
5	0.637	50	0.586	95	0.644	140	0.579	185	0.673	230	0.914	275	0.998	320	0.876
6	0.632	51	0.588	96	0.644	141	0.578	186	0.678	231	0.919	276	0.998	321	0.872
7	0.628	52	0.590	97	0.643	142	0.577	187	0.683	232	0.923	277	0.998	322	0.867
8	0.624	53	0.592	98	0.643	143	0.576	188	0.688	233	0.927	278	0.997	323	0.862
9	0.619	54	0.594	99	0.642	144	0.575	189	0.694	234	0.930	279	0.996	324	0.857
10	0.615	55	0.596	100	0.641	145	0.574	190	0.699	235	0.934	280	0.996	325	0.852
11	0.612	56	0.598	101	0.640	146	0.573	191	0.705	236	0.938	281	0.995	326	0.847
12	0.608	57	0.600	102	0.640	147	0.572	192	0.711	237	0.941	282	0.994	327	0.842
13	0.604	58	0.603	103	0.639	148	0.572	193	0.716	238	0.944	283	0.993	328	0.836
14	0.601	59	0.605	104	0.638	149	0.571	194	0.722	239	0.948	284	0.992	329	0.831
15	0.597	60	0.607	105	0.637	150	0.570	195	0.728	240	0.951	285	0.990	330	0.826
16	0.594	61	0.609	106	0.636	151	0.570	196	0.734	241	0.954	286	0.989	331	0.820
17	0.591	62	0.611	107	0.634	152	0.570	197	0.740	242	0.956	287	0.987	332	0.815
18	0.589	63	0.614	108	0.633	153	0.570	198	0.747	243	0.959	288	0.985	333	0.810
19	0.586	64	0.616	109	0.632	154	0.570	199	0.753	244	0.962	289	0.983	334	0.804
20	0.583	65	0.618	110	0.631	155	0.571	200	0.759	245	0.964	290	0.981	335	0.799
21	0.581	66	0.619	111	0.629	156	0.572	201	0.765	246	0.966	291	0.979	336	0.793
22	0.579	67	0.621	112	0.628	157	0.573	202	0.771	247	0.968	292	0.977	337	0.787
23	0.577	68	0.623	113	0.626	158	0.575	203	0.777	248	0.971	293	0.975	338	0.782
24	0.575	69	0.625	114	0.625	159	0.577	204	0.783	249	0.973	294	0.972	339	0.776
25	0.574	70	0.627	115	0.623	160	0.579	205	0.789	250	0.975	295	0.970	340	0.771
26	0.573	71	0.628	116	0.621	161	0.581	206	0.795	251	0.977	296	0.967	341	0.765
27	0.571	72	0.630	117	0.619	162	0.584	207	0.801	252	0.979	297	0.964	342	0.759
28	0.570	73	0.632	118	0.618	163	0.587	208	0.806	253	0.980	298	0.961	343	0.754
29	0.569	74	0.633	119	0.616	164	0.590	209	0.812	254	0.982	299	0.958	344	0.748
30	0.569	75	0.634	120	0.613	165	0.593	210	0.817	255	0.984	300	0.955	345	0.742
31	0.568	76	0.636	121	0.611	166	0.596	211	0.823	256	0.986	301	0.952	346	0.737
32	0.568	77	0.637	122	0.609	167	0.600	212	0.828	257	0.988	302	0.949	347	0.731
33	0.568	78	0.638	123	0.607	168	0.603	213	0.834	258	0.990	303	0.946	348	0.726
34	0.568	79	0.639	124	0.605	169	0.607	214	0.839	259	0.991	304	0.942	349	0.720
35	0.568	80	0.640	125	0.602	170	0.610	215	0.844	260	0.993	305	0.939	350	0.714
36	0.568	81	0.641	126	0.600	171	0.614	216	0.849	261	0.994	306	0.935	351	0.709
37	0.569	82	0.642	127	0.598	172	0.618	217	0.854	262	0.995	307	0.932	352	0.703
38	0.569	83	0.643	128	0.596	173	0.622	218	0.859	263	0.996	308	0.928	353	0.698
39	0.570	84	0.643	129	0.594	174	0.625	219	0.864	264	0.997	309	0.924	354	0.692
40	0.571	85	0.644	130	0.592	175	0.629	220	0.869	265	0.998	310	0.920	355	0.687
41	0.572	86	0.644	131	0.590	176	0.633	221	0.874	266	0.999	311	0.916	356	0.682
42	0.573	87	0.645	132	0.589	177	0.637	222	0.879	267	0.999	312	0.912	357	0.676
43	0.574	88	0.645	133	0.587	178	0.641	223	0.883	268	0.999	313	0.908	358	0.671
44	0.575	89	0.645	134	0.586	179	0.646	224	0.888	269	1.000	314	0.904	359	0.666

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