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AREAS AND CIRCUMFERENCES OF CIRCLES

Dia.	Area	Circum.	Dia.	Area	Circum.	Dia.	Area	Circum.	Dia.	Area	Circum.	Dia.	Area	Circum.
$\frac{1}{32}$	0.00077	0.098175	$\frac{3}{4}$	2.4053	5.49779	$\frac{1}{2}$	15.904	14.1372	14	56.745	26.7035	$\frac{1}{4}$	153.938	43.9824
$\frac{3}{64}$	0.00173	0.147262	$\frac{15}{16}$	2.5802	5.69414	$\frac{5}{8}$	16.349	14.3335	$\frac{1}{8}$	58.426	27.0962	$\frac{3}{8}$	156.700	44.3751
$\frac{1}{16}$	0.00307	0.196350	$\frac{7}{8}$	2.7612	5.89049	$\frac{3}{4}$	16.800	14.5299	$\frac{1}{4}$	60.132	27.4889	$\frac{1}{2}$	159.485	44.7678
$\frac{3}{32}$	0.00690	0.294524	$\frac{15}{16}$	2.9483	6.08684	$\frac{1}{2}$	17.257	14.7262	$\frac{3}{8}$	61.862	27.8816	$\frac{1}{4}$	162.296	45.1605
$\frac{1}{8}$	0.01227	0.392699	$\frac{7}{8}$	3.1416	6.28319	$\frac{3}{4}$	17.721	14.9226	$\frac{1}{2}$	63.617	28.2743	$\frac{1}{4}$	165.130	45.5532
$\frac{3}{16}$	0.01917	0.490874	$\frac{1}{2}$	3.3410	6.47953	$\frac{1}{2}$	18.190	15.1189	$\frac{3}{8}$	65.397	28.6670	$\frac{1}{4}$	167.990	45.9459
$\frac{1}{4}$	0.02761	0.589049	$\frac{15}{16}$	3.5466	6.67588	$\frac{3}{4}$	18.665	15.3153	$\frac{1}{4}$	67.201	29.0597	$\frac{1}{2}$	170.874	46.3386
$\frac{3}{8}$	0.03758	0.687223	$\frac{7}{8}$	3.7583	6.87223	$\frac{1}{2}$	19.147	15.5116	$\frac{3}{8}$	69.029	29.4524	$\frac{1}{4}$	173.782	46.7313
$\frac{1}{2}$	0.04909	0.785398	$\frac{1}{2}$	3.9761	7.06858	5	19.635	15.7080	$\frac{1}{2}$	70.882	29.8451	$\frac{1}{4}$	176.715	47.1240
$\frac{3}{4}$	0.06213	0.883573	$\frac{3}{4}$	4.2000	7.26493	$\frac{1}{2}$	20.129	15.9043	$\frac{3}{8}$	72.760	30.2378	$\frac{1}{2}$	179.673	47.5167
$\frac{1}{8}$	0.07670	0.981748	$\frac{1}{2}$	4.4301	7.46128	$\frac{3}{4}$	20.629	16.1007	$\frac{1}{4}$	74.662	30.6305	$\frac{3}{8}$	182.655	47.9094
$\frac{3}{16}$	0.09281	1.07992	$\frac{1}{2}$	4.6664	7.65763	$\frac{1}{2}$	21.135	16.2970	$\frac{3}{8}$	76.589	31.0232	$\frac{1}{4}$	185.661	48.3021
$\frac{1}{4}$	0.11045	1.17810	$\frac{3}{4}$	4.9087	7.85398	$\frac{1}{2}$	21.648	16.4934	$\frac{1}{2}$	78.540	31.4159	$\frac{1}{4}$	188.692	48.6948
$\frac{3}{8}$	0.12962	1.27627	$\frac{1}{2}$	5.1572	8.05033	$\frac{3}{8}$	22.166	16.6897	$\frac{1}{2}$	80.516	31.8086	$\frac{1}{2}$	191.748	49.0875
$\frac{1}{2}$	0.15033	1.37445	$\frac{1}{2}$	5.4119	8.24668	$\frac{3}{4}$	22.691	16.8861	$\frac{3}{8}$	82.516	32.2013	$\frac{1}{4}$	194.828	49.4802
$\frac{3}{4}$	0.17257	1.47262	$\frac{1}{2}$	5.6727	8.44303	$\frac{1}{2}$	23.221	17.0824	$\frac{1}{2}$	84.541	32.5940	$\frac{3}{8}$	197.933	49.8729
$\frac{1}{8}$	0.19635	1.57080	$\frac{3}{4}$	5.9396	8.63938	$\frac{1}{2}$	23.758	17.2788	10	86.590	32.9867	$\frac{1}{2}$	201.062	50.2656
$\frac{3}{16}$	0.22166	1.66897	$\frac{1}{2}$	6.2126	8.83573	$\frac{3}{4}$	24.301	17.4751	$\frac{1}{8}$	88.664	33.3794	$\frac{1}{4}$	204.216	50.6583
$\frac{1}{4}$	0.24850	1.76715	$\frac{1}{2}$	6.4918	9.03208	$\frac{1}{2}$	24.850	17.6715	$\frac{1}{4}$	90.763	33.7721	$\frac{3}{8}$	207.395	51.0510
$\frac{3}{8}$	0.27688	1.86532	$\frac{1}{2}$	6.7771	9.22843	$\frac{3}{4}$	25.406	17.8678	$\frac{1}{2}$	92.886	34.1648	$\frac{1}{4}$	210.598	51.4437
$\frac{1}{2}$	0.30680	1.96350	$\frac{1}{2}$	7.0686	9.42478	$\frac{1}{2}$	25.967	18.0642	$\frac{1}{2}$	95.033	34.5575	$\frac{1}{2}$	213.825	51.8364
$\frac{3}{4}$	0.33824	2.06167	$\frac{1}{2}$	7.3662	9.62113	$\frac{3}{4}$	26.535	18.2605	11	97.205	34.9502	$\frac{1}{2}$	217.077	52.2291
$\frac{1}{8}$	0.37122	2.15984	$\frac{1}{2}$	7.6699	9.81748	$\frac{1}{2}$	27.109	18.4569	$\frac{1}{8}$	99.402	35.3429	$\frac{3}{8}$	220.354	52.6218
$\frac{3}{16}$	0.40574	2.25802	$\frac{1}{2}$	7.9798	10.0138	$\frac{1}{2}$	27.688	18.6532	$\frac{1}{4}$	101.62	35.7356	$\frac{1}{2}$	223.655	53.0145
$\frac{1}{4}$	0.44179	2.35619	$\frac{3}{4}$	8.2958	10.2102	6	28.274	18.8496	$\frac{3}{8}$	103.87	36.1283	$\frac{1}{2}$	226.981	53.4072
$\frac{3}{8}$	0.47937	2.45437	$\frac{1}{2}$	8.6179	10.4065	$\frac{1}{2}$	29.465	19.2423	$\frac{1}{8}$	106.14	36.5210	$\frac{3}{8}$	230.331	53.7999
$\frac{1}{2}$	0.51849	2.55254	$\frac{1}{2}$	8.9462	10.6029	$\frac{3}{4}$	30.680	19.6350	$\frac{1}{4}$	108.43	36.9137	$\frac{1}{4}$	233.706	54.1926
$\frac{3}{4}$	0.55914	2.65072	$\frac{1}{2}$	9.2806	10.7992	$\frac{1}{2}$	31.919	20.0277	$\frac{3}{8}$	110.75	37.3064	$\frac{1}{2}$	237.105	54.5853
$\frac{1}{8}$	0.60132	2.74889	$\frac{1}{2}$	9.6211	10.9956	$\frac{3}{4}$	33.183	20.4204	$\frac{1}{2}$	113.10	37.6991	$\frac{3}{8}$	240.529	54.9780
$\frac{3}{16}$	0.64504	2.84707	$\frac{1}{2}$	9.9678	11.1919	$\frac{1}{2}$	34.472	20.8131	$\frac{1}{2}$	115.47	38.0918	$\frac{1}{4}$	243.977	55.3707
$\frac{1}{4}$	0.69029	2.94524	$\frac{1}{2}$	10.321	11.3883	$\frac{3}{4}$	35.785	21.2058	$\frac{1}{8}$	117.86	38.4845	$\frac{3}{8}$	247.450	55.7634
$\frac{3}{8}$	0.73708	3.04342	$\frac{1}{2}$	10.680	11.5846	$\frac{1}{2}$	37.122	21.5984	$\frac{1}{4}$	120.28	38.8772	$\frac{1}{2}$	250.948	56.1561
1	0.78540	3.14159	$\frac{1}{2}$	11.045	11.7810	7	38.485	21.9911	$\frac{3}{8}$	122.72	39.2699	$\frac{1}{2}$	254.470	56.5488
$\frac{1}{16}$	0.88664	3.33794	$\frac{3}{4}$	11.416	11.9773	$\frac{1}{2}$	39.871	22.3838	$\frac{1}{8}$	125.19	39.6626	$\frac{3}{8}$	258.016	56.9415
$\frac{1}{8}$	0.99402	3.53429	$\frac{1}{2}$	11.793	12.1737	$\frac{3}{4}$	41.282	22.7765	$\frac{1}{4}$	127.68	40.0553	$\frac{1}{4}$	261.587	57.3342
$\frac{3}{16}$	1.1075	3.73064	$\frac{1}{2}$	12.177	12.3700	$\frac{1}{2}$	42.718	23.1692	$\frac{3}{8}$	130.19	40.4480	$\frac{3}{8}$	265.183	57.7269
$\frac{1}{4}$	1.2272	3.92699	$\frac{1}{2}$	12.566	12.5664	$\frac{1}{2}$	44.179	23.5619	$\frac{1}{2}$	132.733	40.8408	$\frac{1}{2}$	268.803	58.1196
$\frac{3}{8}$	1.3530	4.12334	$\frac{1}{2}$	12.962	12.7627	$\frac{3}{4}$	45.664	23.9546	$\frac{1}{8}$	135.297	41.2335	$\frac{1}{4}$	272.448	58.5123
$\frac{1}{2}$	1.4849	4.31969	$\frac{1}{2}$	13.364	12.9591	$\frac{1}{2}$	47.173	24.3473	$\frac{3}{8}$	137.887	41.6262	$\frac{3}{8}$	276.117	58.9050
$\frac{3}{4}$	1.6230	4.51604	$\frac{1}{2}$	13.772	13.1554	$\frac{1}{2}$	48.707	24.7400	$\frac{1}{4}$	140.501	42.0189	$\frac{1}{2}$	279.811	59.2977
$\frac{1}{8}$	1.7671	4.71239	$\frac{1}{2}$	14.186	13.3518	8	50.265	25.1327	$\frac{3}{8}$	143.139	42.4116	$\frac{1}{2}$	283.529	59.6904
$\frac{3}{16}$	1.9175	4.90874	$\frac{1}{2}$	14.607	13.5481	$\frac{1}{2}$	51.849	25.5224	$\frac{1}{8}$	145.802	42.8043	$\frac{3}{8}$	287.272	60.0831
$\frac{1}{4}$	2.0739	5.10509	$\frac{1}{2}$	15.033	13.7445	$\frac{3}{4}$	53.456	25.9181	$\frac{1}{4}$	148.490	43.1970	$\frac{1}{4}$	291.040	60.4758
$\frac{3}{8}$	2.2365	5.30144	$\frac{1}{2}$	15.466	13.9408	$\frac{1}{2}$	55.088	26.3108	$\frac{3}{8}$	151.202	43.5897	$\frac{1}{2}$	294.832	60.8685

FUNCTIONS OF NUMBERS

No.	Square	Cube	Square Root	Cube Root	No.	Square	Cube	Square Root	Cube Root	No.	Square	Cube	Square Root	Cube Root	No.	Square	Cube	Square Root	Cube Root
.01	.0001	.000001	0.1000	0.2154	.50	.2500	.125000	0.7071	0.7937	1	1	1	1.0000	1.0000	50	2500	125000	7.0711	3.6840
.02	.0004	.000008	0.1414	0.2714	.51	.2601	.132651	0.7141	0.7990	2	4	8	1.4142	1.2599	51	2601	132651	7.1414	3.7084
.03	.0009	.000027	0.1732	0.3107	.52	.2704	.140608	0.7211	0.8041	3	9	27	1.7321	1.4422	52	2704	140608	7.2111	3.7325
.04	.0016	.000064	0.2000	0.3420	.53	.2809	.148877	0.7280	0.8093	4	16	64	2.0000	1.4887	53	2809	148877	7.2801	3.7563
.05	.0025	.000125	0.2236	0.3684	.54	.2916	.157464	0.7348	0.8143	5	25	125	2.2361	1.7100	54	2916	157464	7.3485	3.7798
.06	.0036	.000216	0.2449	0.3915	.55	.3025	.166375	0.7416	0.8193	6	36	216	2.4495	1.8171	55	3025	166375	7.4162	3.8030
.07	.0049	.000343	0.2646	0.4121	.56	.3136	.175616	0.7483	0.8243	7	49	343	2.6458	1.9129	56	3136	175616	7.4833	3.8259
.08	.0064	.000512	0.2828	0.4309	.57	.3249	.185193	0.7550	0.8291	8	64	512	2.8284	2.0000	57	3249	185193	7.5498	3.8485
.09	.0081	.000729	0.3000	0.4481	.58	.3364	.195112	0.7616	0.8340	9	81	729	3.0000	2.0801	58	3364	195112	7.6158	3.8709
.10	.0100	.001000	0.3162	0.4642	.59	.3481	.205379	0.7681	0.8387	10	100	1000	3.1623	2.1544	59	3481	205379	7.6811	3.8930
.11	.0121	.001331	0.3317	0.4791	.60	.3600	.216000	0.7746	0.8434	11	121	1331	3.3166	2.2240	60	3600	216000	7.7460	3.9149
.12	.0144	.001728	0.3464	0.4932	.61	.3721	.226981	0.7810	0.8481	12	144	1728	3.4641	2.2894	61	3721	226981	7.8102	3.9365
.13	.0169	.002197	0.3606	0.5066	.62	.3844	.238328	0.7874	0.8527	13	169	2197	3.6056	2.3513	62	3844	238328	7.8740	3.9579
.14	.0196	.002744	0.3742	0.5192	.63	.3969	.250047	0.7937	0.8573	14	196	2744	3.7417	2.4101	63	3969	250047	7.9373	3.9791
.15	.0225	.003375	0.3873	0.5313	.64	.4096	.262144	0.8000	0.8618	15	225	3375	3.8730	2.4662	64	4096	262144	8.0000	4.0000
.16	.0256	.004096	0.4000	0.5429	.65	.4225	.274625	0.8062	0.8662	16	256	4096	4.0000	2.5198	65	4225	274625	8.0623	4.0207
.17	.0289	.004913	0.4123	0.5540	.66	.4356	.287496	0.8124	0.8707	17	289	4913	4.1231	2.5713	66	4356	287496	8.1240	4.0412
.18	.0324	.005832	0.4243	0.5646	.67	.4489	.300763	0.8185	0.8750	18	324	5832	4.2426	2.6207	67	4489	300763	8.1854	4.0615
.19	.0361	.006859	0.4359	0.5749	.68	.4624	.314432	0.8246	0.8794	19	361	6859	4.3589	2.6684	68	4624	314432	8.2462	4.0817
.20	.0400	.008000	0.4472	0.5848	.69	.4761	.328509	0.8307	0.8837	20	400	8000	4.4721	2.7144	69	4761	328509	8.3066	4.1016
.21	.0441	.009261	0.4583	0.5944	.70	.4900	.343000	0.8367	0.8879	21	441	9261	4.5826	2.7589	70	4900	343000	8.3666	4.1213
.22	.0484	.010648	0.4690	0.6037	.71	.5041	.357911	0.8426	0.8921	22	484	10648	4.6904	2.8020	71	5041	357911	8.4261	4.1408
.23	.0529	.012167	0.4796	0.6127	.72	.5184	.373248	0.8485	0.8963	23	529	12167	4.7958	2.8439	72	5184	373248	8.4853	4.1602
.24	.0576	.013824	0.4899	0.6214	.73	.5329	.389017	0.8544	0.9004	24	576	13824	4.8990	2.8845	73	5329	389017	8.5440	4.1793
.25	.0625	.015625	0.5000	0.6300	.74	.5476	.405224	0.8602	0.9045	25	625	15625	5.0000	2.9240	74	5476	405224	8.6023	4.1983
.26	.0676	.017576	0.5099	0.6383	.75	.5625	.421875	0.8660	0.9086	26	676	17576	5.0990	2.9625	75	5625	421875	8.6603	4.2172
.27	.0729	.019683	0.5196	0.6463	.76	.5776	.438976	0.8718	0.9126	27	729	19683	5.1962	3.0000	76	5776	438976	8.7178	4.2358
.28	.0784	.021952	0.5292	0.6542	.77	.5929	.456533	0.8775	0.9166	28	784	21952	5.2915	3.0366	77	5929	456533	8.7750	4.2543
.29	.0841	.024389	0.5385	0.6619	.78	.6084	.474532	0.8832	0.9205	29	841	24389	5.3852	3.0723	78	6084	474532	8.8318	4.2727
.30	.0900	.027000	0.5477	0.6694	.79	.6241	.493039	0.8888	0.9244	30	900	27000	5.4772	3.1072	79	6241	493039	8.8882	4.2909
.31	.0961	.029791	0.5568	0.6768	.80	.6400	.512000	0.8944	0.9283	31	961	29791	5.5678	3.1414	80	6400	512000	8.9443	4.3089
.32	.1024	.032768	0.5657	0.6840	.81	.6561	.531441	0.9000	0.9322	32	1024	32768	5.6569	3.1748	81	6561	531441	9.0000	4.3267
.33	.1089	.035937	0.5745	0.6910	.82	.6724	.551368	0.9055	0.9360	33	1089	35937	5.7446	3.2075	82	6724	551368	9.0554	4.3445
.34	.1156	.039304	0.5831	0.6980	.83	.6889	.571787	0.9110	0.9398	34	1156	39304	5.8310	3.2396	83	6889	571787	9.1104	4.3621
.35	.1225	.042875	0.5916	0.7047	.84	.7056	.592704	0.9165	0.9435	35	1225	42875	5.9161	3.2711	84	7056	592704	9.1652	4.3799
.36	.1296	.046656	0.6000	0.7114	.85	.7225	.614125	0.9220	0.9473	36	1296	46656	6.0000	3.3019	85	7225	614125	9.2195	4.3968
.37	.1369	.050653	0.6083	0.7179	.86	.7396	.636056	0.9274	0.9510	37	1369	50653	6.0828	3.3322	86	7396	636056	9.2736	4.4140
.38	.1444	.054872	0.6164	0.7243	.87	.7569	.658503	0.9327	0.9546	38	1444	54872	6.1644	3.3620	87	7569	658503	9.3274	4.4310
.39	.1521	.059319	0.6245	0.7306	.88	.7744	.681472	0.9381	0.9583	39	1521	59319	6.2450	3.3912	88	7744	681472	9.3808	4.4480
.40	.1600	.064000	0.6325	0.7368	.89	.7921	.704969	0.9434	0.9619	40	1600	64000	6.3246	3.4200	89	7921	704969	9.4340	4.4647
.41	.1681	.068921	0.6403	0.7429	.90	.8100	.729000	0.9487	0.9655	41	1681	68921	6.4031	3.4482	90	8100	729000	9.4868	4.4814
.42	.1764	.074088	0.6481	0.7489	.91	.8281	.753571	0.9539	0.9691	42	1764	74088	6.4807	3.4760	91	8281	753571	9.5394	4.4979
.43	.1849	.079507	0.6557	0.7548	.92	.8464	.778688	0.9592	0.9726	43	1849	79507	6.5574	3.5034	92	8464	778688	9.5917	4.5144
.44	.1936	.085184	0.6633	0.7606	.93	.8649	.804357	0.9644	0.9761	44	1936	85184	6.6332	3.5303	93	8649	804357	9.6437	4.5307
.45	.2025	.091125	0.6708	0.7663	.94	.8836	.830584	0.9695	0.9796	45	2025	91125	6.7082	3.5569	94	8836	830584	9.6954	4.5468
.46	.2116	.097336	0.6782	0.7719	.95	.9025	.857375	0.9747	0.9830	46	2116	97336	6.7823	3.5830	95	9025	857375	9.7468	4.5629
.47	.2209	.103823	0.6856	0.7775	.96	.9216	.884736	0.9798	0.9865	47	2209	103823	6.8557	3.6088	96	9216	884736	9.7980	4.5789
.48	.2304	.110592	0.6928	0.7830	.97	.9409	.912673	0.9849	0.9899	48	2304	110592	6.9282	3.6342	97	9409	912673	9.8489	4.5947
.49	.2401	.117649	0.7000	0.7884	.98	.9604	.941192	0.9899	0.9933	49	2401	117649	7.0000	3.6593	98	9604	941192	9.8995	4.6104
.50	.2500	.125000	0.7071	0.7937	.99	.9801	.970299	0.9950	0.9967	99	9801	970299	7.0000	3.6593	99	9801	970299	9.9499	4.6261

FUNCTIONS OF NUMBERS

No.	Square	Cube	Square Root	Cube Root	No.	Square	Cube	Square Root	Cube Root	No.	Square	Cube	Square Root	Cube Root	No.	Square	Cube	Square Root	Cube Root
100	10000	1000000	10.0000	4.6416	150	22500	3375000	12.2474	5.3133	200	40000	8000000	14.1421	5.8480	250	62500	15625000	15.8114	6.2996
101	10201	1030301	10.0499	4.6570	151	22801	3442951	12.2882	5.3251	201	40401	8120601	14.1774	5.8578	251	63001	15813251	15.8430	6.3080
102	10404	1061208	10.0995	4.6723	152	23104	3511808	12.3288	5.3368	202	40804	8242408	14.2127	5.8675	252	63504	16003008	15.8745	6.3164
103	10609	1092727	10.1489	4.6875	153	23409	3581577	12.3693	5.3485	203	41209	8365427	14.2478	5.8771	253	64009	16194277	15.9060	6.3247
104	10816	1124864	10.1980	4.7027	154	23716	3652264	12.4097	5.3601	204	41616	8489664	14.2829	5.8868	254	64516	16387064	15.9374	6.3330
105	11025	1157625	10.2470	4.7177	155	24025	3723875	12.4499	5.3717	205	42025	8615125	14.3178	5.8964	255	65025	16581375	15.9687	6.3413
106	11236	1191016	10.2956	4.7326	156	24336	3796416	12.4890	5.3832	206	42436	8741816	14.3527	5.9059	256	65536	16777216	16.0000	6.3496
107	11449	1225043	10.3441	4.7475	157	24649	3869893	12.5280	5.3947	207	42849	8869743	14.3875	5.9155	257	66049	16974593	16.0312	6.3579
108	11664	1259712	10.3923	4.7622	158	24964	3944312	12.5668	5.4061	208	43264	8999112	14.4222	5.9250	258	66564	17173512	16.0624	6.3661
109	11881	1295029	10.4403	4.7769	159	25281	4019679	12.6055	5.4175	209	43681	9129329	14.4568	5.9345	259	67081	17373979	16.0935	6.3743
110	12100	1331000	10.4881	4.7914	160	25600	4096000	12.6441	5.4288	210	44100	9261000	14.4914	5.9439	260	67600	17576000	16.1245	6.3825
111	12321	1367631	10.5357	4.8059	161	25921	4173281	12.6826	5.4401	211	44521	9393931	14.5258	5.9533	261	68121	17779581	16.1555	6.3907
112	12544	1404928	10.5830	4.8203	162	26244	4251328	12.7209	5.4514	212	44944	9528128	14.5602	5.9627	262	68644	17984728	16.1864	6.3988
113	12769	1442897	10.6301	4.8346	163	26569	4330747	12.7571	5.4626	213	45369	9665397	14.5945	5.9721	263	69169	18191447	16.2173	6.4070
114	12996	1481544	10.6771	4.8488	164	26896	4410944	12.7926	5.4737	214	45796	9800344	14.6287	5.9814	264	69696	18399744	16.2481	6.4151
115	13225	1520875	10.7238	4.8629	165	27225	4492125	12.8282	5.4848	215	46225	9938375	14.6629	5.9907	265	70225	18609625	16.2788	6.4232
116	13456	1560896	10.7703	4.8770	166	27556	4574296	12.8631	5.4959	216	46656	10077696	14.6969	6.0000	266	70756	18821096	16.3095	6.4312
117	13689	1601613	10.8167	4.8910	167	27889	4657463	12.8978	5.5069	217	47089	10218313	14.7309	6.0092	267	71289	19034163	16.3401	6.4393
118	13924	1643032	10.8628	4.9049	168	28224	4741632	12.9315	5.5178	218	47524	10360332	14.7648	6.0185	268	71824	19248832	16.3707	6.4473
119	14161	1685159	10.9087	4.9187	169	28561	4826809	13.0000	5.5288	219	47961	10503459	14.7986	6.0277	269	72361	19465109	16.4012	6.4553
120	14400	1728000	10.9545	4.9324	170	28900	4913000	13.0384	5.5397	220	48400	10648000	14.8324	6.0368	270	72900	19683000	16.4317	6.4633
121	14641	1771561	11.0000	4.9461	171	29241	5000211	13.0767	5.5505	221	48841	10793861	14.8661	6.0459	271	73441	19902511	16.4621	6.4713
122	14884	1815848	11.0454	4.9597	172	29584	5088448	13.1149	5.5613	222	49284	10941048	14.8997	6.0550	272	73984	20123648	16.4924	6.4792
123	15129	1860867	11.0905	4.9732	173	29929	5177717	13.1529	5.5721	223	49729	11089567	14.9332	6.0641	273	74529	20346417	16.5227	6.4872
124	15376	1906624	11.1355	4.9866	174	30276	5268024	13.1909	5.5828	224	50176	11239424	14.9666	6.0732	274	75076	20570824	16.5529	6.4951
125	15625	1953125	11.1803	5.0000	175	30625	5359375	13.2288	5.5934	225	50625	11390625	15.0000	6.0822	275	75625	20796875	16.5831	6.5030
126	15876	2000376	11.2250	5.0133	176	30976	5451776	13.2665	5.6041	226	51076	11543176	15.0333	6.0912	276	76176	21024576	16.6132	6.5108
127	16129	2048383	11.2694	5.0265	177	31329	5545203	13.3041	5.6147	227	51529	11697083	15.0665	6.1002	277	76729	21253933	16.6433	6.5187
128	16384	2097152	11.3137	5.0397	178	31684	5639752	13.3417	5.6252	228	51984	11852352	15.0997	6.1091	278	77284	21484952	16.6733	6.5265
129	16641	2146689	11.3578	5.0528	179	32041	5735339	13.3791	5.6357	229	52441	12008989	15.1327	6.1180	279	77841	21717639	16.7033	6.5343
130	16900	2197000	11.4018	5.0658	180	32400	5832000	13.4164	5.6462	230	52900	12167000	15.1658	6.1269	280	78400	21952000	16.7332	6.5421
131	17161	2248091	11.4455	5.0788	181	32761	5929741	13.4536	5.6567	231	53361	12326391	15.1987	6.1358	281	78961	22188041	16.7631	6.5499
132	17424	2299968	11.4891	5.0916	182	33124	6028568	13.4907	5.6671	232	53824	12487168	15.2315	6.1446	282	79524	22425768	16.7929	6.5577
133	17689	2352637	11.5326	5.1045	183	33489	6128487	13.5277	5.6774	233	54289	12649337	15.2643	6.1534	283	80089	22665187	16.8226	6.5654
134	17956	2406104	11.5758	5.1172	184	33856	6229504	13.5647	5.6877	234	54756	12812904	15.2971	6.1622	284	80656	22906304	16.8523	6.5731
135	18225	2460375	11.6190	5.1299	185	34225	6331625	13.6015	5.6980	235	55225	12978775	15.3297	6.1710	285	81225	23149125	16.8819	6.5808
136	18496	2515456	11.6619	5.1426	186	34596	6434856	13.6382	5.7083	236	55696	13144256	15.3623	6.1797	286	81796	23393656	16.9115	6.5885
137	18769	2571353	11.7047	5.1551	187	34969	6539203	13.6748	5.7185	237	56169	13312053	15.3948	6.1885	287	82369	23639903	16.9411	6.5962
138	19044	2628072	11.7473	5.1676	188	35344	6644672	13.7113	5.7287	238	56644	13481272	15.4272	6.1972	288	82944	23887872	16.9706	6.6039
139	19321	2685619	11.7898	5.1801	189	35721	6751269	13.7477	5.7388	239	57121	13651919	15.4596	6.2058	289	83521	24137569	17.0000	6.6115
140	19600	2744000	11.8322	5.1925	190	36100	6859000	13.7840	5.7489	240	57600	13824000	15.4919	6.2145	290	84100	24389000	17.0294	6.6191
141	19881	2803221	11.8743	5.2048	191	36481	6967871	13.8203	5.7590	241	58081	13997321	15.5242	6.2231	291	84681	24642171	17.0587	6.6267
142	20164	2863288	11.9164	5.2171	192	36864	7077888	13.8564	5.7690	242	58564	14172488	15.5563	6.2317	292	85264	24897088	17.0880	6.6343
143	20449	2924207	11.9583	5.2293	193	37249	7189057	13.8924	5.7790	243	59049	14348907	15.5885	6.2403	293	85849	25153757	17.1172	6.6419
144	20736	2985984	12.0000	5.2415	194	37636	7301384	13.9284	5.7890	244	59536	14526784	15.6205	6.2488	294	86436	25412184	17.1464	6.6494
145	21025	3048625	12.0416	5.2536	195	38025	7414875	13.9642	5.7989	245	60025	14706125	15.6525	6.2573	295	87025	25672375	17.1756	6.6569
146	21316	3112136	12.0830	5.2656	196	38416	7529536	14.0000	5.8088	246	60516	14886936	15.6844	6.2658	296	87616	25934336	17.2047	6.6644
147	21609	3176523	12.1244	5.2776	197	38809	7645373	14.0357	5.8186	247	61009	15069233	15.7162	6.2743	297	88209	26198073	17.2337	6.6719
148	21904	3241792	12.1655	5.2896	198	39204	7762392	14.0712	5.8285	248	61504	15252992	15.7480	6.2828	298	88804	26463592	17.2627	6.6794
149	22201	3307949	12.2066	5.3015	199	39601	7880599	14.1067	5.8383	249	62001	15438249	15.7797	6.2912	299	89401	26730899	17.2916	6.6869

FUNCTIONS OF NUMBERS

No.	Square	Cube	Square Root	Cube Root	No.	Square	Cube	Square Root	Cube Root	No.	Square	Cube	Square Root	Cube Root	No.	Square	Cube	Square Root	Cube Root
300	90000	27000000	17.3205	6.6943	350	122500	42875000	18.7083	7.0473	400	160000	64000000	20.0000	7.3681	450	202500	91125000	21.2132	7.6631
301	90601	27270901	17.3494	6.7018	351	123201	43243551	18.7550	7.0540	401	160801	64481201	20.0250	7.3742	451	203401	91733851	21.2368	7.6688
302	91204	27543608	17.3781	6.7092	352	123904	43614208	18.7617	7.0607	402	161604	64964808	20.0499	7.3803	452	204304	92345408	21.2603	7.6744
303	91809	27818127	17.4069	6.7166	353	124609	43986977	18.7883	7.0674	403	162409	65450827	20.0749	7.3864	453	205209	92959677	21.2838	7.6801
304	92416	28094464	17.4356	6.7240	354	125316	44361864	18.8149	7.0740	404	163216	65939264	20.0998	7.3925	454	206116	93576664	21.3073	7.6857
305	93025	28372625	17.4642	6.7313	355	126025	44738875	18.8414	7.0807	405	164025	66430125	20.1246	7.3986	455	207025	94196375	21.3307	7.6914
306	93636	28652616	17.4929	6.7387	356	126736	45118016	18.8680	7.0873	406	164836	66923416	20.1494	7.4047	456	207936	94818816	21.3542	7.6970
307	94249	28934443	17.5214	6.7460	357	127449	45499293	18.8944	7.0940	407	165649	67419143	20.1742	7.4108	457	208849	95443992	21.3776	7.7026
308	94864	29218112	17.5499	6.7533	358	128164	45882712	18.9209	7.1006	408	166464	67917312	20.1990	7.4169	458	209764	96071912	21.4009	7.7082
309	95481	29503629	17.5784	6.7606	359	128881	46268279	18.9473	7.1072	409	167281	68417929	20.2237	7.4229	459	210681	96702579	21.4243	7.7138
310	96100	29791000	17.6068	6.7679	360	129600	46656000	18.9737	7.1138	410	168100	68921000	20.2485	7.4290	460	211600	97336000	21.4476	7.7194
311	96721	30080231	17.6352	6.7752	361	130321	47045881	19.0000	7.1204	411	168921	69426531	20.2731	7.4350	461	212521	97972181	21.4709	7.7250
312	97344	30371328	17.6635	6.7824	362	131044	47437928	19.0263	7.1269	412	169744	69934528	20.2978	7.4410	462	213444	98611128	21.4942	7.7306
313	97969	30664297	17.6918	6.7897	363	131769	47832147	19.0526	7.1335	413	170569	70444997	20.3224	7.4470	463	214369	99252847	21.5174	7.7362
314	98596	30959144	17.7200	6.7969	364	132496	48228544	19.0788	7.1400	414	171396	70959944	20.3470	7.4530	464	215296	99897344	21.5407	7.7418
315	99225	31255875	17.7482	6.8041	365	133225	48627125	19.1050	7.1466	415	172225	71473375	20.3715	7.4590	465	216225	100544625	21.5639	7.7473
316	99856	31554496	17.7764	6.8113	366	133956	49027896	19.1311	7.1531	416	173056	71991296	20.3961	7.4650	466	217156	101194696	21.5870	7.7529
317	100489	31855013	17.8045	6.8185	367	134689	49430863	19.1572	7.1596	417	173889	72511713	20.4206	7.4710	467	218089	101847563	21.6102	7.7584
318	101124	32157432	17.8326	6.8256	368	135424	49836032	19.1833	7.1661	418	174724	73034632	20.4450	7.4770	468	219024	102503232	21.6333	7.7639
319	101761	32461759	17.8606	6.8328	369	136161	50243409	19.2094	7.1726	419	175561	73560059	20.4695	7.4829	469	219961	103161709	21.6564	7.7695
320	102400	32768000	17.8885	6.8399	370	136900	50653000	19.2354	7.1791	420	176400	74088000	20.4939	7.4889	470	220900	103823000	21.6795	7.7750
321	103041	33076161	17.9165	6.8470	371	137641	51064811	19.2614	7.1855	421	177241	74618461	20.5183	7.4948	471	221841	104487111	21.7025	7.7805
322	103684	33386248	17.9444	6.8541	372	138384	51478848	19.2873	7.1920	422	178084	75151448	20.5426	7.5007	472	222784	105154048	21.7256	7.7860
323	104329	33698267	17.9722	6.8612	373	139129	51895117	19.3132	7.1984	423	178929	75686967	20.5670	7.5067	473	223729	105823817	21.8486	7.7915
324	104976	34012224	18.0000	6.8683	374	139876	52313624	19.3391	7.2048	424	179776	76225024	20.5913	7.5126	474	224676	106496424	21.7715	7.7970
325	105625	34328125	18.0278	6.8753	375	140625	52734375	19.3649	7.2112	425	180625	76765625	20.6155	7.5185	475	225625	107171875	21.7945	7.8025
326	106276	34646576	18.0555	6.8824	376	141376	53157376	19.3907	7.2177	426	181476	77308776	20.6398	7.5244	476	226576	107850176	21.8174	7.8079
327	106929	34967583	18.0831	6.8894	377	142129	53582633	19.4165	7.2240	427	182329	77844583	20.6640	7.5302	477	227529	108531333	21.8403	7.8134
328	107584	35287552	18.1108	6.8964	378	142884	54010152	19.4422	7.2304	428	183184	78402752	20.6882	7.5361	478	228484	109215352	21.8632	7.8188
329	108241	35611289	18.1384	6.9034	379	143641	54439939	19.4679	7.2368	429	184041	78953589	20.7123	7.5420	479	229484	109902239	21.8861	7.8243
330	108900	35937000	18.1659	6.9104	380	144400	54872000	19.4936	7.2432	430	184900	79507000	20.7364	7.5478	480	230400	110592000	21.9089	7.8297
331	109561	36264691	18.1934	6.9174	381	145161	55306341	19.5192	7.2495	431	185761	80062991	20.7605	7.5537	481	231361	111284641	21.9317	7.8352
332	110224	36594368	18.2209	6.9244	382	145924	55742968	19.5448	7.2558	432	186624	80621568	20.7846	7.5595	482	232324	111980168	21.9545	7.8406
333	110889	36926037	18.2483	6.9313	383	146689	56181887	19.5704	7.2622	433	187489	81182737	20.8087	7.5654	483	233289	112678587	21.9773	7.8460
334	111556	37259704	18.2757	6.9382	384	147456	56623104	19.5959	7.2685	434	188356	81746504	20.8327	7.5712	484	234256	113379904	22.0000	7.8514
335	112225	37595375	18.3030	6.9451	385	148225	57066625	19.6214	7.2748	435	189225	82312875	20.8567	7.5770	485	235225	114084125	22.0227	7.8568
336	112896	37933056	18.3303	6.9521	386	148996	57512456	19.6469	7.2811	436	190096	82881856	20.8806	7.5828	486	236196	114791256	22.0454	7.8622
337	113569	38272753	18.3576	6.9589	387	149769	57960603	19.6723	7.2874	437	190969	83453453	20.9045	7.5886	487	237169	115501303	22.0681	7.8676
338	114244	38614472	18.3848	6.9658	388	150544	58411072	19.6977	7.2936	438	191844	84027672	20.9284	7.5944	488	238144	116214272	22.0907	7.8730
339	114921	38958219	18.4120	6.9727	389	151321	58863869	19.7231	7.2999	439	192721	84604519	20.9523	7.6001	489	239121	116930169	22.1133	7.8784
340	115600	39304000	18.4391	6.9795	390	152100	59319000	19.7484	7.3061	440	193600	85184000	20.9762	7.6059	490	240100	117649000	22.1359	7.8837
341	116281	39651821	18.4662	6.9864	391	152881	59776471	19.7737	7.3124	441	194481	85766121	21.0000	7.6117	491	241081	118370771	22.1585	7.8891
342	116964	40001688	18.4932	6.9932	392	153664	60236288	19.7990	7.3186	442	195364	86358088	21.0238	7.6174	492	242064	119095488	22.1811	7.8944
343	117649	40353607	18.5203	7.0000	393	154449	60698457	19.8242	7.3248	443	196249	86959857	21.0476	7.6232	493	243064	119823157	22.2036	7.8998
344	118336	40707584	18.5472	7.0068	394	155236	61162984	19.8494	7.3310	444	197136	87528384	21.0713	7.6289	494	244036	120553784	22.2261	7.9051
345	119025	41063625	18.5742	7.0136	395	156025	61629875	19.8746	7.3372	445	198025	88121125	21.0950	7.6346	495	245025	121287375	22.2486	7.9105
346	119716	41421736	18.6011	7.0203	396	156816	62099136	19.8997	7.3434	446	198916	88716536	21.1187	7.6403	496	246016	122029336	22.2711	7.9158
347	120409	41781923	18.6279	7.0271	397	157609	62570773	19.9249	7.3496	447	199809	89314623	21.1424	7.6460	497	247009	122763473	22.2935	7.9211
348	121104	42144192	18.6548	7.0338	398	158404	63044792	19.9499	7.3558	448	200704	89915392	21.1660	7.6517	498	248004	123505992	22.3159	7.9264
349	121801	42508549	18.6815	7.0406	399	159201	63521199	19.9750	7.3619	449	201601	90518849	21.1896	7.6574	499	249001	124251499	22.3383	7.9317

METRIC CONVERSIONS

- 1 gram = 15.432 grains
- 1 meter = 39.371 inches or 3.28083 feet
- 1 millimeter = 0.03937 inch, or 1/25 in. approx.
- 1 metric ton = $\left\{ \begin{array}{l} 2204.6 \text{ pounds or} \\ 9842 \text{ tons of 2240 pounds} \end{array} \right.$
- 1000 kilograms = $\left\{ \begin{array}{l} 2204.6 \text{ pounds or} \\ 9842 \text{ tons of 2240 pounds} \end{array} \right.$
- 1.016 metric ton = 1 ton of 2240 pounds
- 1016 kilograms = 1 ton of 2240 pounds

Unit	Inches to Millimeters	Millimeters to Inches	Pounds to Kilograms	Kilograms to Pounds
1	25.4001	.039371	0.45359	2.20462
2	50.8001	.078742	0.90719	4.40924
3	76.2002	.118112	1.36078	6.61386
4	101.6002	.157483	1.81437	8.81849
5	127.0003	.196854	2.26796	11.02311
6	152.4003	.236225	2.72156	13.22773
7	177.8004	.275596	3.17515	15.43235
8	203.2004	.314966	3.62874	17.63697
9	228.6005	.354337	4.08233	19.84159
10	254.0006	.393708	4.53592	22.04622
11	279.4007	.433079	4.98951	24.25084
12	304.8006	.472450	5.44312	26.45546
13	330.2007	.511821	5.89671	28.66008
14	355.6008	.551192	6.35030	30.86470
15	381.0002	.590563	6.80389	33.06932
16	406.4008	.629932	7.25748	35.27394
17	431.8009	.669303	7.71107	36.47856
18	457.2010	.708674	8.16566	39.68318
19	482.6011	.748045	8.61925	41.88780
20	508.0010	.787420	9.07190	44.09240

1 kilogram per sq. centimeter = 14.2232 lbs. per sq. in.
 1 kilogram per sq. millimeter = 1422.32 lbs. per sq. in.
 1000 lbs. per sq. in. = $\left\{ \begin{array}{l} 0.70308 \text{ kilograms per sq. mm.} \\ 70.308 \text{ kilograms per sq. cm.} \end{array} \right.$

DECIMAL AND METRIC EQUIVALENTS OF PARTS OF AN INCH

Fractional Inches	Decimal Inches	Millimeters	Fractional Inches	Decimal Inches	Millimeters
1/64 =	.015625 =	0.39687	33/64 =	.515625 =	13.09671
1/32 =	.03125 =	0.79374	17/32 =	.53125 =	13.49362
3/64 =	.046875 =	1.19061	35/64 =	.546875 =	13.89045
1/16 =	.0625 =	1.58748	9/16 =	.5625 =	14.28737
5/64 =	.078125 =	1.98435	37/64 =	.578125 =	14.68419
3/32 =	.09375 =	2.38123	19/32 =	.59375 =	15.08111
7/64 =	.109375 =	2.77809	39/64 =	.609375 =	15.47793
1/8 =	.125 =	3.17497	5/8 =	.625 =	15.87485
9/64 =	.140625 =	3.57183	41/64 =	.640625 =	16.27167
5/32 =	.15625 =	3.96871	21/32 =	.65625 =	16.66859
11/64 =	.171875 =	4.36557	43/64 =	.671875 =	17.06541
3/16 =	.1875 =	4.76245	11/16 =	.6875 =	17.46234
13/64 =	.203125 =	5.15931	45/64 =	.703125 =	17.85915
7/32 =	.21875 =	5.55620	23/32 =	.71875 =	18.25608
15/64 =	.234375 =	5.95305	47/64 =	.734375 =	18.65289
1/4 =	.25 =	6.34994	3/4 =	.75 =	19.04982
17/64 =	.265625 =	6.74679	49/64 =	.765625 =	19.44663
9/32 =	.28125 =	7.14368	25/32 =	.78125 =	19.84356
19/64 =	.296875 =	7.54053	51/64 =	.796875 =	20.24037
5/16 =	.3125 =	7.93743	13/16 =	.8125 =	20.63731
21/64 =	.328125 =	8.33427	53/64 =	.828125 =	21.03411
11/32 =	.34375 =	8.73117	27/32 =	.84375 =	21.43105
23/64 =	.359375 =	9.12801	55/64 =	.859375 =	21.82785
3/8 =	.375 =	9.52491	7/8 =	.875 =	22.22479
25/64 =	.390625 =	9.92175	57/64 =	.890625 =	22.62159
13/32 =	.40625 =	10.31865	29/32 =	.90625 =	23.01853
27/64 =	.421875 =	10.71549	59/64 =	.921875 =	23.41533
7/16 =	.4375 =	11.11240	15/16 =	.9375 =	23.81228
29/64 =	.453125 =	11.50923	61/64 =	.953125 =	24.20907
15/32 =	.46875 =	11.90614	31/32 =	.96875 =	24.60602
31/64 =	.484375 =	12.30297	63/64 =	.984375 =	25.00281
1/2 =	.5 =	12.69988	1		25.39977

MEASUREMENT CONVERSION TABLES

Circle	
Area of.....	Square of the diameter $\times .7854$.
Area of Equal Circle.....	Area of square $\times 1.273$.
Area of Sector Circle.....	Number of degrees in arc \times square of radius $\times .008727$.
Area of Segment Circle.....	Area of sector with same arc minus area of triangle formed by radii of the arc and chord of the segment.
Circumference.....	Diameter of circle $\times 3.14159$.
Circumference of Equal Circle.....	Side of square $\times 3.545$.
Diameter.....	Circumference of circle $\times .31831$.
Diameter of Circumscribing Circle.....	Side of square $\times 1.1142$.
Diameter of Equal Circle.....	Side of square $\times 1.1128$.
Cone	
Volume of.....	Area of base \times one-third of perpendicular height.
Cylinder	
Area of.....	Length \times circumference of body plus area of both ends.
Volume of.....	Area of base \times perpendicular height.
Ellipse	
Area of.....	Product of axes $\times .7854$; or half product of axes $\times 3.14159$.
Hexagon	
Area of.....	Square of diameter of inscribed circle (distance across flats) $\times .866$, or one side $\times 2.598$.
Diameter across Flats.....	Diameter across corners divided by 1.156.
Weight per foot (Steel).....	Weight per foot of same size Round Bar $\times 1.1026$.
Iron	
Weight (Cast).....	(Approx.) 0.26 lb. per cubic inch.
Weight (Wrought).....	(Approx.) 0.28 lb. per cubic inch.
Octagon	
Area of.....	Square of diameter of inscribed circle (distance across flats) $\times .828$.
Diameter across Flats.....	Diameter across corners divided by 1.082.
Weight per foot (Steel).....	Weight per foot of same size Round Bar $\times 1.0547$.
Parallelogram	
Volume of (Square or Rectangular).....	Area of cross section \times length.
Polygon	
Area of.....	Half the perimeter \times the perpendicular distance from the center to any one side.
Prism	
Volume of.....	Area of base \times perpendicular height.
Sphere (Ball)	
Area of.....	Square of diameter $\times 3.14159$; or area of its great circle $\times 4$.
Volume of.....	Cube of diameter $\times .5236$.
Square	
Side of Equal Square.....	Diameter $\times .8862$; or circumference $\times .2821$.
Side of an Inscribed Square.....	Diameter of circumscribing circle $\times .7071$ or circumference of circle $\times .2251$.
Steel	
Weight (Carbon).....	(Approx.) 0.283 lb. per cubic inch.
Weight (Round Section).....	Square of the number of $\frac{1}{4}$ inches in the diameter divided by 6 = weight per foot.
Weight (Square of Flat Section).....	Area $\times 3.4$ = weight per foot.
Trapezoid	
Area of.....	Half the sum of the two parallel sides \times the perpendicular distance between them.
Triangle	
Area of.....	Half base \times perpendicular height.
Wedge	
Volume of.....	Length of edge plus twice length of base \times one-sixth of the product of the height of the wedge and the breadth of its base.

METRIC MEASURE EQUIVALENTS

1 millimeter	= 0.03937 inch = 1/25 inch, nearly
25.4 millimeters	= 1 inch
1 centimeter	= 0.3937 inch
2.54 centimeters	= 1 inch
1 meter	= 39.37 inches = 3.2808 feet = 1.0936 yards
0.3048 meter	= 1 foot
1 kilometer	= 0.62137 statute mile
1.6093 kilometers	= 1 mile
1 square millimeter	= 0.00155 square inch, or 1973.5 cir. mils
645.2 square millimeters	= 1 square inch
1 square meter	= 10.7640 square feet = 1.196 sq. yds.
1 hectare	= 107641 square feet = 2.4711 acres
1 cubic centimeter	= 0.061 cubic inch
16.387 cubic centimeters	= 1 cubic inch
1 cubic meter	= 35.314 cubic feet = 1.308 cubic yards
0.7645 cubic meter	= 1 cubic yard
1 cubic meter	= 264.2 U. S. gallons of 231 cubic inches
1 liter (1 cu. dm.)	= 61.0234 cubic inches = 0.0353 cubic foot
28.317 liters	= 1 cubic foot
1 liter	= 0.2642 U. S. gallon of 231 cubic inches
3.785 liters	= 1 U. S. gallon of 231 cubic inches
1 hectoliter	= 0.1308 cubic yard = 3.5314 cubic feet
1 gram	= 15.43235 grains (Act of Congress)
0.0648 gram	= 1 grain
1 gram	= 0.0353 ounce avoirdupois
1 kilogram	= 35.2738 ounces avoirdupois = 2.2046 pounds
0.45359 kilogram	= 1 pound avoirdupois
907.2 kilograms	= 1 ton of 2000 pounds
1016 kilograms	= 1 ton of 2240 pounds
1 metric ton	
(1000 kilograms)	= 2204.6 pounds
1 kg. per sq. cm.	= 14.2232 lbs. per sq. in.
1 kg. per sq. mm.	= 1422.32 lbs. per sq. in.
0.70308 kg. per sq. mm.	= 1000 lbs. per sq. in.
70.308 kg. per sq. cm.	= 1000 lbs. per sq. in.
1 kilogram-meter	= 7.2330 foot-pounds
1 kilowatt	= 1.34 horse-power
1 calorie	= 3.968 British thermal units (B.t.u.)

INTERCONVERSION TABLE

Multiply by

To Convert From	To B.t.u.	To P.C.U.	To Cal.	To Ft.-lb.	To Ft. Tons	To Kg.-m.	To Hp-hr.	To Kw-hr.	To Joules	To Lb. C.	To Lb. H ₂ O
B.t.u.....	1.00000	0.55556	0.251996	778.000	0.389001	107.563	0.033929	0.032931	1055.20	0.06876	0.001031
P.C.U.....	1.80000	1.00000	0.453593	1400.40	0.700202	193.613	0.037072	0.035276	1899.36	0.031238	0.001855
Calories.....	3.96832	2.20462	1.00000	3091.36	1.54368	426.844	0.001559	0.001163	4187.37	0.032729	0.004089
Ft.lb.....	0.001285	0.037141	0.033239	1.00000	0.000500	0.138255	0.030500	0.033767	1.35625	0.038840	0.031325
Ft. Tons.....	2.57069	1.42816	0.647804	2000.00	1.00000	276.511	0.001010	0.037535	2712.59	0.031768	0.002649
Kg.-m.....	0.009297	0.005165	0.002343	7.23301	0.003617	1.00000	0.033653	0.032725	9.81009	0.063194	0.039580
Hp-hr.....	2544.99	1413.88	641.327	1980000	990.004	273747	1.00000	0.746000	2685473	0.175044	2.62261
Kw-hr.....	3411.57	1895.32	859.702	2654200	1327.10	366959	1.34041	1.00000	3599889	0.234648	3.51562
Joules.....	0.039477	0.035265	0.032388	0.737311	0.033687	0.101937	0.033724	0.032778	1.00000	0.06518	0.039766
Lbs. C.....	14544.0	8080.00	3665.03	113150 ₃	5657.63	1564396	5.71434	4.26285	153470 ₃	1.00000	14.9876
Lbs. H ₂ O.....	970.400	539.111	244.537	754971	377.487	104379	0.381270	0.284424	1023966	0.066744	1.00000

Note: The small subnumeral following a zero indicates that the zero is to be taken that number of times, thus, 0.031428 is equivalent to 0.0001428.

"P.C.U." refers to the "pound-centigrade" unit. The ton used is 2000 lb. "Lb. C." refers to pounds of carbon oxidized, 100% efficiency equivalent to the corresponding number of heat units.

"Lb. H₂O" refers to pounds of water evaporated at 100° C. = 212° F. at 100% efficiency.

INTERCONVERSION TABLE FOR UNITS OF VOLUME AND WEIGHT

Multiply by

To Convert From	To Cu. in.	To Cu. ft.	To Cu. yd.	To Fl. oz.	To Pt.	To Qt.	To Gal.	To Grain	To Oz. Troy	To Oz. Av.	To Lb. Troy	To Lb. Av.	To C.C. or G.	To L. or Kg.
Cu. in.....	1.00000	0.03787	0.02143	0.554112	0.034632	0.017316	0.004329	252.891	0.526857	0.578037	0.043905	0.036127	16.3871	0.016387
Cu. ft.....	1728.00	1.00000	0.037037	957.505	59.8442	29.9221	7.48052	436996	910.408	998.848	75.8674	62.4280	28316.9	28.3169
Cu. yd.....	46656.0	27.0000	1.00000	25852.6	1615.79	807.896	201.974	117990 ₃	24581.0	26968.9	2048.42	1685.56	764556	764.556
Fl. oz.....	1.80469	0.001044	0.03868	1.00000	0.062500	0.031250	0.007813	456.390	0.950813	1.04318	0.079234	0.065199	29.5736	0.029573
Pt.....	28.8750	0.016710	0.06189	16.0000	1.00000	0.500000	0.125000	7302.23	15.2130	16.6908	1.26775	1.04318	473.177	0.473177
Qt.....	57.7500	0.033420	0.001238	32.0000	2.00000	1.00000	0.250000	1460.45	30.4260	33.3816	2.53550	2.08635	946.354	0.946354
Gal.....	231.000	0.133681	0.004951	128.000	8.00000	4.00000	1.00000	58417.9	121.704	133.527	10.1420	8.34541	3785.42	3.78542
Grain.....	0.003954	0.02288	0.038475	0.002191	0.031369	0.036850	0.01712	1.00000	0.002083	0.002286	0.031735	0.031428	0.064799	0.031428
Oz. Troy.....	1.89805	0.001098	0.034068	1.05173	0.065733	0.032867	0.008217	480.000	1.00000	1.09714	0.083333	0.068571	31.1035	0.031104
Oz. Av.....	1.72999	0.001001	0.033708	0.958608	0.059913	0.029957	0.007489	437.500	0.911457	1.00000	0.075955	0.062500	28.3495	0.028350
Lb. Troy.....	22.7766	0.013181	0.034882	12.6208	0.788800	0.394400	0.098600	5760.00	12.0000	13.1657	1.00000	0.822857	373.242	0.373242
Lb. Av.....	27.6799	0.016018	0.035933	15.3378	0.958611	0.479306	0.119826	7000.00	14.5833	16.0000	1.21528	1.00000	453.593	0.453593
C.C. or G.....	0.061024	0.03531	0.031308	0.033814	0.002113	0.001057	0.02642	15.4323	0.032151	0.035274	0.002679	0.002205	1.00000	0.001000
L. or Kg.....	61.0237	0.035315	0.001308	33.8140	2.11337	1.05669	0.264172	15432.3	32.1507	35.2739	2.67923	2.20462	1000.00	1.00000

Note: The small subnumeral following a zero indicates that the zero is to be taken that number of times, thus, 0.031428 is equivalent to 0.0001428.

Values Used in Constructing Table: 1 in. = 2.540001 cm.; 1 cu. in. = 16.387083 C.C. = 16.387083 g. H₂O at 4° C. = 39° F.; 1 lb. av. = 453.5926 g.; 1 gal. = 8.34541 lb.; 1 lb. av. = 27.679886 cu. in. H₂O at 4° C.; 1 lb. av. = 7000 grains, 1 gal. = 58417.87 grains; 231 cu. in. = 1 gal. = 3785.4162 g.

HARDNESS AND TENSILE STRENGTH COORDINATION

Shore Uni.	Rockwell B-1/16	C	Brinell 10 mm	Tensile p. s. i.	Shore Uni.	Rockwell B-1/16	C	Brinell 10 mm	Tensile p. s. i.
			18	10,000	31	94	14	206	100,500
			20	12,000	32	95	15	210	102,400
			24	14,000	32	95	16	215	104,600
			28	16,000	33	96	17	220	106,800
			32	18,000	33	97	18	225	109,000
			35	20,000	34	97	19	230	110,000
			39	22,000	35	98	20	235	113,200
			42	24,000	36	99	21	241	115,800
			46	26,000	36	100	22	247	118,500
			50	28,000	37	101	23	253	121,200
	3		53	30,000	38	102	24	259	124,000
	10		57	32,000	39	102	25	265	126,500
	15		60	34,000	40	103	26	272	129,500
	22		64	36,000	41	104	27	279	133,000
	28		68	38,000	42	105	28	286	135,000
	33		72	40,000	43	106	29	294	139,500
	38		76	42,000	44	106	30	301	142,300
	43		79	44,000	45	107	31	309	146,000
	47		83	46,000	46	108	32	318	150,000
	50		87	48,000	47	109	33	327	153,800
	54		92	50,000	48	110	34	337	158,000
	57		96	52,000	50	111	35	347	162,800
	60		100	54,000	51	111	36	357	167,800
	62		104	56,000	52	113	37	367	173,500
	65		108	58,000	53	114	38	377	179,600
	67		113	60,000	54	115	39	387	186,000
	69		117	62,000	56	116	40	398	193,000
	71		122	64,000	57	117	41	408	200,000
	73		127	66,000	58		42	419	206,500
	75		131	68,000	59		43	430	213,400
	76		136	70,000	61		44	442	221,000
	78		140	72,000	62		45	453	231,600
	80		145	74,000	63		46	464	236,600
	81		150	76,000	65		47	476	245,500
	82		154	78,000	66		48	488	255,500
25	84		158	80,000	67		49	500	263,500
25	85	1	160	80,700	69		50	512	273,000
25	85	2	162	81,500	70		51	524	283,000
26	86	3	165	82,800	71		52	536	
26	87	4	168	84,000	73		53	548	
26	88	4	171	85,000	74		56		
27	88	5	174	87,000	76		57		
28	88	6	177	88,000	77		58		
29	89	7	180	89,200	78		59		
29	89	8	183	90,600	80		60		
29	90	9	186	91,800	81		61		
29	91	10	190	93,800	82		62		
30	91	11	193	95,000	84		63		
30	92	12	197	95,800					
30	93	13	201	98,500					

NOTE—The tensile values shown here for hardness readings are not to be taken as absolute or accurate but can be used as a guide to inspection and checking work.

TEMPERATURE CONVERSION TABLE

C.	F.	C.	F.	C.	F.	C.	F.	C.	F.	C.	F.	C.	F.
-73.3	-100	13.9	57	171	340	543	1010	921	1690	1293	2360		
-67.8	-90	14.4	58	177	350	549	1020	927	1700	1299	2370		
-62.2	-80	15.0	59	182	360	554	1030	932	1710	1304	2380		
-56.7	-70	15.6	60	188	370	560	1040	938	1720	1310	2390		
-51.1	-60	16.1	61	193	380	566	1050	943	1730	1316	2400		
-45.6	-50	16.7	62	199	390	571	1060	949	1740	1321	2410		
-40.0	-40	17.2	63	204	400	577	1070	954	1750	1327	2420		
-34.4	-30	17.8	64	210	410	582	1080	960	1760	1332	2430		
-28.9	-20	18.3	65	216	420	588	1090	966	1770	1338	2440		
-23.3	-10	18.9	66	221	430	593	1100	971	1780	1343	2450		
-17.8	0	19.4	67	227	440	599	1110	977	1790	1349	2460		
-17.8	0	20.0	68	232	450	604	1120	982	1800	1354	2470		
-17.2	1	20.6	69	238	460	610	1130	988	1810	1360	2480		
-16.7	2	21.1	70	243	470	616	1140	993	1820	1366	2490		
-16.1	3	21.7	71	249	480	621	1150	999	1830	1371	2500		
-15.6	4	22.2	72	254	490	627	1160	1004	1840	1377	2510		
-15.0	5	22.8	73	260	500	632	1170	1010	1850	1382	2520		
-14.4	6	23.3	74	266	510	638	1180	1016	1860	1388	2530		
-13.9	7	23.9	75	271	520	643	1190	1021	1870	1393	2540		
-13.3	8	24.4	76	277	530	649	1200	1027	1880	1399	2550		
-12.8	9	25.0	77	282	540	654	1210	1032	1890	1404	2560		
-12.2	10	25.6	78	288	550	660	1220	1038	1900	1410	2570		
-11.7	11	26.1	79	293	560	666	1230	1043	1910	1416	2580		
-11.1	12	26.7	80	299	570	671	1240	1049	1920	1421	2590		
-10.6	13	27.2	81	304	580	677	1250	1054	1930	1427	2600		
-10.0	14	27.8	82	310	590	682	1260	1060	1940	1432	2610		
-9.44	15	28.3	83	316	600	688	1270	1066	1950	1438	2620		
-8.89	16	28.9	84	321	610	693	1280	1071	1960	1443	2630		
-8.33	17	29.4	85	327	620	699	1290	1077	1970	1449	2640		
-7.78	18	30.0	86	332	630	704	1300	1082	1980	1454	2650		
-7.22	19	30.6	87	338	640	710	1310	1088	1990	1460	2660		
-6.67	20	31.1	88	343	650	716	1320	1093	2000	1466	2670		
-6.11	21	31.7	89	349	660	721	1330	1093	2000	1471	2680		
-5.56	22	32.2	90	354	670	727	1340	1099	2010	1477	2690		
-5.00	23	32.8	91	360	680	732	1350	1104	2020	1482	2700		
-4.44	24	33.3	92	366	690	738	1360	1110	2030	1488	2710		
-3.89	25	33.9	93	371	700	743	1370	1116	2040	1493	2720		
-3.33	26	34.4	94	377	710	749	1380	1121	2050	1499	2730		
-2.78	27	35.0	95	382	720	754	1390	1127	2060	1504	2740		
-2.22	28	35.6	96	388	730	760	1400	1132	2070	1510	2750		
-1.67	29	36.1	97	393	740	766	1410	1138	2080	1516	2760		
-1.11	30	36.7	98	399	750	771	1420	1143	2090	1521	2770		
-0.56	31	37.2	99	404	760	777	1430	1149	2100	1527	2780		
0.	32	37.8	100	410	770	782	1440	1154	2110	1532	2790		
0.56	33	43	110	416	780	788	1450	1160	2120	1538	2800		
1.11	34	49	120	421	790	793	1460	1166	2130	1543	2810		
1.67	35	54	130	427	800	799	1470	1171	2140	1549	2820		
2.22	36	60	140	432	810	804	1480	1177	2150	1554	2830		
2.78	37	66	150	438	820	810	1490	1182	2160	1560	2840		
3.33	38	71	160	443	830	816	1500	1188	2170	1566	2850		
3.89	39	77	170	449	840	821	1510	1193	2180	1571	2860		
4.44	40	82	180	454	850	827	1520	1199	2190	1577	2870		
5.00	41	88	190	460	860	832	1530	1204	2200	1582	2880		
5.56	42	93	200	466	870	838	1540	1210	2210	1588	2890		
6.11	43	99	210	471	880	843	1550	1216	2220	1593	2900		
6.67	44	100	212	477	890	849	1560	1221	2230	1599	2910		
7.22	45	104	220	482	900	854	1570	1227	2240	1604	2920		
7.78	46	110	230	488	910	860	1580	1232	2250	1610	2930		
8.33	47	116	240	493	920	866	1590	1238	2260	1616	2940		
8.89	48	121	250	499	930	871	1600	1243	2270	1621	2950		
9.44	49	127	260	504	940	877	1610	1249	2280	1627	2960		
10.0	50	132	270	510	950	882	1620	1254	2290	1632	2970		
10.6	51	138	280	516	960	888	1630	1260	2300	1638	2980		
11.1	52	143	290	521	970	893	1640	1266	2310	1643	2990		
11.7	53	149	300	527	980	899	1650	1271	2320	1649	3000		
12.2	54	154	310	532	990	904	1660	1277	2330	1654	3010		
12.8	55	160	320	538	1000	910	1670	1282	2340	1659	3020		
13.3	56	166	330	543	1010	916	1680	1288	2350	1664	3030		

Note: The numbers in bold face type refer to the temperature either in degrees Centigrade or Fahrenheit which is desired to convert into the other scale. If converting from Fahrenheit degrees to Centigrade degrees the equivalent temperature will be found in the left column, while if converting from degrees Centigrade to degrees Fahrenheit, the answer will be found in the column on the right.

