

Lambert conformal conic projection with two standard parallels
Plane coordinate projection tables

Ellipsoidal constants

a = 6378137 m
f = 1/298.257222101

Defining constants

$\phi_b = 39^{\circ}20'$ (latitude of grid origin)
 $\lambda_o = 105\ 30$ (longitude of origin and Central Meridian, CM)
 $\phi_s = 39\ 43$ (southern standard parallel)
 $\phi_n = 40\ 47$ (northern standard parallel)
 $E_o = 914401.8289$ m (easting coordinate of origin)
 $N_b = 304800.6096$ m (northing coordinate of origin)

Derived constants

$l = 0.646133456811 = \sin(\phi_o)$
 $K = 12361909.8309$ m (mapping radius at the equator)
 $R_b = 7646051.6244$ m (mapping radius at grid origin)

Lambert coordinates (N,E) from geodetic positions (ϕ, λ)

$\gamma = (\lambda_{CM} - \lambda) \sin(\phi_o)$ (γ is the meridional convergence)
 $E = R \sin(\gamma) + E_o$ (R from table)
 $N = R_b - R \cos(\gamma) + N_b$

Station	Latitude Longitude	R γ	Sin(γ) Cos(γ)	E N
Sample 1	40 15 00.00000	7544273.613 m	-0.0056385482	871863.078 m
	106 00 00.00000	-0 19 23.04022	0.9999841033	406698.550 m

Geodetic positions from Lambert coordinates

$\tan(\gamma) = (E - E_o) / ((R_b - (N - N_b)))$
 $R = (R_b - (N - N_b)) / \cos(\gamma)$
 $\lambda = \lambda_{CM} - \gamma/l$
 ϕ from table using R

Station	E N	E - E _o R _b - (N - N _b)	R γ	Latitude Longitude
Sample 2	964401.829 m	50000.000 m	7536217.492 m	40 19 21.1964
	414800.610 m	7536051.624 m	0 22 48.50031	104 54 42.0160

WARNING: Use sufficient significant digits for trig.functions

NAD 83
COLORADO NORTH

<u>Lat</u>	<u>R (meters)</u>	<u>tab diff.</u>	<u>k</u>
39°20'	7646051.624	30.84197	1.00008395
39 21	7644201.107	30.84191	1.00007939
39 22	7642350.592	30.84187	1.00007490
39 23	7640500.080	30.84182	1.00007050
39 24	7638649.570	30.84178	1.00006618
39 25	7636799.064	30.84174	1.00006195
39 26	7634948.560	30.84170	1.00005780
39 27	7633098.058	30.84166	1.00005373
39 28	7631247.558	30.84163	1.00004975
39 29	7629397.060	30.84160	1.00004585
39 30	7627546.564	30.84157	1.00004203
39 31	7625696.070	30.84155	1.00003830
39 32	7623845.577	30.84152	1.00003465
39 33	7621995.086	30.84150	1.00003108
39 34	7620144.596	30.84149	1.00002760
39 35	7618294.106	30.84147	1.00002420
39 36	7616443.618	30.84146	1.00002088
39 37	7614593.130	30.84145	1.00001765
39 38	7612742.644	30.84144	1.00001450
39 39	7610892.157	30.84144	1.00001143
39 40	7609041.671	30.84144	1.00000845
39 41	7607191.185	30.84144	1.00000555
39 42	7605340.698	30.84144	1.00000273
39 43	7603490.212	30.84145	1.00000000
39 44	7601639.725	30.84145	0.99999735
39 45	7599789.238	30.84147	0.99999479
39 46	7597938.750	30.84148	0.99999231
39 47	7596088.261	30.84150	0.99998991
39 48	7594237.772	30.84151	0.99998760
39 49	7592387.281	30.84154	0.99998537
39 50	7590536.789	30.84156	0.99998322
39 51	7588686.295	30.84159	0.99998116
39 52	7586835.800	30.84161	0.99997918
39 53	7584985.303	30.84165	0.99997728
39 54	7583134.804	30.84168	0.99997547
39 55	7581284.303	30.84172	0.99997375
39 56	7579433.800	30.84176	0.99997210
39 57	7577583.295	30.84180	0.99997054
39 58	7575732.787	30.84184	0.99996907
39 59	7573882.276	30.84189	0.99996768

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<u>Lat</u>	<u>R (meters)</u>	<u>tab diff.</u>	<u>k</u>
40° 0'	7572031.763	30.84194	0.99996637
40 1	7570181.246	30.84199	0.99996515
40 2	7568330.727	30.84205	0.99996401
40 3	7566480.204	30.84211	0.99996295
40 4	7564629.677	30.84217	0.99996198
40 5	7562779.147	30.84223	0.99996109
40 6	7560928.613	30.84230	0.99996029
40 7	7559078.076	30.84236	0.99995957
40 8	7557227.534	30.84243	0.99995893
40 9	7555376.988	30.84251	0.99995838
40 10	7553526.437	30.84258	0.99995792
40 11	7551675.882	30.84266	0.99995753
40 12	7549825.322	30.84274	0.99995724
40 13	7547974.758	30.84283	0.99995702
40 14	7546124.188	30.84291	0.99995689
40 15	7544273.613	30.84300	0.99995685
40 16	7542423.033	30.84309	0.99995688
40 17	7540572.447	30.84319	0.99995701
40 18	7538721.856	30.84329	0.99995721
40 19	7536871.259	30.84339	0.99995751
40 20	7535020.656	30.84349	0.99995788
40 21	7533170.047	30.84359	0.99995834
40 22	7531319.431	30.84370	0.99995889
40 23	7529468.809	30.84381	0.99995952
40 24	7527618.181	30.84392	0.99996023
40 25	7525767.545	30.84404	0.99996103
40 26	7523916.903	30.84415	0.99996191
40 27	7522066.254	30.84427	0.99996288
40 28	7520215.597	30.84440	0.99996393
40 29	7518364.934	30.84452	0.99996506
40 30	7516514.262	30.84465	0.99996629
40 31	7514663.583	30.84478	0.99996759
40 32	7512812.896	30.84492	0.99996898
40 33	7510962.201	30.84505	0.99997046
40 34	7509111.498	30.84519	0.99997201
40 35	7507260.787	30.84533	0.99997366
40 36	7505410.067	30.84548	0.99997539
40 37	7503559.338	30.84562	0.99997720
40 38	7501708.601	30.84577	0.99997910
40 39	7499857.855	30.84592	0.99998108

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<u>Lat</u>	<u>R (meters)</u>	<u>tab diff.</u>	<u>k</u>
40° 40'	7498007.099	30.84608	0.99998315
40 41	7496156.335	30.84623	0.99998530
40 42	7494305.561	30.84639	0.99998754
40 43	7492454.777	30.84656	0.99998986
40 44	7490603.984	30.84672	0.99999227
40 45	7488753.180	30.84689	0.99999476
40 46	7486902.367	30.84706	0.99999734
40 47	7485051.543	30.84723	1.00000000
40 48	7483200.709	30.84741	1.00000275
40 49	7481349.865	30.84759	1.00000558
40 50	7479499.010	30.84777	1.00000850
40 51	7477648.144	30.84795	1.00001150
40 52	7475797.267	30.84814	1.00001459
40 53	7473946.379	30.84832	1.00001776
40 54	7472095.479	30.84852	1.00002101
40 55	7470244.569	30.84871	1.00002436
40 56	7468393.646	30.84891	1.00002778
40 57	7466542.712	30.84910	1.00003130
40 58	7464691.765	30.84931	1.00003490
40 59	7462840.807	30.84951	1.00003858
41 0	7460989.836	30.84972	1.00004235
41 1	7459138.853	30.84993	1.00004620
41 2	7457287.858	30.85014	1.00005014
41 3	7455436.849	30.85036	1.00005416
41 4	7453585.828	30.85057	1.00005827
41 5	7451734.793	30.85079	1.00006247
41 6	7449883.746	30.85102	1.00006675
41 7	7448032.685	30.85124	1.00007112
41 8	7446181.610	30.85147	1.00007557
41 9	7444330.522	30.85170	1.00008010
41 10	7442479.420	30.85193	1.00008473
41 11	7440628.304	30.85217	1.00008943
41 12	7438777.174	30.85241	1.00009423
41 13	7436926.029	30.85265	1.00009911
41 14	7435074.870	30.85289	1.00010407
41 15	7433223.697	30.85314	1.00010912
41 16	7431372.508	30.85339	1.00011426
41 17	7429521.305	30.85364	1.00011948
41 18	7427670.086	30.85390	1.00012479
41 19	7425818.853	30.85415	1.00013018