

The Sundial Primer - "Dialling Guide"

created by Carl Sabanski

Analemmatic Sundial

Latitude: 50.0° N/S

Earliest Sunrise: 3:49 a.m. Latest Sunset: 8:11 p.m.
 Semi-Major Axis (E-W): 1000 mm Semi-Minor Axis (N-S): 766.0 mm
 Sunrise/Sunset Markers: X = ± 371.3 mm

Local Time		X	Y	Z	W	Local Time		X	Y	Z	W
12:00		0.0	766.0	766.0	0.0						
11:55	12:05	21.8	765.9	766.2	21.8	8:25	3:35	806.4	453.0	925.0	865.1
11:50	12:10	43.6	765.3	766.6	43.6	8:20	3:40	819.2	439.4	929.6	881.9
11:45	12:15	65.4	764.4	767.2	65.4	8:15	3:45	831.5	425.6	934.1	898.5
11:40	12:20	87.2	763.1	768.1	87.2	8:10	3:50	843.4	411.6	938.5	914.8
11:35	12:25	108.9	761.5	769.2	109.0	8:05	3:55	854.9	397.4	942.8	931.0
11:30	12:30	130.5	759.5	770.6	130.7	8:00	4:00	866.0	383.0	946.9	946.9
11:25	12:35	152.1	757.1	772.3	152.4	7:55	4:05	876.7	368.5	951.0	962.7
11:20	12:40	173.6	754.4	774.1	174.0	7:50	4:10	887.0	353.7	954.9	978.2
11:15	12:45	195.1	751.3	776.2	195.6	7:45	4:15	896.9	338.8	958.7	993.4
11:10	12:50	216.4	747.9	778.6	217.2	7:40	4:20	906.3	323.7	962.4	1008.5
11:05	12:55	237.7	744.1	781.1	238.7	7:35	4:25	915.3	308.5	965.9	1023.3
11:00	1:00	258.8	739.9	783.9	260.1	7:30	4:30	923.9	293.2	969.3	1037.9
10:55	1:05	279.8	735.4	786.9	281.5	7:25	4:35	932.0	277.6	972.5	1052.2
10:50	1:10	300.7	730.6	790.1	302.8	7:20	4:40	939.7	262.0	975.5	1066.3
10:45	1:15	321.4	725.4	793.4	324.0	7:15	4:45	946.9	246.2	978.4	1080.2
10:40	1:20	342.0	719.8	797.0	345.1	7:10	4:50	953.7	230.4	981.1	1093.9
10:35	1:25	362.4	714.0	800.7	366.2	7:05	4:55	960.0	214.4	983.7	1107.3
10:30	1:30	382.7	707.7	804.6	387.1	7:00	5:00	965.9	198.3	986.1	1120.4
10:25	1:35	402.7	701.2	808.6	407.9	6:55	5:05	971.3	182.1	988.3	1133.4
10:20	1:40	422.6	694.3	812.8	428.7	6:50	5:10	976.3	165.8	990.3	1146.1
10:15	1:45	442.3	687.0	817.1	449.3	6:45	5:15	980.8	149.4	992.1	1158.5
10:10	1:50	461.7	679.5	821.5	469.8	6:40	5:20	984.8	133.0	993.8	1170.7
10:05	1:55	481.0	671.6	826.1	490.2	6:35	5:25	988.4	116.5	995.2	1182.7
10:00	2:00	500.0	663.4	830.7	510.4	6:30	5:30	991.4	100.0	996.5	1194.4
9:55	2:05	518.8	654.9	835.5	530.5	6:25	5:35	994.1	83.4	997.5	1205.9
9:50	2:10	537.3	646.1	840.3	550.5	6:20	5:40	996.2	66.8	998.4	1217.1
9:45	2:15	555.6	636.9	845.2	570.4	6:15	5:45	997.9	50.1	999.1	1228.1
9:40	2:20	573.6	627.5	850.1	590.1	6:10	5:50	999.0	33.4	999.6	1238.9
9:35	2:25	591.3	617.8	855.2	609.6	6:05	5:55	999.8	16.7	999.9	1249.4
9:30	2:30	608.8	607.7	860.2	629.0	6:00	6:00	1000.0	0.0	1000.0	1259.7
9:25	2:35	625.9	597.4	865.3	648.2	5:55	6:05	999.8	-16.7	999.9	1269.7
9:20	2:40	642.8	586.8	870.4	667.3	5:50	6:10	999.0	-33.4	999.6	1279.5
9:15	2:45	659.3	575.9	875.5	686.2	5:45	6:15	997.9	-50.1	999.1	1289.1
9:10	2:50	675.6	564.8	880.6	704.9	5:40	6:20	996.2	-66.8	998.4	1298.5
9:05	2:55	691.5	553.4	885.7	723.5	5:35	6:25	994.1	-83.4	997.5	1307.6
9:00	3:00	707.1	541.7	890.7	741.9	5:30	6:30	991.4	-100.0	996.5	1316.4
8:55	3:05	722.4	529.7	895.8	760.0	5:25	6:35	988.4	-116.5	995.2	1325.1
8:50	3:10	737.3	517.5	900.8	778.0	5:20	6:40	984.8	-133.0	993.8	1333.5
8:45	3:15	751.8	505.1	905.7	795.8	5:15	6:45	980.8	-149.4	992.1	1341.7
8:40	3:20	766.0	492.4	910.7	813.5	5:10	6:50	976.3	-165.8	990.3	1349.6
8:35	3:25	779.9	479.5	915.5	830.9	5:05	6:55	971.3	-182.1	988.3	1357.4
8:30	3:30	793.4	466.3	920.3	848.1	5:00	7:00	965.9	-198.3	986.1	1364.9

Analemmatic Sundial

Latitude: 50.0° N/S

Earliest Sunrise: 3:49 a.m. Latest Sunset: 8:11 p.m.
 Semi-Major Axis (E-W): 1000 mm Semi-Minor Axis (N-S): 766.0 mm
 Sunrise/Sunset Markers: $X = \pm 371.3$ mm

Local Time		X	Y	Z	W
4:55	7:05	960.0	-214.4	983.7	1372.2
4:50	7:10	953.7	-230.4	981.1	1379.3
4:45	7:15	946.9	-246.2	978.4	1386.1
4:40	7:20	939.7	-262.0	975.5	1392.8
4:35	7:25	932.0	-277.6	972.5	1399.3
4:30	7:30	923.9	-293.2	969.3	1405.5
4:25	7:35	915.3	-308.5	965.9	1411.6
4:20	7:40	906.3	-323.7	962.4	1417.4
4:15	7:45	896.9	-338.8	958.7	1423.1
4:10	7:50	887.0	-353.7	954.9	1428.5
4:05	7:55	876.7	-368.5	951.0	1433.8
4:00	8:00	866.0	-383.0	946.9	1438.9
3:55	8:05	854.9	-397.4	942.8	1443.8
3:50	8:10	843.4	-411.6	938.5	1448.5
3:45	8:15	831.5	-425.6	934.1	1453.0

Analematic Sundial

Latitude: 50.0° N/S

Date Scale

Semi-Major Axis (E-W): 1000 mm Semi-Minor Axis (N-S): 766.0 mm

Month	Date										
	1	5	6	10	11	15	16	20	21	25	26
January	-272.7	-267.6	-266.0	-258.9	-256.8	-248.0	-245.6	-235.1	-232.3	-220.5	-217.3
February	-197.3	-182.9	-179.1	-163.8	-160.0	-144.0	-139.9	-123.4	-119.2	-102.3	-97.9
March	-85.0	-67.6	-63.1	-45.5	-41.1	-23.3	-19.0	-1.1	3.3	21.0	25.4
April	51.7	69.0	73.4	90.3	94.6	111.3	115.3	131.6	135.6	151.2	155.0
May	173.7	188.0	191.4	204.6	207.9	220.1	223.0	234.1	236.8	246.5	248.7
June	260.7	267.0	268.5	273.1	274.2	277.1	277.5	278.6	278.7	276.7	277.6
July	274.2	269.8	268.5	262.6	260.9	253.2	251.1	242.0	239.6	229.1	226.4
August	208.6	195.7	192.4	178.5	175.0	160.4	156.6	141.3	137.4	121.6	117.5
September	93.0	76.2	72.0	54.9	50.6	33.3	29.1	11.7	7.3	-10.2	-14.6
October	-36.4	-53.9	-58.2	-75.5	-79.7	-96.9	-101.1	-117.9	-122.0	-138.4	-142.4
November	-165.9	-180.9	-184.6	-198.7	-202.2	-215.3	-218.4	-230.4	-233.2	-243.8	-246.4
December	-257.4	-264.8	-266.4	-271.8	-273.0	-276.4	-277.1	-278.6	-278.7	-278.0	-277.6

Northern Hemisphere

Month	Date										
	1	5	6	10	11	15	16	20	21	25	26
January	272.7	267.6	266.0	258.9	256.8	248.0	245.6	235.1	232.3	220.5	217.3
February	197.3	182.9	179.1	163.8	160.0	144.0	139.9	123.4	119.2	102.3	97.9
March	85.0	67.6	63.1	45.5	41.1	23.3	19.0	1.1	-3.3	-21.0	-25.4
April	-51.7	-69.0	-73.4	-90.3	-94.6	-111.3	-115.3	-131.6	-135.6	-151.2	-155.0
May	-173.7	-188.0	-191.4	-204.6	-207.9	-220.1	-223.0	-234.1	-236.8	-246.5	-248.7
June	-260.7	-267.0	-268.5	-273.1	-274.2	-277.1	-277.5	-278.6	-278.7	-276.7	-277.6
July	-274.2	-269.8	-268.5	-262.6	-260.9	-253.2	-251.1	-242.0	-239.6	-229.1	-226.4
August	-208.6	-195.7	-192.4	-178.5	-175.0	-160.4	-156.6	-141.3	-137.4	-121.6	-117.5
September	-93.0	-76.2	-72.0	-54.9	-50.6	-33.3	-29.1	-11.7	-7.3	10.2	14.6
October	36.4	53.9	58.2	75.5	79.7	96.9	101.1	117.9	122.0	138.4	142.4
November	165.9	180.9	184.6	198.7	202.2	215.3	218.4	230.4	233.2	243.8	246.4
December	257.4	264.8	266.4	271.8	273.0	276.4	277.1	278.6	278.7	278.0	277.6

Southern Hemisphere

The shaded "Date" boxes identify the two extremes of the "Date Scale" that occur on the Summer and Winter Solstices.

A number of "Date Scale" configurations are available including the following "Date Line" combinations:

a) 1

c) 1,10,20

e) 1,5,10,15,20,25

b) 1,15

d) 1,11,21

f) 1,6,11,16,21,26

Analemmatic Sundial

Latitude: 50.0° N/S

Earliest Sunrise: 3:49 a.m. Latest Sunset: 8:11 p.m.
 Semi-Major Axis (E-W): 1500 mm Semi-Minor Axis (N-S): 1149.1 mm
 Sunrise/Sunset Markers: X = ± 557.0 mm

Local Time		X	Y	Z	W	Local Time		X	Y	Z	W
12:00		0.0	1149.1	1149.1	0.0						
11:55	12:05	32.7	1148.8	1149.3	32.7	8:25	3:35	1209.7	679.5	1387.4	1297.6
11:50	12:10	65.4	1148.0	1149.8	65.4	8:20	3:40	1228.7	659.1	1394.3	1322.8
11:45	12:15	98.1	1146.6	1150.8	98.1	8:15	3:45	1247.2	638.4	1401.1	1347.7
11:40	12:20	130.7	1144.7	1152.1	130.8	8:10	3:50	1265.1	617.4	1407.7	1372.3
11:35	12:25	163.3	1142.2	1153.9	163.4	8:05	3:55	1282.4	596.1	1414.1	1396.5
11:30	12:30	195.8	1139.2	1155.9	196.0	8:00	4:00	1299.0	574.5	1420.4	1420.4
11:25	12:35	228.2	1135.7	1158.4	228.6	7:55	4:05	1315.1	552.7	1426.5	1444.0
11:20	12:40	260.5	1131.6	1161.2	261.1	7:50	4:10	1330.5	530.6	1432.4	1467.2
11:15	12:45	292.6	1127.0	1164.4	293.5	7:45	4:15	1345.3	508.2	1438.1	1490.1
11:10	12:50	324.7	1121.8	1167.9	325.8	7:40	4:20	1359.5	485.6	1443.6	1512.7
11:05	12:55	356.5	1116.1	1171.7	358.0	7:35	4:25	1373.0	462.8	1448.9	1534.9
11:00	1:00	388.2	1109.9	1175.9	390.2	7:30	4:30	1385.8	439.7	1453.9	1556.8
10:55	1:05	419.7	1103.2	1180.3	422.2	7:25	4:35	1398.0	416.5	1458.7	1578.3
10:50	1:10	451.1	1095.9	1185.1	454.2	7:20	4:40	1409.5	393.0	1463.3	1599.5
10:45	1:15	482.2	1088.1	1190.1	486.0	7:15	4:45	1420.4	369.4	1467.6	1620.3
10:40	1:20	513.0	1079.8	1195.5	517.7	7:10	4:50	1430.6	345.5	1471.7	1640.8
10:35	1:25	543.7	1070.9	1201.0	549.2	7:05	4:55	1440.1	321.5	1475.5	1660.9
10:30	1:30	574.0	1061.6	1206.9	580.7	7:00	5:00	1448.9	297.4	1479.1	1680.7
10:25	1:35	604.1	1051.8	1212.9	611.9	6:55	5:05	1457.0	273.1	1482.4	1700.1
10:20	1:40	633.9	1041.4	1219.2	643.0	6:50	5:10	1464.4	248.7	1485.4	1719.1
10:15	1:45	663.4	1030.6	1225.6	673.9	6:45	5:15	1471.2	224.2	1488.2	1737.8
10:10	1:50	692.6	1019.2	1232.3	704.7	6:40	5:20	1477.2	199.5	1490.6	1756.1
10:05	1:55	721.5	1007.4	1239.1	735.3	6:35	5:25	1482.5	174.8	1492.8	1774.0
10:00	2:00	750.0	995.1	1246.1	765.6	6:30	5:30	1487.2	150.0	1494.7	1791.6
9:55	2:05	778.2	982.4	1253.2	795.8	6:25	5:35	1491.1	125.1	1496.3	1808.8
9:50	2:10	805.9	969.1	1260.5	825.8	6:20	5:40	1494.3	100.1	1497.6	1825.7
9:45	2:15	833.4	955.4	1267.8	855.6	6:15	5:45	1496.8	75.2	1498.7	1842.2
9:40	2:20	860.4	941.3	1275.2	885.1	6:10	5:50	1498.6	50.1	1499.4	1858.3
9:35	2:25	887.0	926.7	1282.7	914.4	6:05	5:55	1499.6	25.1	1499.9	1874.1
9:30	2:30	913.1	911.6	1290.3	943.5	6:00	6:00	1500.0	0.0	1500.0	1889.5
9:25	2:35	938.9	896.1	1297.9	972.4	5:55	6:05	1499.6	-25.1	1499.9	1904.6
9:20	2:40	964.2	880.2	1305.6	1001.0	5:50	6:10	1498.6	-50.1	1499.4	1919.3
9:15	2:45	989.0	863.9	1313.2	1029.3	5:45	6:15	1496.8	-75.2	1498.7	1933.7
9:10	2:50	1013.4	847.2	1320.9	1057.4	5:40	6:20	1494.3	-100.1	1497.6	1947.7
9:05	2:55	1037.3	830.0	1328.5	1085.2	5:35	6:25	1491.1	-125.1	1496.3	1961.3
9:00	3:00	1060.7	812.5	1336.1	1112.8	5:30	6:30	1487.2	-150.0	1494.7	1974.6
8:55	3:05	1083.5	794.6	1343.7	1140.1	5:25	6:35	1482.5	-174.8	1492.8	1987.6
8:50	3:10	1105.9	776.3	1351.2	1167.1	5:20	6:40	1477.2	-199.5	1490.6	2000.2
8:45	3:15	1127.8	757.6	1358.6	1193.8	5:15	6:45	1471.2	-224.2	1488.2	2012.5
8:40	3:20	1149.1	738.6	1366.0	1220.2	5:10	6:50	1464.4	-248.7	1485.4	2024.4
8:35	3:25	1169.8	719.2	1373.2	1246.3	5:05	6:55	1457.0	-273.1	1482.4	2036.0
8:30	3:30	1190.0	699.5	1380.4	1272.1	5:00	7:00	1448.9	-297.4	1479.1	2047.3

Analemmatic Sundial

Latitude: 50.0° N/S

Earliest Sunrise: 3:49 a.m. Latest Sunset: 8:11 p.m.
 Semi-Major Axis (E-W): 1500 mm Semi-Minor Axis (N-S): 1149.1 mm
 Sunrise/Sunset Markers: X = ± 557.0 mm

Local Time		X	Y	Z	W
4:55	7:05	1440.1	-321.5	1475.5	2058.3
4:50	7:10	1430.6	-345.5	1471.7	2068.9
4:45	7:15	1420.4	-369.4	1467.6	2079.2
4:40	7:20	1409.5	-393.0	1463.3	2089.2
4:35	7:25	1398.0	-416.5	1458.7	2098.9
4:30	7:30	1385.8	-439.7	1453.9	2108.3
4:25	7:35	1373.0	-462.8	1448.9	2117.3
4:20	7:40	1359.5	-485.6	1443.6	2126.1
4:15	7:45	1345.3	-508.2	1438.1	2134.6
4:10	7:50	1330.5	-530.6	1432.4	2142.8
4:05	7:55	1315.1	-552.7	1426.5	2150.7
4:00	8:00	1299.0	-574.5	1420.4	2158.3
3:55	8:05	1282.4	-596.1	1414.1	2165.7
3:50	8:10	1265.1	-617.4	1407.7	2172.7
3:45	8:15	1247.2	-638.4	1401.1	2179.6

Analemmatic Sundial

Latitude: 50.0° N/S

Date Scale

Semi-Major Axis (E-W): 1500 mm Semi-Minor Axis (N-S): 1149.1 mm

Month	Date										
	1	5	6	10	11	15	16	20	21	25	26
January	-409.1	-401.3	-399.0	-388.4	-385.3	-372.0	-368.4	-352.6	-348.5	-330.7	-326.0
February	-295.9	-274.3	-268.7	-245.8	-240.0	-216.1	-209.9	-185.1	-178.9	-153.4	-146.9
March	-127.5	-101.3	-94.7	-68.3	-61.7	-35.0	-28.4	-1.7	4.9	31.5	38.1
April	77.6	103.6	110.0	135.5	141.9	166.9	173.0	197.4	203.4	226.9	232.5
May	260.5	281.9	287.1	307.0	311.8	330.1	334.4	351.1	355.1	369.7	373.0
June	391.1	400.6	402.7	409.7	411.3	415.6	416.2	417.8	418.0	415.0	416.4
July	411.3	404.7	402.7	393.9	391.3	379.8	376.7	363.0	359.3	343.7	339.5
August	312.9	293.5	288.5	267.8	262.5	240.6	234.9	212.0	206.2	182.4	176.3
September	139.5	114.3	108.0	82.3	75.9	50.0	43.6	17.5	10.9	-15.3	-21.9
October	-54.6	-80.8	-87.2	-113.3	-119.6	-145.3	-151.7	-176.8	-183.1	-207.6	-213.6
November	-248.8	-271.4	-276.8	-298.1	-303.3	-323.0	-327.7	-345.6	-349.8	-365.7	-369.5
December	-386.0	-397.2	-399.6	-407.7	-409.5	-414.6	-415.6	-417.8	-418.0	-417.0	-416.4

Northern Hemisphere

Month	Date										
	1	5	6	10	11	15	16	20	21	25	26
January	409.1	401.3	399.0	388.4	385.3	372.0	368.4	352.6	348.5	330.7	326.0
February	295.9	274.3	268.7	245.8	240.0	216.1	209.9	185.1	178.9	153.4	146.9
March	127.5	101.3	94.7	68.3	61.7	35.0	28.4	1.7	-4.9	-31.5	-38.1
April	-77.6	-103.6	-110.0	-135.5	-141.9	-166.9	-173.0	-197.4	-203.4	-226.9	-232.5
May	-260.5	-281.9	-287.1	-307.0	-311.8	-330.1	-334.4	-351.1	-355.1	-369.7	-373.0
June	-391.1	-400.6	-402.7	-409.7	-411.3	-415.6	-416.2	-417.8	-418.0	-415.0	-416.4
July	-411.3	-404.7	-402.7	-393.9	-391.3	-379.8	-376.7	-363.0	-359.3	-343.7	-339.5
August	-312.9	-293.5	-288.5	-267.8	-262.5	-240.6	-234.9	-212.0	-206.2	-182.4	-176.3
September	-139.5	-114.3	-108.0	-82.3	-75.9	-50.0	-43.6	-17.5	-10.9	15.3	21.9
October	54.6	80.8	87.2	113.3	119.6	145.3	151.7	176.8	183.1	207.6	213.6
November	248.8	271.4	276.8	298.1	303.3	323.0	327.7	345.6	349.8	365.7	369.5
December	386.0	397.2	399.6	407.7	409.5	414.6	415.6	417.8	418.0	417.0	416.4

Southern Hemisphere

The shaded "Date" boxes identify the two extremes of the "Date Scale" that occur on the Summer and Winter Solstices.

A number of "Date Scale" configurations are available including the following "Date Line" combinations:

- | | | |
|---------|------------|--------------------|
| a) 1 | c) 1,10,20 | e) 1,5,10,15,20,25 |
| b) 1,15 | d) 1,11,21 | f) 1,6,11,16,21,26 |

Analemmatic Sundial

Latitude: 50.0° N/S

Earliest Sunrise: 3:49 a.m. Latest Sunset: 8:11 p.m.
 Semi-Major Axis (E-W): 2000 mm Semi-Minor Axis (N-S): 1532.1 mm
 Sunrise/Sunset Markers: X = ± 742.7 mm

Local Time		X	Y	Z	W	Local Time		X	Y	Z	W
12:00		0.0	1532.1	1532.1	0.0						
11:55	12:05	43.6	1531.7	1532.3	43.6	8:25	3:35	1612.9	905.9	1849.9	1730.2
11:50	12:10	87.2	1530.6	1533.1	87.3	8:20	3:40	1638.3	878.8	1859.1	1763.8
11:45	12:15	130.8	1528.8	1534.4	130.8	8:15	3:45	1662.9	851.2	1868.1	1796.9
11:40	12:20	174.3	1526.3	1536.2	174.4	8:10	3:50	1686.8	823.2	1876.9	1829.7
11:35	12:25	217.7	1523.0	1538.5	217.9	8:05	3:55	1709.8	794.8	1885.5	1862.0
11:30	12:30	261.1	1519.0	1541.3	261.4	8:00	4:00	1732.1	766.0	1893.9	1893.9
11:25	12:35	304.2	1514.3	1544.5	304.8	7:55	4:05	1753.5	736.9	1902.0	1925.3
11:20	12:40	347.3	1508.8	1548.3	348.1	7:50	4:10	1774.0	707.4	1909.9	1956.3
11:15	12:45	390.2	1502.7	1552.5	391.3	7:45	4:15	1793.7	677.6	1917.5	1986.9
11:10	12:50	432.9	1495.8	1557.2	434.4	7:40	4:20	1812.6	647.5	1924.8	2017.0
11:05	12:55	475.4	1488.2	1562.3	477.4	7:35	4:25	1830.6	617.0	1931.8	2046.6
11:00	1:00	517.6	1479.9	1567.8	520.3	7:30	4:30	1847.8	586.3	1938.5	2075.7
10:55	1:05	559.7	1470.9	1573.8	563.0	7:25	4:35	1864.0	555.3	1945.0	2104.4
10:50	1:10	601.4	1461.2	1580.1	605.6	7:20	4:40	1879.4	524.0	1951.1	2132.7
10:45	1:15	642.9	1450.8	1586.8	648.0	7:15	4:45	1893.9	492.5	1956.8	2160.4
10:40	1:20	684.0	1439.7	1593.9	690.3	7:10	4:50	1907.4	460.7	1962.3	2187.7
10:35	1:25	724.9	1427.9	1601.4	732.3	7:05	4:55	1920.1	428.7	1967.4	2214.5
10:30	1:30	765.4	1415.5	1609.1	774.2	7:00	5:00	1931.9	396.5	1972.1	2240.9
10:25	1:35	805.5	1402.3	1617.2	815.9	6:55	5:05	1942.7	364.2	1976.5	2266.7
10:20	1:40	845.2	1388.5	1625.6	857.3	6:50	5:10	1952.6	331.6	1980.5	2292.1
10:15	1:45	884.6	1374.1	1634.2	898.6	6:45	5:15	1961.6	298.9	1984.2	2317.0
10:10	1:50	923.5	1359.0	1643.1	939.6	6:40	5:20	1969.6	266.0	1987.5	2341.4
10:05	1:55	962.0	1343.2	1652.2	980.3	6:35	5:25	1976.7	233.1	1990.4	2365.4
10:00	2:00	1000.0	1326.8	1661.5	1020.8	6:30	5:30	1982.9	200.0	1992.9	2388.8
9:55	2:05	1037.5	1309.8	1671.0	1061.1	6:25	5:35	1988.1	166.8	1995.1	2411.8
9:50	2:10	1074.6	1292.2	1680.6	1101.1	6:20	5:40	1992.4	133.5	1996.9	2434.3
9:45	2:15	1111.1	1273.9	1690.4	1140.7	6:15	5:45	1995.7	100.2	1998.2	2456.3
9:40	2:20	1147.2	1255.0	1700.3	1180.1	6:10	5:50	1998.1	66.8	1999.2	2477.8
9:35	2:25	1182.6	1235.5	1710.3	1219.2	6:05	5:55	1999.5	33.4	1999.8	2498.8
9:30	2:30	1217.5	1215.5	1720.4	1258.0	6:00	6:00	2000.0	0.0	2000.0	2519.4
9:25	2:35	1251.8	1194.9	1730.5	1296.5	5:55	6:05	1999.5	-33.4	1999.8	2539.5
9:20	2:40	1285.6	1173.6	1740.7	1334.6	5:50	6:10	1998.1	-66.8	1999.2	2559.1
9:15	2:45	1318.7	1151.9	1750.9	1372.4	5:45	6:15	1995.7	-100.2	1998.2	2578.2
9:10	2:50	1351.2	1129.6	1761.1	1409.9	5:40	6:20	1992.4	-133.5	1996.9	2596.9
9:05	2:55	1383.0	1106.7	1771.3	1447.0	5:35	6:25	1988.1	-166.8	1995.1	2615.1
9:00	3:00	1414.2	1083.4	1781.5	1483.7	5:30	6:30	1982.9	-200.0	1992.9	2632.9
8:55	3:05	1444.7	1059.5	1791.6	1520.1	5:25	6:35	1976.7	-233.1	1990.4	2650.1
8:50	3:10	1474.6	1035.1	1801.6	1556.1	5:20	6:40	1969.6	-266.0	1987.5	2667.0
8:45	3:15	1503.7	1010.2	1811.5	1591.7	5:15	6:45	1961.6	-298.9	1984.2	2683.3
8:40	3:20	1532.1	984.8	1821.3	1626.9	5:10	6:50	1952.6	-331.6	1980.5	2699.3
8:35	3:25	1559.8	959.0	1831.0	1661.7	5:05	6:55	1942.7	-364.2	1976.5	2714.7
8:30	3:30	1586.7	932.7	1840.5	1696.2	5:00	7:00	1931.9	-396.5	1972.1	2729.8

Analemmatic Sundial

Latitude: 50.0° N/S

Earliest Sunrise: 3:49 a.m. Latest Sunset: 8:11 p.m.
 Semi-Major Axis (E-W): 2000 mm Semi-Minor Axis (N-S): 1532.1 mm
 Sunrise/Sunset Markers: X = ± 742.7 mm

Local Time		X	Y	Z	W
4:55	7:05	1920.1	-428.7	1967.4	2744.4
4:50	7:10	1907.4	-460.7	1962.3	2758.5
4:45	7:15	1893.9	-492.5	1956.8	2772.3
4:40	7:20	1879.4	-524.0	1951.1	2785.6
4:35	7:25	1864.0	-555.3	1945.0	2798.5
4:30	7:30	1847.8	-586.3	1938.5	2811.0
4:25	7:35	1830.6	-617.0	1931.8	2823.1
4:20	7:40	1812.6	-647.5	1924.8	2834.8
4:15	7:45	1793.7	-677.6	1917.5	2846.1
4:10	7:50	1774.0	-707.4	1909.9	2857.0
4:05	7:55	1753.5	-736.9	1902.0	2867.6
4:00	8:00	1732.1	-766.0	1893.9	2877.7
3:55	8:05	1709.8	-794.8	1885.5	2887.5
3:50	8:10	1686.8	-823.2	1876.9	2897.0
3:45	8:15	1662.9	-851.2	1868.1	2906.1

Analemmatic Sundial

Latitude: 50.0° N/S

Date Scale

Semi-Major Axis (E-W): 2000 mm Semi-Minor Axis (N-S): 1532.1 mm

Month	Date										
	1	5	6	10	11	15	16	20	21	25	26
January	-545.4	-535.1	-532.0	-517.8	-513.7	-496.1	-491.2	-470.2	-464.6	-440.9	-434.6
February	-394.5	-365.7	-358.2	-327.7	-320.1	-288.1	-279.8	-246.9	-238.5	-204.5	-195.8
March	-169.9	-135.1	-126.3	-91.0	-82.2	-46.7	-37.9	-2.2	6.5	42.0	50.7
April	103.4	138.1	146.7	180.7	189.1	222.5	230.6	263.2	271.1	302.5	310.1
May	347.4	375.9	382.8	409.3	415.7	440.2	445.9	468.2	473.5	493.0	497.4
June	521.5	534.1	537.0	546.2	548.3	554.2	555.0	557.1	557.4	553.4	555.3
July	548.3	539.6	537.0	525.2	521.8	506.4	502.3	484.0	479.1	458.3	452.7
August	417.2	391.3	384.7	357.0	350.0	320.8	313.2	282.7	274.9	243.1	235.0
September	185.9	152.4	144.0	109.8	101.2	66.7	58.2	23.3	14.6	-20.4	-29.2
October	-72.8	-107.7	-116.3	-151.0	-159.4	-193.7	-202.2	-235.7	-244.1	-276.8	-284.8
November	-331.8	-361.8	-369.1	-397.5	-404.4	-430.6	-436.9	-460.8	-466.4	-487.6	-492.7
December	-514.7	-529.6	-532.8	-543.6	-546.0	-552.9	-554.2	-557.1	-557.4	-556.1	-555.3

Northern Hemisphere

Month	Date										
	1	5	6	10	11	15	16	20	21	25	26
January	545.4	535.1	532.0	517.8	513.7	496.1	491.2	470.2	464.6	440.9	434.6
February	394.5	365.7	358.2	327.7	320.1	288.1	279.8	246.9	238.5	204.5	195.8
March	169.9	135.1	126.3	91.0	82.2	46.7	37.9	2.2	-6.5	-42.0	-50.7
April	-103.4	-138.1	-146.7	-180.7	-189.1	-222.5	-230.6	-263.2	-271.1	-302.5	-310.1
May	-347.4	-375.9	-382.8	-409.3	-415.7	-440.2	-445.9	-468.2	-473.5	-493.0	-497.4
June	-521.5	-534.1	-537.0	-546.2	-548.3	-554.2	-555.0	-557.1	-557.4	-553.4	-555.3
July	-548.3	-539.6	-537.0	-525.2	-521.8	-506.4	-502.3	-484.0	-479.1	-458.3	-452.7
August	-417.2	-391.3	-384.7	-357.0	-350.0	-320.8	-313.2	-282.7	-274.9	-243.1	-235.0
September	-185.9	-152.4	-144.0	-109.8	-101.2	-66.7	-58.2	-23.3	-14.6	20.4	29.2
October	72.8	107.7	116.3	151.0	159.4	193.7	202.2	235.7	244.1	276.8	284.8
November	331.8	361.8	369.1	397.5	404.4	430.6	436.9	460.8	466.4	487.6	492.7
December	514.7	529.6	532.8	543.6	546.0	552.9	554.2	557.1	557.4	556.1	555.3

Southern Hemisphere

The shaded "Date" boxes identify the two extremes of the "Date Scale" that occur on the Summer and Winter Solstices.

A number of "Date Scale" configurations are available including the following "Date Line" combinations:

- | | | |
|---------|------------|--------------------|
| a) 1 | c) 1,10,20 | e) 1,5,10,15,20,25 |
| b) 1,15 | d) 1,11,21 | f) 1,6,11,16,21,26 |

Analemmatic Sundial

Latitude: 50.0° N/S

Earliest Sunrise: 3:49 a.m. Latest Sunset: 8:11 p.m.
 Semi-Major Axis (E-W): 2500 mm Semi-Minor Axis (N-S): 1915.1 mm
 Sunrise/Sunset Markers: X = ± 928.3 mm

Local Time		X	Y	Z	W	Local Time		X	Y	Z	W
12:00		0.0	1915.1	1915.1	0.0						
11:55	12:05	54.5	1914.7	1915.4	54.5	8:25	3:35	2016.1	1132.4	2312.4	2162.7
11:50	12:10	109.0	1913.3	1916.4	109.1	8:20	3:40	2047.9	1098.5	2323.9	2204.7
11:45	12:15	163.5	1911.0	1918.0	163.6	8:15	3:45	2078.7	1064.0	2335.2	2246.2
11:40	12:20	217.9	1907.8	1920.2	218.0	8:10	3:50	2108.5	1029.0	2346.2	2287.1
11:35	12:25	272.2	1903.7	1923.1	272.4	8:05	3:55	2137.3	993.5	2356.9	2327.5
11:30	12:30	326.3	1898.7	1926.6	326.7	8:00	4:00	2165.1	957.6	2367.4	2367.4
11:25	12:35	380.3	1892.8	1930.7	381.0	7:55	4:05	2191.8	921.1	2377.5	2406.7
11:20	12:40	434.1	1886.0	1935.3	435.1	7:50	4:10	2217.5	884.3	2387.3	2445.4
11:15	12:45	487.7	1878.3	1940.6	489.1	7:45	4:15	2242.2	847.0	2396.8	2483.6
11:10	12:50	541.1	1869.7	1946.4	543.0	7:40	4:20	2265.8	809.4	2406.0	2521.2
11:05	12:55	594.2	1860.2	1952.8	596.7	7:35	4:25	2288.3	771.3	2414.8	2558.2
11:00	1:00	647.0	1849.9	1959.8	650.3	7:30	4:30	2309.7	732.9	2423.2	2594.7
10:55	1:05	699.6	1838.6	1967.2	703.7	7:25	4:35	2330.0	694.1	2431.2	2630.6
10:50	1:10	751.8	1826.5	1975.1	757.0	7:20	4:40	2349.2	655.0	2438.8	2665.8
10:45	1:15	803.6	1813.5	1983.5	810.0	7:15	4:45	2367.3	615.6	2446.1	2700.6
10:40	1:20	855.1	1799.6	1992.4	862.8	7:10	4:50	2384.3	575.9	2452.9	2734.7
10:35	1:25	906.1	1784.9	2001.7	915.4	7:05	4:55	2400.1	535.9	2459.2	2768.2
10:30	1:30	956.7	1769.3	2011.4	967.8	7:00	5:00	2414.8	495.7	2465.2	2801.1
10:25	1:35	1006.9	1752.9	2021.5	1019.8	6:55	5:05	2428.4	455.2	2470.6	2833.4
10:20	1:40	1056.5	1735.7	2032.0	1071.7	6:50	5:10	2440.7	414.5	2475.7	2865.1
10:15	1:45	1105.7	1717.6	2042.7	1123.2	6:45	5:15	2452.0	373.6	2480.3	2896.3
10:10	1:50	1154.4	1698.7	2053.8	1174.5	6:40	5:20	2462.0	332.6	2484.4	2926.8
10:05	1:55	1202.5	1679.0	2065.2	1225.4	6:35	5:25	2470.9	291.3	2488.0	2956.7
10:00	2:00	1250.0	1658.5	2076.8	1276.1	6:30	5:30	2478.6	250.0	2491.2	2986.0
9:55	2:05	1296.9	1637.3	2088.7	1326.4	6:25	5:35	2485.1	208.5	2493.9	3014.7
9:50	2:10	1343.2	1615.2	2100.8	1376.3	6:20	5:40	2490.5	166.9	2496.1	3042.8
9:45	2:15	1388.9	1592.4	2113.0	1425.9	6:15	5:45	2494.6	125.3	2497.8	3070.3
9:40	2:20	1433.9	1568.8	2125.4	1475.2	6:10	5:50	2497.6	83.5	2499.0	3097.2
9:35	2:25	1478.3	1544.4	2137.9	1524.0	6:05	5:55	2499.4	41.8	2499.8	3123.5
9:30	2:30	1521.9	1519.4	2150.5	1572.5	6:00	6:00	2500.0	0.0	2500.0	3149.2
9:25	2:35	1564.8	1493.6	2163.2	1620.6	5:55	6:05	2499.4	-41.8	2499.8	3174.3
9:20	2:40	1607.0	1467.1	2175.9	1668.3	5:50	6:10	2497.6	-83.5	2499.0	3198.9
9:15	2:45	1648.4	1439.9	2188.7	1715.5	5:45	6:15	2494.6	-125.3	2497.8	3222.8
9:10	2:50	1689.0	1412.0	2201.4	1762.3	5:40	6:20	2490.5	-166.9	2496.1	3246.1
9:05	2:55	1728.8	1383.4	2214.2	1808.7	5:35	6:25	2485.1	-208.5	2493.9	3268.9
9:00	3:00	1767.8	1354.2	2226.8	1854.6	5:30	6:30	2478.6	-250.0	2491.2	3291.1
8:55	3:05	1805.9	1324.3	2239.5	1900.1	5:25	6:35	2470.9	-291.3	2488.0	3312.7
8:50	3:10	1843.2	1293.8	2252.0	1945.1	5:20	6:40	2462.0	-332.6	2484.4	3333.7
8:45	3:15	1879.6	1262.7	2264.4	1989.6	5:15	6:45	2452.0	-373.6	2480.3	3354.2
8:40	3:20	1915.1	1231.0	2276.6	2033.6	5:10	6:50	2440.7	-414.5	2475.7	3374.1
8:35	3:25	1949.7	1198.7	2288.7	2077.2	5:05	6:55	2428.4	-455.2	2470.6	3393.4
8:30	3:30	1983.4	1165.8	2300.7	2120.2	5:00	7:00	2414.8	-495.7	2465.2	3412.2

Analemmatic Sundial**Latitude: 50.0° N/S**

Earliest Sunrise: 3:49 a.m. Latest Sunset: 8:11 p.m.
 Semi-Major Axis (E-W): 2500 mm Semi-Minor Axis (N-S): 1915.1 mm
 Sunrise/Sunset Markers: $X = \pm 928.3$ mm

Local Time		X	Y	Z	W
4:55	7:05	2400.1	-535.9	2459.2	3430.5
4:50	7:10	2384.3	-575.9	2452.9	3448.2
4:45	7:15	2367.3	-615.6	2446.1	3465.4
4:40	7:20	2349.2	-655.0	2438.8	3482.0
4:35	7:25	2330.0	-694.1	2431.2	3498.1
4:30	7:30	2309.7	-732.9	2423.2	3513.8
4:25	7:35	2288.3	-771.3	2414.8	3528.9
4:20	7:40	2265.8	-809.4	2406.0	3543.5
4:15	7:45	2242.2	-847.0	2396.8	3557.6
4:10	7:50	2217.5	-884.3	2387.3	3571.3
4:05	7:55	2191.8	-921.1	2377.5	3584.5
4:00	8:00	2165.1	-957.6	2367.4	3597.2
3:55	8:05	2137.3	-993.5	2356.9	3609.4
3:50	8:10	2108.5	-1029.0	2346.2	3621.2
3:45	8:15	2078.7	-1064.0	2335.2	3632.6

Analematic Sundial

Latitude: 50.0° N/S

Date Scale

Semi-Major Axis (E-W): 2500 mm Semi-Minor Axis (N-S): 1915.1 mm

Month	Date										
	1	5	6	10	11	15	16	20	21	25	26
January	-681.8	-668.9	-665.0	-647.3	-642.1	-620.1	-614.0	-587.7	-580.8	-551.1	-543.3
February	-493.1	-457.2	-447.8	-409.6	-400.1	-360.1	-349.8	-308.6	-298.1	-255.7	-244.8
March	-212.4	-168.9	-157.8	-113.8	-102.8	-58.4	-47.4	-2.8	8.1	52.5	63.4
April	129.3	172.6	183.4	225.8	236.4	278.1	288.3	329.0	338.9	378.1	387.6
May	434.2	469.9	478.4	511.6	519.7	550.2	557.4	585.2	591.9	616.2	621.7
June	651.9	667.6	671.2	682.8	685.4	692.7	693.7	696.4	696.7	691.7	694.1
July	685.4	674.5	671.2	656.4	652.2	633.0	627.8	605.0	598.9	572.8	565.9
August	521.5	489.2	480.9	446.3	437.5	401.0	391.4	353.3	343.6	303.9	293.8
September	232.4	190.5	180.0	137.2	126.5	83.4	72.7	29.2	18.2	-25.5	-36.5
October	-91.0	-134.7	-145.4	-188.8	-199.3	-242.2	-252.8	-294.6	-305.1	-346.0	-356.0
November	-414.7	-452.3	-461.4	-496.8	-505.4	-538.3	-546.1	-576.0	-583.0	-609.5	-615.9
December	-643.4	-662.0	-666.0	-679.5	-682.4	-691.1	-692.7	-696.4	-696.7	-695.1	-694.1

Northern Hemisphere

Month	Date										
	1	5	6	10	11	15	16	20	21	25	26
January	681.8	668.9	665.0	647.3	642.1	620.1	614.0	587.7	580.8	551.1	543.3
February	493.1	457.2	447.8	409.6	400.1	360.1	349.8	308.6	298.1	255.7	244.8
March	212.4	168.9	157.8	113.8	102.8	58.4	47.4	2.8	-8.1	-52.5	-63.4
April	-129.3	-172.6	-183.4	-225.8	-236.4	-278.1	-288.3	-329.0	-338.9	-378.1	-387.6
May	-434.2	-469.9	-478.4	-511.6	-519.7	-550.2	-557.4	-585.2	-591.9	-616.2	-621.7
June	-651.9	-667.6	-671.2	-682.8	-685.4	-692.7	-693.7	-696.4	-696.7	-691.7	-694.1
July	-685.4	-674.5	-671.2	-656.4	-652.2	-633.0	-627.8	-605.0	-598.9	-572.8	-565.9
August	-521.5	-489.2	-480.9	-446.3	-437.5	-401.0	-391.4	-353.3	-343.6	-303.9	-293.8
September	-232.4	-190.5	-180.0	-137.2	-126.5	-83.4	-72.7	-29.2	-18.2	25.5	36.5
October	91.0	134.7	145.4	188.8	199.3	242.2	252.8	294.6	305.1	346.0	356.0
November	414.7	452.3	461.4	496.8	505.4	538.3	546.1	576.0	583.0	609.5	615.9
December	643.4	662.0	666.0	679.5	682.4	691.1	692.7	696.4	696.7	695.1	694.1

Southern Hemisphere

The shaded "Date" boxes identify the two extremes of the "Date Scale" that occur on the Summer and Winter Solstices.

A number of "Date Scale" configurations are available including the following "Date Line" combinations:

- a) 1
- b) 1,15
- c) 1,10,20
- d) 1,11,21
- e) 1,5,10,15,20,25
- f) 1,6,11,16,21,26