Comparative Lengths of Days & Nights

The longest day is longer than the longest night, and the shortest day is longer than the shortest night, for the reason that sunrise occurs when the upper edge of the disk of the Sun appears on the horizon, and sunset is at the moment when the upper edge disappears below the horizon.

These are the instants of first and last direct sunlight; but at these times the center of the Sun's disk is still 50 minutes of arc vertically below the horizon, because the semidiameter of the sun is 16 minutes of arc, and in addition the Sun is seen 34 minutes of arc above its actual geometric position on account of atmospheric refraction.

Consequently, the length of every day exceeds the time that the center of the Sun is geometrically above the horizon by the intervals of time required for the Sun to move through these extra amounts of 50 minutes of arc in altitude at both rising and setting, or 100 minutes of arc altogether; this shortens the night by the same amount.

On any two dates when the center of the Sun is at equal distances north and south of the equator, as it is at the summer and winter solstices, the center is geometrically below the horizon on one date for the same length of time as it is above the horizon on the other date; but on both dates the upper edge of the disk is visible longer than the center is geometrically above the horizon by the time required for 100 minutes of arc of motion in altitude, and therefore the day that is the longer exceeds the night on the other date by twice this amount, i.e., by the time equivalent of 200 minutes of arc in altitude.

This excess is greater the higher the latitude because the path of the Sun at rising and setting is at a smaller angle with the horizon, and more time is required in this slanting motion to cover a given vertical distance.

Latitude	Longest Day	Longest Night	Shortest Day	Shortest Night	Excess of Day over Night
25° N	13 h 42 m	13 h 25 m	10 h 35 m	10 h 18 m	17 m
35° N	14 h 31 m	14 h 12 m	9 h 48 m	9 h 29 m	19 m
40° N	15 h 02 m	14 h 40 m	9 h 20 m	8 h 58 m	22 m
45° N	15 h 38 m	15 h 14 m	8 h 46 m	8 h 22 m	24 m
50° N	16 h 23 m	15 h 56 m	8 h 04 m	7 h 37 m	27 m
60° N	18 h 53 m	18 h 08 m	5 h 52 m	5 h 07 m	45 m