The cleared lunar distance is used to determine what GMT that distance corresponds to. The *Nautical Almanac* listed the lunar distances for the moon and various objects at three-hour intervals. The cleared distance would lie within one of those intervals.

The basic idea is to use interpolation to find the time corresponding to the cleared distance.

If
D is the angular difference between the tabulated distances which bracket your cleared distance: dd°mm′ss′′$_{UTCi}$ and dd°mm′ss′′$_{UTCi+3}$

and
d is the angular difference between the earlier tabulated distance and your cleared distance: dd°mm′ss′′$_{UTCi}$ and dd°mm′ss′′$_{UTCi+t}$

and
t is the yet unknown time interval hh:mm:ss between the earlier tabulated distance UTC and your observation moment: UTC_i and UTC_{i+t}

then:

$$\frac{\mathbf{D}}{\mathbf{d}} = \frac{3\ [\text{hours}]}{\mathbf{t}}$$

or,

$$\mathbf{t}\ [\text{hours}] = 3\ [\text{hours}] \cdot \frac{\mathbf{d}}{\mathbf{D}}$$

or,

$$\mathbf{t}\ [\text{seconds}] = 10800\ [\text{seconds}] \cdot \frac{\mathbf{d}}{\mathbf{D}}$$

To simplify this calculation the "*proportional logarithm*" of time **t** as being *the common log of 10800 [seconds] minus the common log of* ***t*** *[seconds]* was introduced in the "*Tables Requisite*".

Because

$$\mathbf{D} \cdot \mathbf{t} = 10800 \cdot \mathbf{d}$$

we can write:

$$\log \mathbf{D} + \log \mathbf{t} = \log 10800 + \log \mathbf{d}$$

or,

$$\log \mathbf{t} = \log 10800 + \log \mathbf{d} - \log \mathbf{D}$$

or, (subtracting each term from log of 10800 [seconds]):

$$(\log 10800 - \log \mathbf{t}) =$$
$$= (\log 10800 - \log 10800) + (\log 10800 - \log \mathbf{d}) - (\log 10800 - \log \mathbf{D})$$

or,

$$(\log 10800 - \log \mathbf{t}) = (\log 10800 - \log \mathbf{d}) - (\log 10800 - \log \mathbf{D})$$

This is therefore:

$$\text{plog}\ \mathbf{t} = \text{plog}\ \mathbf{d} - \text{plog}\ \mathbf{D}$$

where *plog* is the *proportional logarithm* as defined above.

An example:

On 2015-Jan-01 the reduced and cleared lunar distance between the Moon and Jupiter was found to be equal to 83°.

Looking up the *Precomputed Lunar Distances* table for that date one finds that the angle (83°) fits within the following brackets:

12:00 UT, 84° 35'.2, PL 2620
15:00 UT, 82° 56'.8, PL 2628

D, the total change in the distance during the three-hour interval (the angle between the brackets), equals to

84° 35.2' - 82° 56.8' = 1° 38.4'

Looking 1° 38.4' up in "*Tables Requisite*" (in the ^{h}° ^{m}′ column) one finds:

plog **D** = 2623

d is the angular difference between the first distance tabulated at 12:00 UT and the distance cleared for the yet unknown time of lunar sight:

d = 84° 35.2' - 83° 00.0' = 1° 35.2'

Looking 1° 35.2' up in "*Tables Requisite*" (in the ^{h}° ^{m}′ column):

plog **d** = 2766

The plog **t** is their difference:

plog **t** = plog **d** - plog **D** = 2766 - 2623 = 143

Looking up 143 in "*Tables Requisite*" (in the **PL** column) falls between the tabulated values of 142 and 145, which correspond to 2^{h} 54.2^{m} and 2^{h} 54.1^{m} or 02:54:12 and 02:54:06 respectively.
The interpolated value of **t** is approximately 02:54:10.

Adding the time offset **t** of the lunar to the UTC of the first time bracket gives us the UTC of the lunar itself:

12:00:00 + 02:54:10 = 14:54:10