RPL PPL Light & Time Guide

How Fast Does The Sun Move?

Knowing this helps you understand and solve lots of other time and light questions.
The earth rotates 360° in on day, 24 hours or 1440 minutes
The sun moves at 1440m/360° = **0.25° per minute or 4min per 1°**
Each hour the sun moves 360/24 = **15° per hour**

Sunrise v Twilight?

Sunrise is when the first part of the sun reaches the horizon in the morning.
Morning Civil Twilight is when the sun is **6° below the horizon**, known as First Light
Twilight is the average time when things start being clearly distinguishable by the human eye.
Under VFR you must **not takeoff prior to first light** aka morning civil twilight.
AIP Gen 2.7 - 1

Sunset v Twilight?

Sunset is when the last part of the sun reaches the horizon in the afternoon.
Evening Civil Twilight is when the sun is **6° below the horizon**, known as Last Light. \
Twilight is the average time when things stop being clearly distinguishable by the human eye.
Under VFR you must **plan to land 10 min prior to last light** aka evening civil twilight.

Get A Free Copy Of The AIP Here

The AIP is freely available from the airservices website. Here. Click Agree, then click AIP Book. You can order a copy and updates. For those going to CPL the AIP is a must. For those going only to PPL the VFRG should be sufficient.

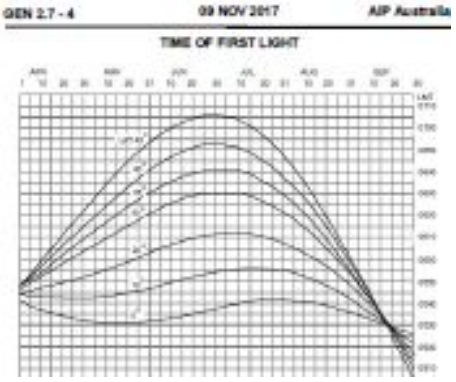
Get Your Copy Of The VFRG Here

The **VFRG is available** Here. For RPL and PPL you will 100% want to have a recent VFRG in your exam, **order it** Here and order lots of freebies (safety publications in main menu) with it. They often run out and take months to re-print. Costs $39.95 plus $15 postage. You can borrow a recent one of anyone.

↓ Calculations On Next Page ↓

How To Find LMT & Then First Or Last Light?

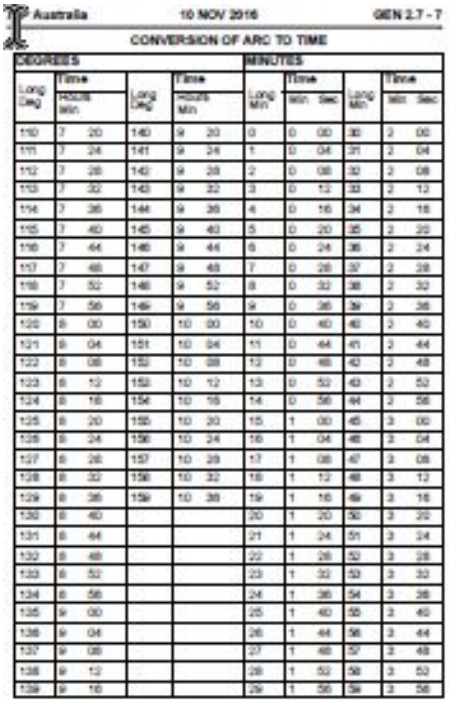
Step 1 Find LMT



1. First we need a date and latitude. , Enter the CORRECT chart in VFRG or AIP Gen 2.7 - 3 , from the top at the correct date. Instructions are in AIP Gen 2.7 or VFRG
2. Go vertically down until you hit the line corresponding with the latitude.
3. From that point move horizontal and read off LMT, write it down.

   The chart is used since locations further north or south, have longer or shorter days, depending on the season. .

Step 2 Convert LMT To UTC



1. Use instruction in AIP Gen 2.7 - 3 or VFRG to convert to ARC time. Daylight savings is from early Oct to early Apr in the South & Eastern States only (NSW, VIC, ACT, TAS, SA). CASA will give clear dates. Note Broken Hill is on SA time.

   e. to convert to EST, add 10 hours to UTC;

   f. to convert to CST, add $9^1/_2$ hours to UTC;

   g. to convert to WST, add 8 hours to UTC.

Example: To determine last light at Echuca
(S36 09.0 E144 46.0) on 20th November.
Using the graph, enter at 20th November at the top of the page and follow downwards to latitude 36° (by interpolation), then horizontally to the left and read off LMT = 1919. To convert to UTC, enter the "Conversion of Arc to Time" table, at longitude 144° (9 hours 36 minutes). Add the increment corresponding to 46' in the right hand column
= 3' 04" + 0936 = 0939.
Subtract this from the LMT found: 1919 – 0939 = 0940 UTC.
To find EST add 10 hours to UTC = 1940 EST.

Step 3 Calculate To Crosscheck (optional)

Echuca 144° 46.0 can be solved by maths to cross check. Use airport longitude x 4° per min / 60 min per hour , then take the answer from LMT and this gives you LMT to UTC.

E.g. 144° 46.0 = 144 + (46/ 60 = 0.7666667)
(144.76666667 x 4) / 60 = 9.65111111 = 9 hours 39 min
Because 0.6511111 x 60 = 39 minutes.

The table above is simply the maths on the left all done for you.

While learning use both methods to ensure accuracy and to lock in understanding.

Some find this method better and faster.

Example Of Basic Time Questions For RPL PPL

If LMT is 1500 at a location at 150°E, what is UTC?

- 0300 UTC
- 0400 UTC
- 0500 UTC
- 0200 UTC

Incorrect
Earth rotates at 1° per 4 minutes.
150 x 4min = 600 minutes
600 minutes = 10 hours
Longitude to the EAST is behind UTC.
1500 – 1000 = 0500 UTC
Answer: 0500 UTC

Example Of Normal Time Questions For RPL PPL

You are flying from Dubbo to Port Macquarie, with a last light time of 6:15pm AEST.
What is the latest you can plan to land in Port Macquarie?

- 1805Z
- 0805Z
- 0815Z
- 0755Z

Incorrect
See AIP ENR 1.2 1.1.2 or the VFRG – 10 minutes prior to last light
18:15 AEST is 8 hours 15 minutes after 10am which was 0000Z
10 minutes prior to 0815Z is 0805Z
All the information on daylight is in the VFRG : https://vfrg.casa.gov.au/pre-flight-planning/preparation/daylight-and-darkness/
The rule on last light is here: https://vfrg.casa.gov.au/operations/general-information/visual-flight-rules/

Example Of Easy Time Questions For CPL

MELBOURNE/Moorabbin **ELEV 55**
AVFAX CODE 3003
VIC UTC +10 YMMB
S 37 58.6 E 145 06.1 VAR 12 DEG E CERT
AD OPR Moorabbin Airport Corporation, Airport Management Centre, Bundora Parade, Moorabbin Airport, Mentone, VIC, 3194. PH 03 8587 8000. ARO 0428 058 295. Fax 9587 1782.

The entry for Moorabbin in ERSA shows the above details. What is the last possible minute you can plan to land for a day VFR flight on the 2nd Feb 2018?

- 10:02 UTC
- 09:52 UTC
- 10:12 UTC
- 6:32 pm

Incorrect

First Light - Last Light Results

Location:	YMMB
Date:	02-Feb-2018
First-Light:	19:04 UTC
Last-Light:	10:02 UTC

10:02 UTC is last light. thus 10 min prior is 09:52 UTC

Example Of Complex Time Questions For ATPL

Qantas Flight QF11 Airbus A380 departs Sydney SYD 03111010 LST for LAX.
Flight time (ETI) 13h 50min.
What is ETA LAX in LST?
LAX is UTC – 8 in winter and swaps to -7 on 1st Mar.

- 6.10 am
- 6.00 am
- 8.50 am
- 7.00 am
- 8.10 am

Incorrect

Departure · Mon, Mar 11

10:10 AM · Sydney Airport (SYD)
Travel time: 13h 50m · Overnight
6:00 AM · Los Angeles International Airport (LAX)

Working: ETD is given in 8 digit format, meaning the year and seconds are dropped off either end.
Departs Sydney 10.10 am LST, or 1010 in 24 hour time LST on 11 Mar
Daylight saving in Sydney ends around the start of April.
Local (LST) to Zulu conversion is UTC +11 hours due to daylight saving time.
Therefore UTC = LST – 1100
111010 – 1100 = 102310Z
ETI is 13h 50 min or 1350
ETA = 102310Z+ 1350 = 103700Z= 111300Z
SFO LST is UTC – 7 = 111300Z – 0700 = 110600 LST
06.00 or 6am arrival LST