Example 5-11

A visual fix is obtained 6 nm right of track. A constant heading of 065°M is then maintained (i.e. no corrections at this stage), and after flying a further 30 nm, a second fix is established 10 nm right of track. Calculate the heading required to rejoin track 40 nm further on.

$$\begin{aligned} 4 \text{ nm in } 30 \text{ nm} &= 8 \text{ nm in } 60 \text{ nm} \\ \therefore \text{TE} &= 8° \text{ right} \\ 10 \text{ nm in } 40 \text{ nm} &= 15 \text{ nm in } 60 \text{ nm} \\ \therefore \text{CA} &= 15° \end{aligned}$$

In this particular case, there is only sufficient information available to determine the TMG between the two fixes. To calculate the TE, this TMG must be related to an imaginary track line parallel to the original track, as figure 5-36 shows.

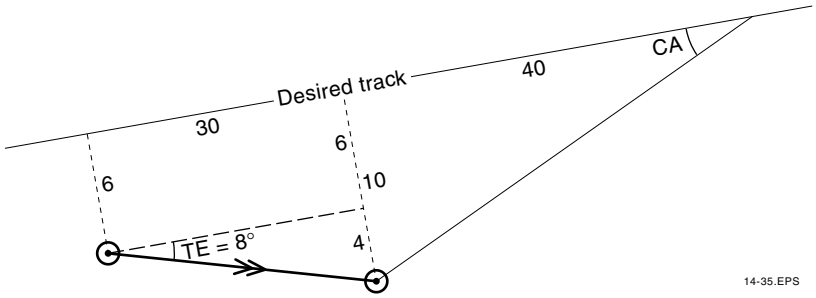

Figure 5-36 The 1-in-60 rule when both fixes are off the planned track.

Neither TE nor CA is greater than 15°, so:

$$\begin{aligned} \text{heading change} &= 8° + 15° \\ &= 23° \text{ left} \\ \therefore \text{new heading} &= 065°\text{M} - 23° \\ &= 042°\text{M} \end{aligned}$$

Example 5-12

You fix your position 3 nm left of the flight-planned track (FPT), at point *A* in figure 5-37, and take up a new heading of 085°M with the aim of rejoining FPT in 50 nm (at point *C*). However, after only 20 nm, a second fix is obtained 2 nm right of FPT (point *B*), and you immediately alter heading to regain FPT at point *C* (which is now only 30 nm ahead). Calculate the new intercept heading.

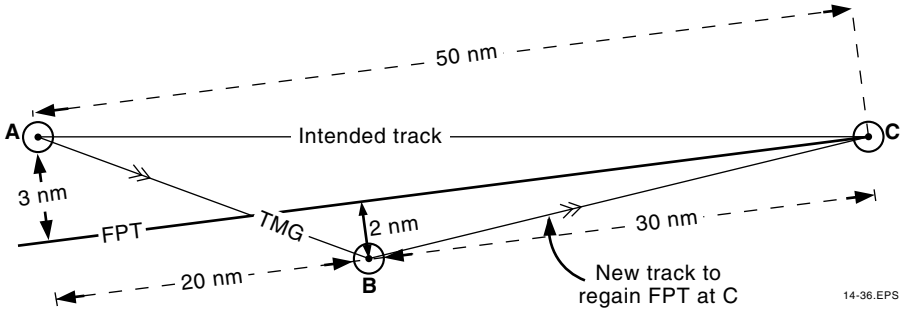

Figure 5-37 The 1-in-60 rule – a further complication.

As in the previous example, there is no information available regarding the tracking of the aircraft prior to the first fix, and we can only be sure of the TMG between the two fixes (*A* and *B*). The track, and therefore the heading, will have to be altered at the second fix (point *B*) by an amount equal to TE + CA. Normally, the TE and CA would be determined by comparing the TMG (*A* to *B*) and the required track between the first fix (*A*) and the point where FPT is to be rejoined (*C*). However, in this case, there is insufficient information available to readily determine these values of TE and CA (see figure 5-34), since the known off-track distances only relate to the original FPT and not the intended intercept track (*A* to *C*).

9. Latitude and date.
10. Advanced by 1 hr.
11. (a) 08 19 30;
    (b) 20 10 15;
    (c) 03 23 37.
12. (a) 03 08 19 30;
    (b) 12 20 10 15;
    (c) 04 03 23 37.
13. (a) 02 27 00;
    (b) 06 32 52;
    (c) 05 07 52;
    (d) 01 13 48.
14. (a) 28 09 30 UTC;
    (b) 28 17 44 UTC;
    (c) 14 18 27 UTC;
    (d) 22 07 52 UTC.
15. Start of morning civil twilight, end of evening civil twilight.
16. (a) 0621 LMT;
    (b) 1817 LMT;
    (c) 0435 LMT;
    (d) 1843 LMT.
17. (a) 11 hr 13 min;
    (b) 13 hr 5 min;
    (c) 15 hr 3 min;
    (d) 13 hr 5 min.
18. 18 09 28 LMT;
    18 00 05 UTC;
    18 09 35 CST.
19. 23 16 10 EST; 23 06 10 UTC.
20. 6-figure: 20 16 45;
    8-figure: 05 20 16 45.
21. 3 hr, 1 hr.
22. 1426 LMT.
23. 1044 UTC; 2114 CSuT.
24. 2104 CSuT.

Review 3

1. Representative fraction; graduated scale line; words (e.g. 1 cm = 5 nm).
2. WAC, ERC-L, VTC.
3. VTC (transverse Mercator).
4. Use the latitude scale; measure at mid-latitude.
5. Permanently established, without passenger facilities (see legend page 80).
6. Three mines (and to the north-east, a power transmission line).
7. 130°M, 54 nm.
8. Great circle.
9. 29 km, 302°T.
10. The aerodrome has an aeronautical beacon.
11. The height is a calculated maximum.
12. Retaining wall or weir, and a pipeline running SW from the lake.
13. VFR approach point
14. Constant angle.
15. Smaller.
16. Contours and colour tinting (hypsometric tints).
17. Lambert.
18. Transverse Mercator.
19. AIP Supplement.
20. Middle.
21. 1 min of latitude.
22. Bearings and shapes are correct; meridians are straight lines, and parallels are concentric circles concave to the nearer pole; great circles can be assumed to be straight lines; rhumb lines are curved lines concave to the nearer pole; scale is effectively constant.
23. A straight line.
24. Two.
25. Is not.
26. Expands.
27. Bearings.

Review 4

1. (a) 168;
   (b) 1.02;
   (c) 52.5.
2. Heading to track.
3. Heading and groundspeed.
4. 134 kt TAS.
5. 150 kt TAS.
6. 144 kt IAS.
7. Refer to table 2.

Pressure height (ft)	Temperature (°C)	IAS (kt)	TAS (kt)
4,000	+10	135	*144*
6,500	–01	160	*175*
1,500	+25	125	*131*
10,000	–10	140	*161*
8,000	zero	170	*192*
7,000	+05	150	*168*

Table 2 Review 4, question 7.

8. 16.6 nm.
9. 50 minutes.
10. 187 kt.
11. Refer to the table 3 (page 289).
12. 322°M, GS 75 kt.
13. 261°M, GS 66 kt.
14. 100°M, GS 133 kt.
15. 062°M, GS 127 kt.
16. Refer to table 4 (page 289).
17. TR 031, GS 108 kt.
18. TR 103°M, GS 130 kt.
19. Refer to table 5 (page 289).
20. 27 nm.
21. 52 nm.
22. 20 nm.