Eg 3.1

1. Stage I

Clearly define the problem:

Given integer # of minutes (MINS),
find integer # of hours (HOURS)

= integer ~~of~~ part of $\frac{MINS}{60}$
using integer arithmetic.

Formula is $\boxed{HOURS = MINS / 60}$
in integer arithmetic $\lfloor MINS/60 \rfloor$ "floor"

Also find remaining # of minutes (RMINS)

$$RMINS = MINS \pmod{60}$$

(question says not to use MOD)

$$\boxed{RMINS = MINS - 60 * HOURS}$$

Stage II

Layout a coarse logical structure

- Read MINS
- Calculate HOURS, RMINS
- Print results

Stage III

Refine the structure — add more detail.

"underscore"

PROGRAM HRS_MINS

Aim/description

Declare variables

← Prompt for input

Read MINS

HOURS = MINS / 60

RMINS = MINS − 60 * HOURS

← Label output

Print HOURS, RMINS

End of program

Stage IV

```
PROGRAM  Hrs_Mins

!Aim:  To calculate the # of hours
!      in MINS minutes and the
!      remaining # of minutes RMINS.

! Declare variables:

INTEGER :: MINS, HOURS, RMINS
 OPEN(1, FILE='hrs_mins.dat')  ! (iii)
! Prompt for MINS:

(ii)
! WRITE(*,*) 'Enter # of minutes:'
  ! PRINT*, 'Enter # of minutes:'

 READ (*,*)  MINS  !(i), (ii)
READ (1,*) MINS   ! (iii)
 HOURS = MINS / 60      ! 60. is stored differently
 RMINS = MINS - 60*HOURS! from 60

 ! Output results
 WRITE(*,*) 'HOURS=', HOURS, 'RMINS=', RMINS
 CLOSE(1)   !(iii)  not necessary.
 STOP
 END PROGRAM  Hrs_Mins
```