

# SINGAPORE AIRLINES Case Study 2: Scheduling Pilots

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This presents even more complex problems than the scheduling of planes! There are strict limits on the hours pilots can work, the rest time between work (dependent on whether they have entered a significantly different time zone), the total hours worked in a week, in 28 days and in a year.

On longer flights, the situation is further complicated as the flight crew might consist of up to 4 pilots so that some rest hours are counted. One of the key measures used in any calculation is the *stick time*, which is a measure of the work time from 'chocks off' (takeoff) to 'chocks on' (landing). For pilots working on new routes, stick time is calculated by

$$S = (0.8t + 18) \text{ minutes}$$

where  $t$  is the scheduled flight time in minutes and  $S$  is rounded up to the nearest 5 minutes.

For example, when  $t = 30$  minutes,

$$\begin{aligned} S &= (0.8 \times 30 + 18) \\ &= (24 + 18) \\ &= 42 \text{ minutes} \end{aligned}$$

giving a final value of 45 minutes, after rounding up to the nearest 5 minutes.

## Problem 1

Find  $S$  when  $t = 40, 50, 60, 70$  minutes (remember each time to round up to the nearest 5 minutes).

## Problem 2

Find  $S$  when a scheduled flight time is 4 hours.

(Note that your answer to this problem should show that the stick time is less than the flight time.)

## Problem 3

What flight time results in the stick time being *the same* as the flight time?

**Problem 4**

The relationship between stick time and flight time can be illustrated on a graph, though note that this is not a continuous relationship. Copy and complete the graph below: the first part has already been drawn.

