

5. The depth of water, D metres, in a harbour, t hours after midnight on a particular day, is modelled by the equation

$$D = a + b \sin(30t)^\circ \quad 0 \leq t < 24$$

where a and b are constants.

Given that the depth of the water on this day

- was 10 m at 3:00 am
- was 8.5 m at 5:00 am

(a) find a complete equation for the model.

(3)

(b) In the context of the model, interpret the value of the constant a .

(1)

Given that the depth of the water was 4.9 m at 10:30 am on this day,

(c) evaluate the model found in part (a), giving a reason for your answer.

(2)