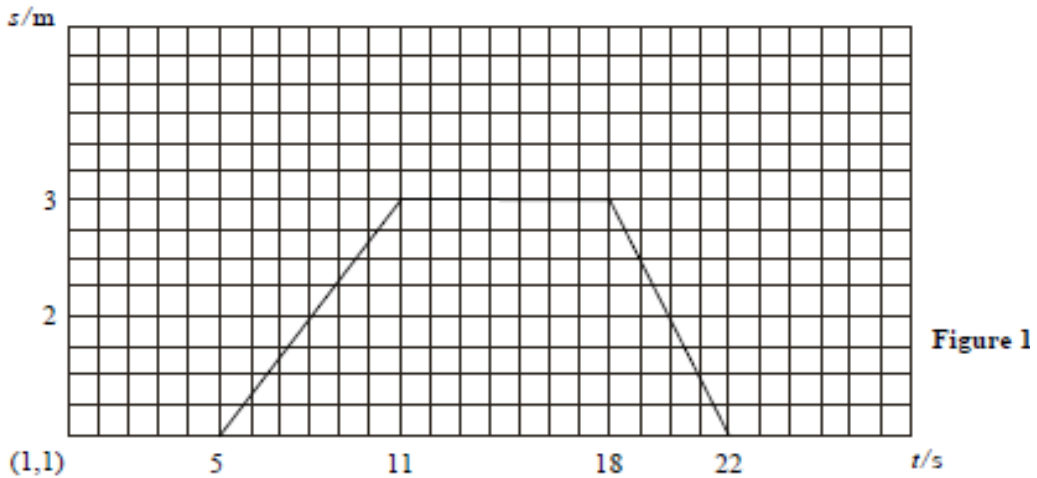


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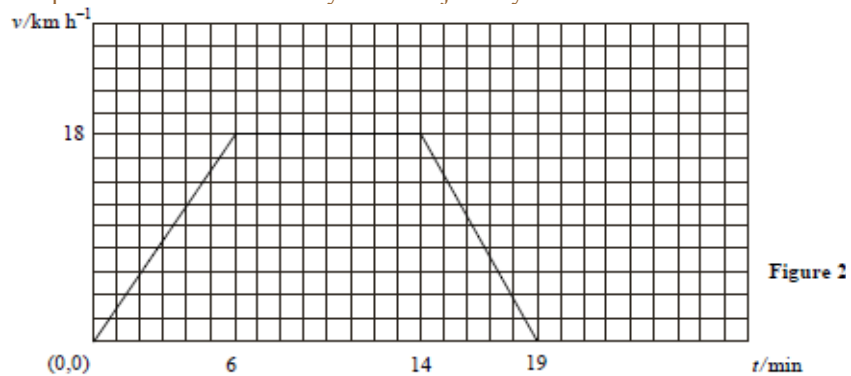
Question 12a

A student holds a motion sensor attached to a data-logger and its calculator.
List the instructions you should give the student so that the calculator will display the graph shown in **Figure 1**. (14)



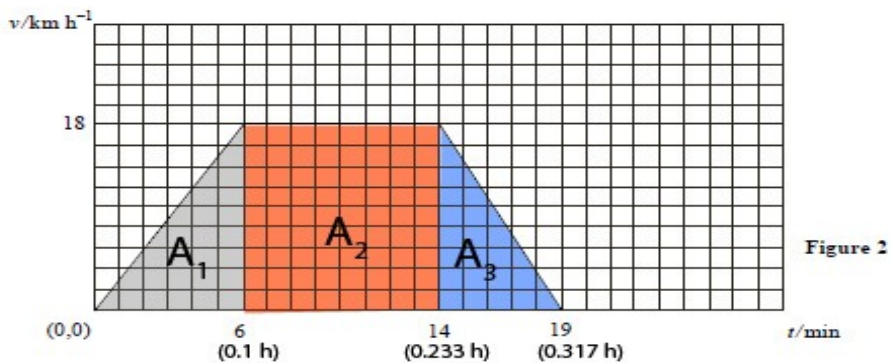
Stand 1m from the wall. Press start on the logger. Wait 5 seconds. Walk at a steady speed of 0.334 ms^{-1} in a straight line away from the wall, for 6 seconds. Stop for 7 seconds and then walk straight back at a steady speed of 0.5 ms^{-1} .

The graph in **Figure 2** represents the motion of a cyclist on a journey.



Using the graph, calculate the distance travelled by the cyclist and the average speed for the journey. (14)

Distance travelled = area under graph = $(0.05 \times 18) + (0.133 \times 18) + (0.042 \times 18) = 4.05 \text{ km}$



Average speed = total distance / total time = $4.05 / 0.317 = 12.8 \text{ km h}^{-1} \approx 3.55 \text{ m s}^{-1}$