17

A car and caravan, connected by a tow bar, move forward together along a horizontal road.

Their velocity $v\,\text{m s}^{-1}$ at time t seconds, for $0 \leq t < 20$, is given by

$$v = 0.5t + 0.01t^2$$

17 (a) Show that when $t = 15$ their acceleration is $0.8\,\text{m s}^{-2}$

[2 marks]

17 (b) The car has a mass of 1500 kg

The caravan has a mass of 850 kg

When $t = 15$ the tension in the tow bar is 800 N and the car experiences a resistance force of 100 N

17 (b) (i) Find the total resistance force experienced by the caravan when $t = 15$

[2 marks]

17 (b) (ii) Find the driving force being applied by the car when $t = 15$

[3 marks]

17 (c) State one assumption you have made about the tow bar.

[1 mark]