2 The variation with time t of the velocity v of two cars P and Q is shown in Fig. 2.1.

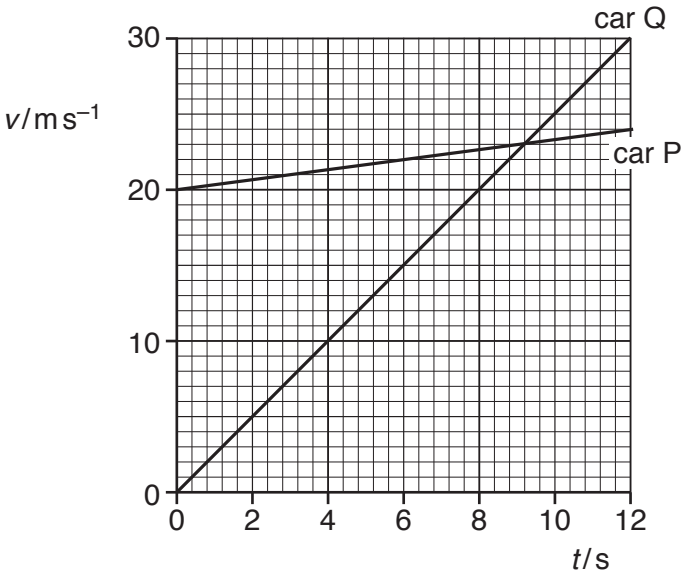

Fig. 2.1

The cars travel in the same direction along a straight road.
Car P passes car Q at time $t = 0$.

(a) The speed limit for cars on the road is 100 km h^{-1}. State and explain whether car Q exceeds the speed limit.

.....[1]

(b) Calculate the acceleration of car P.

acceleration = ... m s^{-2} [2]

(c) Determine the distance between the two cars at time $t = 12\,s$.

distance = ... m [3]

(d) From time $t = 12\,s$, the velocity of each car remains constant at its value at $t = 12\,s$.

Determine the time t at which car Q passes car P.

t = ... s [2]

[Total: 8]