7 A particle P is moving along a straight line through the fixed point O
The speed, v m/s, of P at time t seconds is given by

$$v = \frac{t^2}{27} + 2 + \frac{3}{t^2} \quad \text{for} \quad 1 \leqslant t \leqslant 5$$

(a) Complete the table of values for $v = \frac{t^2}{27} + 2 + \frac{3}{t^2}$

Give your values of v to 2 decimal places.

t	1	1.5	2	2.5	3	3.5	4	4.5	5
v	5.04		2.90	2.71		2.70	2.78	2.90	

(2)

(b) On the grid opposite, plot the points from your completed table and join them to form a smooth curve.

(3)

(c) Using your curve, find an estimate, to one decimal place, for the speed of P when $t = 1.75$

(1)

The acceleration of P at time t seconds where $1 \leqslant t \leqslant 5$ is a m/s^2

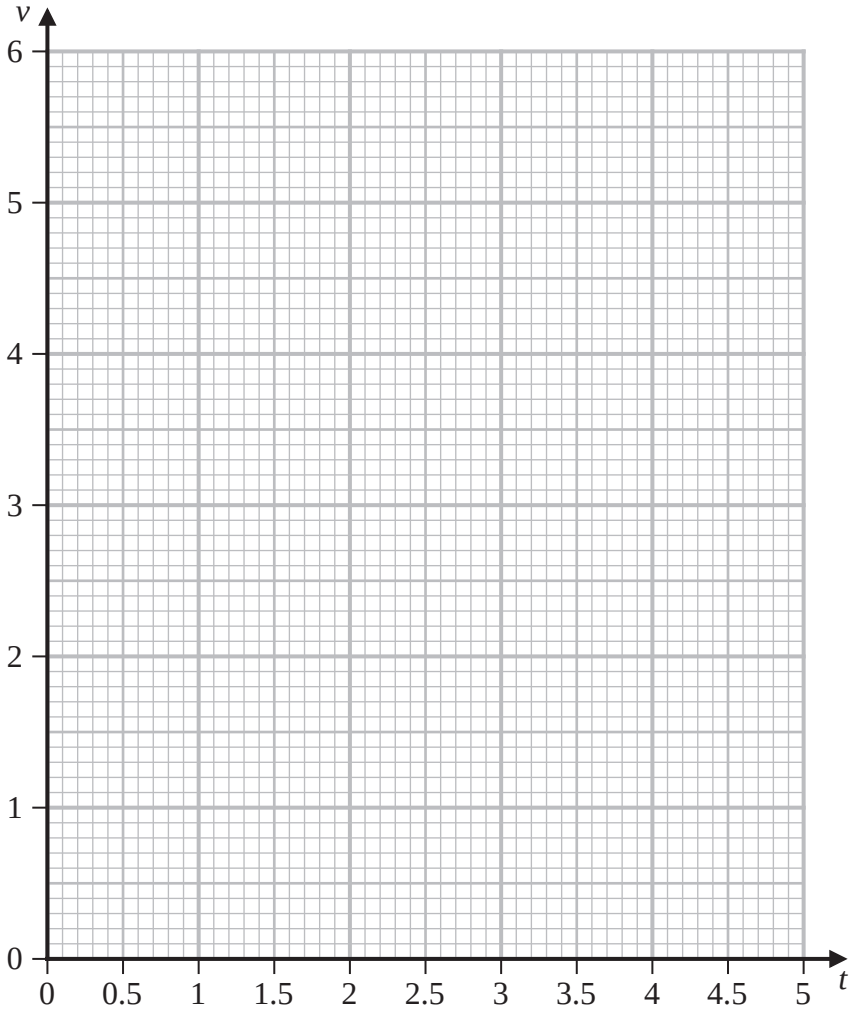
(d) Find an expression for a in terms of t

(2)

(e) Using your answer to part (d), find the value of t when P has its minimum speed in the time interval $1 \leqslant t \leqslant 5$
Show clear algebraic working.

(3)

Question 7 continued

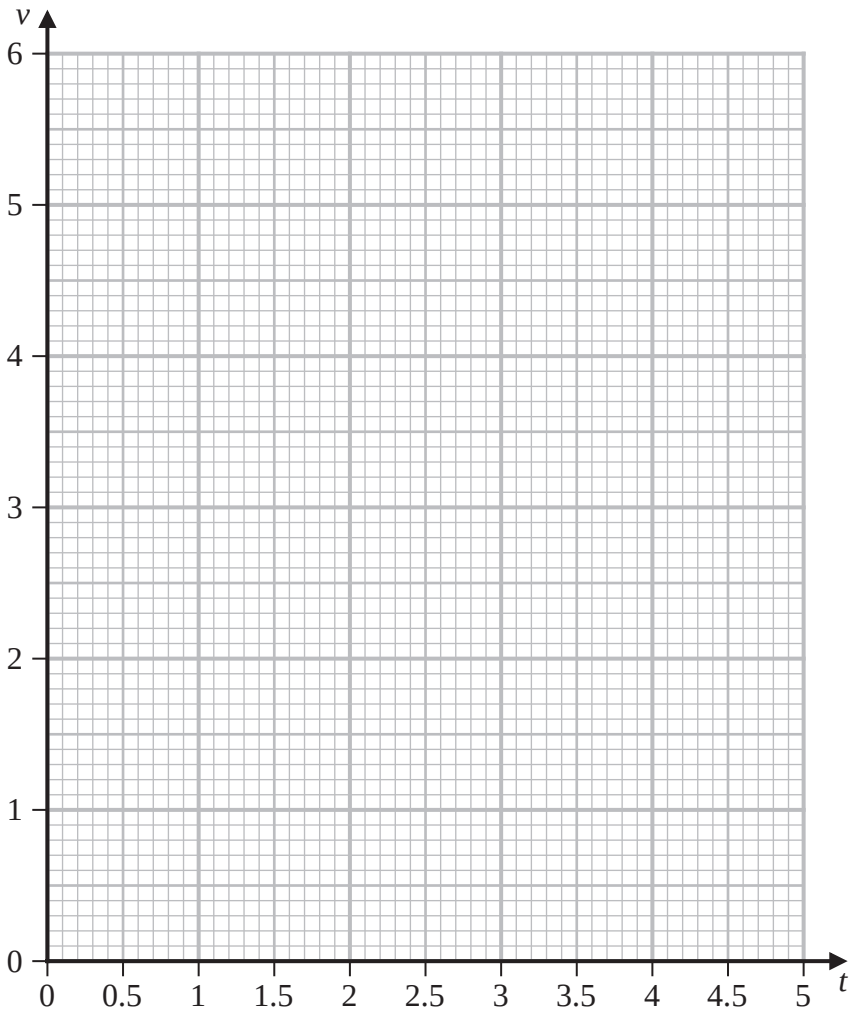


Turn over for a spare grid if you need to redraw your curve.

Question 7 continued

Question 7 continued

Only use this grid if you need to redraw your curve.



(Total for Question 7 is 11 marks)