3. A particle P is moving along the x-axis.

At time t seconds, where $t \geqslant 0$, the displacement of P from the origin O is x metres and P is moving with velocity $v\,\text{m s}^{-1}$ in the positive x direction.

The acceleration of P is $\frac{3\sqrt{x+1}}{4}\,\text{m s}^{-2}$ in the positive x direction.

When $t = 0$, $x = 15$ and $v = 8$

(a) Show that $v = (x+1)^{\frac{3}{4}}$

(4)

(b) Find t in terms of v.

(5)

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Question 3 continued

(Total for Question 3 is 9 marks)