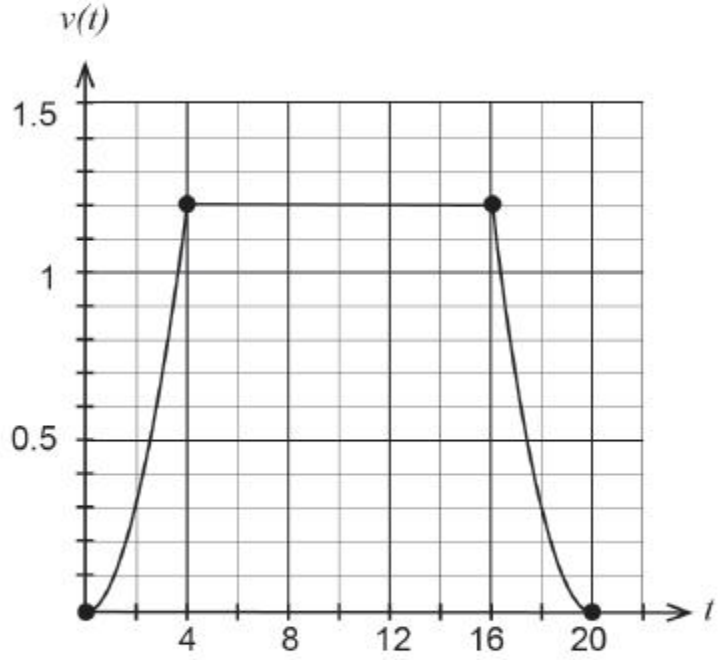
Question 11 **(7 marks)**

A lift goes up within a high rise building so that its velocity $v(t)$ is given by the graph shown below. The maximum velocity of the lift during its ascent is 1.2 ms^{-1}. For the first four seconds, the acceleration is given by $a(t) = kt$. For the final four seconds of its ascent, the lift decelerates at the same rate.



(a) Show that the value of the constant $k = \frac{3}{20}$. (2 marks)

(b) Using the incremental formula, determine the approximate change in velocity v from $t = 2$ to $t = 2.1$ seconds. (2 marks)

(c) Determine the total distance that the lift travels upwards during its ascent, correct to the nearest 0.1 m. (3 marks)