6 A particle starts from rest at a point O. The acceleration of the particle at time t s after leaving O is $a\,\mathrm{m\,s^{-2}}$, where

$$a = 2(t+1)^{-\frac{1}{2}} - 1 \text{ for } t \geqslant 0.$$

Find the distance that the particle travels from O until the time at which its acceleration is zero. [8]