12 A particle moves in a straight line. Its velocity, v ms^{-1}, at time t seconds is given by

$$v = \cos t - \sin t.$$

(a) Find the acceleration, a ms^{-2}, when $t = \frac{\pi}{3}$. [2]

The displacement of the particle from a fixed point O at time t is s metres. The particle passes through O when $t = 0$.

(b) Find the displacement at the time when the particle first changes direction after passing through O. [6]

(c) Find an expression for a in terms of s. [1]

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