7 A particle moves in a straight line. At time t seconds after passing through a fixed point O, its velocity, $v\,\text{ms}^{-1}$, is given by $v = 10\sin 2t - 6\cos 2t$.

(a) Find an expression for the acceleration of the particle. [2]

(b) Find the acceleration when $t = \frac{\pi}{4}$. [1]

(c) Find the first time at which the acceleration is zero. [3]

(d) Find the displacement of the particle between $t = \frac{\pi}{4}$ and $t = \frac{\pi}{2}$. [4]

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