Marked example 1

Paper 1 style · No calculator

1 6 marks SL 5.9 ●●○ Typical

A particle starts from a point O with velocity $5\ \text{m s}^{-1}$ and moves in a straight line. Its acceleration at time t seconds is $a(t) = 4 - 2t\ \text{m s}^{-2}$.

(a) Find an expression for the velocity $v(t)$. **[2]**

(b) Find the time at which the particle comes to rest. **[2]**

(c) Find the displacement of the particle from O at that time. **[2]**

MARKSCHEME (a)

$v(t) = 4t - t^2 + c$ **A1**

$v(0) = 5:\ v(t) = 4t - t^2 + 5$ **A1**

Total 2 marks

MARKSCHEME (b)

$-(t-5)(t+1) = 0$ **(M1)**

$t = 5$ **A1**

Total 2 marks

Note $t = -1$ is rejected: $t \geq 0$.

MARKSCHEME (c)

$s(t) = 2t^2 - \dfrac{t^3}{3} + 5t,\ s(0) = 0$ **M1**

$s(5) = 50 - \dfrac{125}{3} + 25 = \dfrac{100}{3}\ \text{m}$ **A1**

Total 2 marks

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