

1. [ACSI 15 Prelims (modified)]

A particle P travelling in a straight line passes a fixed point O . Its velocity, $v \text{ ms}^{-1}$, is given by the equation $v = t^2 - 6t + 8$, where t is the time in seconds after passing O .

- (a) Find the times when P is instantaneously at rest. [2]
- (b) Find the total distance travelled by P when its velocity reaches 8ms^{-1} again. [5]
- (c) What is the initial acceleration of the particle? [2]

2. [CHIJSJCS 15 Prelims]

A particle moves in a straight line such that t seconds after passing through a fixed point O , its velocity, $v \text{ m/s}$, is given by $v = 24 \cos(2t)$. When $t = 0$, its displacement from O is -6 metres. Find

- (a) the magnitude of the acceleration when $t = 1$, [2]
- (b) the value of t when the particle first reaches the fixed point O , [4]
- (c) the distance travelled by the particle up to the second instantaneous rest. [4]

Answers

1. (a) $t = 2$ or $t = 4$.
(b) $14\frac{2}{3}\text{m}$.
(c) -6 ms^{-2} .
2. (a) 43.6 ms^{-2} .
(b) $t = \frac{\pi}{12}$.
(c) 36 m .