

Two IB's Questions

1)

A particle moves along a straight line. The velocity, $v \text{ ms}^{-1}$ t seconds after we start observing the movement is given by $v(t) = 1 - 2 \sin 3t$.

- (a) Find an expression for the acceleration of the particle. **[2 marks]**
- (b) Find an expression for the displacement of the particle from its original position. **[6 marks]**
- (c) Find the displacement of the particle from its original position $\frac{\pi}{6}$ seconds after we start observing the movement. **[3 marks]**
- (d) Find the total distance travelled by the particle in the first $\frac{\pi}{6}$ seconds after we start observing the movement. **[10 marks]**

2)

A particle moves along a straight line. The velocity, $v \text{ ms}^{-1}$ t seconds after we start observing the movement is given by $v(t) = -\sin t^2$.

- (a) Find an expression for the acceleration of the particle. **[2 marks]**
- (b) How far is the particle from its original position 3 seconds after we start observing the movement. **[3 marks]**
- (c) How many times does the particle change direction during this 3 seconds? **[2 marks]**
- (d) Find the total distance travelled by the particle during this 3 seconds. **[3 marks]**
- (e) How many times does the particle change direction during the first 100 seconds? **[3 marks]**

Two Questions about kinematics

1)

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- (e) How many times does the particle change direction during the first 100 seconds? **[3 marks]**