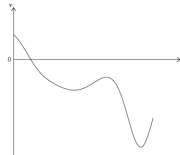


## IB Calculus Problem 16

A particle  $P$  moves along a straight line. The velocity  $v \text{ ms}^{-1}$  of  $P$  after  $t$  seconds is given by  $v(t) = 7\cos t - 5t^{\cos t}$ , for  $0 \leq t \leq 7$ .

The following diagram shows the graph of  $v$ .

The figure is not to scale.



- Find the initial velocity of  $P$ .
- Find the maximum speed of  $P$ .
- Write down the number of times the acceleration of  $P$  is  $0 \text{ ms}^{-2}$ .
- Find the acceleration of  $P$  when the particle changes direction.
- Find the total distance travelled by  $P$ .