7 A particle P is moving along the x-axis. At time t seconds $(t \geqslant 0)$ the velocity of P is v m/s where

$$v = t^2 - 10t + 28$$

(a) Find the velocity of P when $t = 1$

(1)

Given that the distance of P from the origin is 24 m when $t = 3$

(b) find the distance of P from the origin when $t = 5$

(5)

(c) Find the acceleration of P when $t = 9$

(2)

(d) (i) Show that there are no values of t for which P is instantaneously at rest.

(ii) Find the least magnitude of the velocity of P

(3)

Question 7 continued

Question 7 continued

Question 7 continued

(Total for Question 7 is 11 marks)