**Using Integration**

If we know the acceleration, we can integrate to find expressions for velocity and displacement. Recall that the area under a velocity-time graph gives the displacement. Be careful if the velocity (and hence the area) falls under the t-axis as this will give negative displacement.

**Example**

A particle P, moves in a straight line. At t seconds its acceleration is $\left(6t + 12\right)ms^{-1}$. When t = 0, P is at the point A and its velocity is 3ms-1.

a) Find an expression for the velocity of P in terms of t

b) Find the distance travelled between times t = 3 and t = 5

**Example** *(Textbook Page 189 Example 7)*

A particle travels in a straight line. After $t$ seconds its velocity, $v$ ms-1, is given by

$v=5-3t^{2}$, $t\geq 0$. Find the distance travelled by the particle in the third second of its motion.

**Test Your Understanding** *(EdExcel M2 June 2015 Q6)*



Exercise 11D Page 189