**Motion of a Particle**

(a) The distance $s$ of a particle at time $t$ is given by $s = 5t^2 + 8t + 3$. Find an expression for the velocity $v$ of the particle, and the velocity after 6 seconds.
(b) The distance $s$ of a particle at time $t$ is given by $s = t^3 + 2t^2 + 10t - 3$. Find an expression for the velocity $v$ of the particle, and the velocity after 2 seconds.

(a) $v = 10t + 8$
$v = 68 \text{ m/s}$

(b) $v = 3t^2 + 4t + 10$
$v = 30 \text{ m/s}$

(a) The distance $s$ of a particle at time $t$ is given by $s = 0.5t^3 - 0.1t^2$. Find expressions for the velocity $v$ and acceleration $a$ of the particle. Find the acceleration after 4 seconds.
(b) The distance $s$ of a particle at time $t$ is given by $s = 5t + 3t^2 + t^3$. Find expressions for the velocity $v$ and acceleration $a$ of the particle. Find the acceleration after 0.5 seconds.

(a) $v = 1.5t^2 - 0.2t$
$a = 3t - 0.2$
$a = 11.8 \text{ m/s}^2$

(b) $v = 5 + 6t + 3t^2$
$a = 6 + 6t$
$a = 9 \text{ m/s}^2$

(a) The distance $s$ of a particle at time $t$ is given by $s = 2t^2 - 6t$. Find the time at which the velocity is instantaneously zero.
(b) The distance $s$ of a particle at time $t$ is given by $s = 2t^3 - 15t^2 + 9t$. Find the time at which the acceleration is instantaneously zero.

(a) $v = 4t - 6$
when $v = 0$ $t = 1.5\text{s}$

(b) $v = 6t^2 - 30t + 9$
$a = 12t - 30$
when $a = 0$ $t = 2.5\text{sec.}$

A particle travels in a straight line where the distance from the origin O is given by $s = 2t^2 - \frac{3}{t}$. Find the velocity and acceleration of the particle after 5 seconds.

$v = 4t + \frac{3}{t^2}$ $a = 4 - \frac{6}{t^3}$

$v = 20.12 \text{ m/s}$
$a = 3.952 \text{ m/s}^2$