**8C Calculus in Mechanics**

1. A particle is moving in a straight line with acceleration at time t seconds given by:

,

The velocity of the particle at time is . Find:

1. An expression for the velocity at time seconds
2. The maximum speed of the particle
3. The distance travelled in the first 3 seconds
4. A particle of mass 6kg is moving on the positive x-axis. At time seconds the displacement, , of the particle from the origin is given by:

, where

1. Find the velocity of the particle when
2. Given that the particle is acted on by a single force of variable magnitude which acts in the direction of the positive x-axis, find the value of when