Name: _____

Class: _____

Due Date: _____

Physics Topic 18C – Momentum with Calculus

Answer the following questions. The solutions to this worksheet can be found on the YouTube channel Go Physics Go.

1. E: The momentum of a particle is given below. Find a formula for the force exerted on the particle.

   a. $\vec{p} = 6t^3 + 4t + 5$

   b. $\vec{p} = 4 \sin 6t$

2. E: Given: $\vec{p} = 3t^2 + 18$

   a. Find a formula for the force.

   b. Calculate the value of the momentum and of the force at $t = 2$.

   c. Find the average force between $t = 1$ and $t = 4$.

   d. Find the average momentum between $t = 1$ and $t = 4$.

3. E: A particle, whose mass is 7.5 kg, is initially at rest. It is now subjected to a force whose equation is $F = 18t$.

   a. Find the velocity at $t = 5$.

   b. Find the change in momentum from $t = 2$ to $t = 7$.

4. E: A particle with a mass of 3.00 kg is subjected to a force given by $F = 24t$. At $t = 7.00$ s the velocity is 250. m/s.

   a. Calculate the initial velocity.

   b. Calculate the change in momentum from $t = 2$ s to $t = 5$ s.

5. E: A particle is subjected to a force from $t = 1$ to $t = 5$ whose equation is given by $(F - 24) = -6(t - 3)^2$. Calculate the impulse.