Name: _____

Class: _____

Due Date: _____

Physics Topic 17B – Power with Calculus

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

1. During lift-off, the total work performed by a rocket engine as time goes by is given by the equation $W = 2t^3 + 8t^2$.

   a. As a function of time, find a formula for the instantaneous power of the engine.

   b. Find the cumulative work performed by the engine at $t = 5$ s.

   c. Find the work done between $t = 2$ s and $t = 5$ s.

   d. Find the average power between $t = 2$ s and $t = 5$ s.

   e. Find the instantaneous power at $t = 2$ s and at $t = 5$ s.

2. Accelerating from rest, a locomotive engine delivers instantaneous power given by the equation $P = 12t^2$.

   a. As a function of time, find a formula for the cumulative work performed by the engine.

   b. Find the instantaneous power at $t = 2$ s and at $t = 5$ s.

   c. Find the cumulative work done at $t = 5$ s.

   d. Find the work done between $t = 2$ s and $t = 5$ s.

   e. Find the average power between $t = 2$ s and $t = 5$ s.