

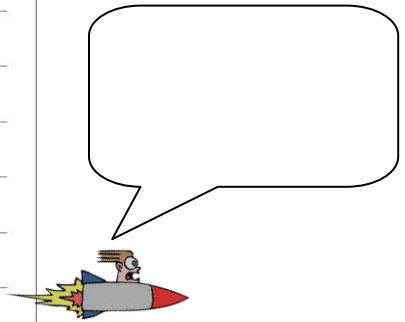
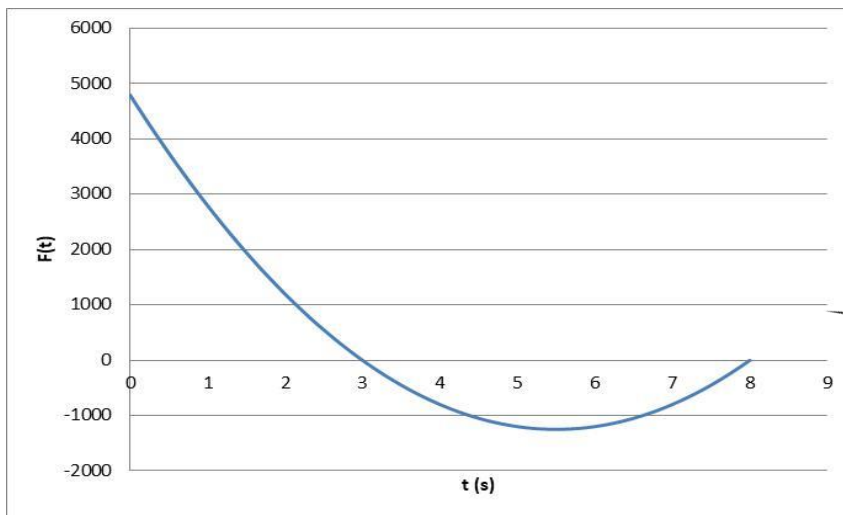
# Collisions Assignment

/20

Name: \_\_\_\_\_

Date: \_\_\_\_\_

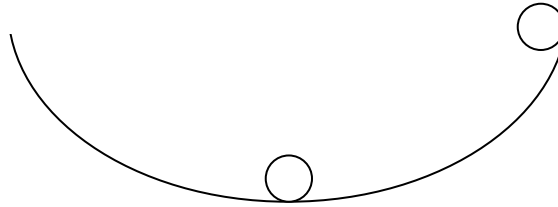
1. [ 5 marks ] The force profile for mini-rocket man is given below. The speed of the 50 kg rocket ship at  $t=0$  s was 20 m/s. Calculate the final speed of the rocket ship after 8 seconds of impulse (you must do part a)) – part b is optional.
- Solve this by estimating the area from the graph.
  - Solve this by integrating the function from 0 to 8 seconds (compare to part a))
    - $F(t) = 200t^2 - 2200t + 4800$
    - Check your answer using Wolfram Alpha (attach output image).



2. [ 5 marks ] During an ice-storm a collision occurs on an icy frictionless road. A 3,000 kg truck moving at 15m/s to the right collides with a 1500kg Lamborghini moving at 5 m/s to the right. The collision is inelastic. How far up the hill do they slide after the collision?



3. [ 5 marks ] A 3.0g marble is dropped into a bowl that is 20 cm high. It collides elastically with another marble of mass 5.0g at rest at the bottom of the bowl. How high up the ramp on the other side does the second marble go? How high does ball one go after the collision and on which side?



4. [ 5 marks ] Warren fires a sticky dart (mass of 1.13 grams) from a dart gun at a pop can (mass of 13.68 grams) sitting at the very edge of a table 70cm tall. The dart is fired at 8 m/s horizontally and sticks to the can forcing it off of the desk. How far from the edge of the table does the can (with the dart attached) land?

