1. A ball is thrown straight up into the air at a time $t = 0$. The height of the ball relative to the ground at any point in time is given by the function

$$p(t) = -t^2 + 4t + 5.$$

   (a) (6 points) For $t > 0$, find the instantaneous velocity of the object using the <u>limit definition of the derivative</u>.

   (b) (2 points) At what time does the ball first hit the ground?

   (c) (2 points) What is the instantaneous velocity of the ball when it hits the ground in part (b)?