**MA 121: HW 1**     **Name:**_____

Answer these questions on a separate sheet of paper.

Suppose that Thor throws a hammer in a straight line. After $t$ seconds, the hammer is $t^2$ Swedish miles away from him[1].

(1) How far away is the hammer from Thor at time $t = 3$ seconds?

(2) Approximately how fast was the hammer travelling in the first three seconds. (Hint: Remember that distance equals rate times time.)

(3) How far is the hammer from Thor at time $t = 3.5$ seconds?

(4) Approximately how fast was the hammer travelling between time $t = 3$ and time $t = 3.5$? Compare this answer to your answer in (2). Explain the qualitative difference between the two answers.

(5) Let $h$ be a non-zero number. Find expressions representing the following quantities. You should "simplify" your answers as much as possible (in part (a), this will involve FOIL and other algebra). Your answers will have $h$ in them.

 (a) The distance the hammer has travelled between time $t = 3$ and time $t = 3 + h$.

 (b) Approximately how fast the hammer travelled between time $t = 3$ and time $t = 3 + h$. If $h = .5$, is your answer the same as your answer from (3)? If not, why not?

(6) Exactly how fast was the hammer travelling at precisely $t = 3$ seconds? (To answer this question, think about what happens to your answer in (5b) if $h \approx 0$.)

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[1]I'm not sure if there are Norwegian miles or not, maybe they were Norwegian miles...