## 413: PROBLEM SET 7. DUE THURSDAY 3 APRIL

(1) Section 5.2.4 #1.

(2) Section 5.2.4 #2.

(3) Section 5.2.4 # 8.

(4) Section 5.3.4 # 1.

(5) Section 5.3.4 # 7.

(6) Section 5.3.4 # 8.

(7) Section 5.4.6 #14.

(8) One day, Sherlock Holmes sees Dr. Watson walk past him at a constant speed of 3 mph. Five minutes later, Watson walks past the same spot again, still at 3 mph. Holmes calls to Watson and says:

"Watson! I deduce that you must have stopped at some point on your journey!"

Watson replies: "Not so, Holmes. I have been walking for the last five minutes at a constant speed of 3 mph."

Holmes says: "You are lying, Watson! For if we let $f(t)$ denote the distance between your position at time $t$ and your present position, then clearly $f(0) = f(5) = 0$. So by Rolle's Theorem there must exist a time $t_0$ with $0 < t_0 < 5$ such that $f'(t_0) = 0$, meaning that at time $t_0$, your speed was zero, and therefore you were stationary!"

Who is right, and why?