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A SYSTEMIC INITIATIVE FOR MODELING INVESTIGATIONS
& OPPORTUNITIES WITH DIFFERENTIAL EQUATIONS

STUDENT VERSION

Newton Watson Time of Death

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STATEMENT

It was hot for a London fall day – 70°F. Holmes arrived at Barker Avenue Annex to find the inspector hunched over the body. "It is important that we determine the exact time of death, sir, for in that way we may immediately determine the motive," said the inspector. Not wishing to pursue the unpursuable non sequitur, Holmes took out his thermometer and after a few moments of discrete(!) investigation, announced, "I say! 94.6°F. (What no metric system?) And it is presently noon." With that he departed into the London fog, to return to the body at the same spot in one hour. After performing another investigation Holmes declared, "93.4°F at 1 o'clock." And then silence . . . After some analysis, Holmes predicted the time of death to the minute.

Holmes shared with Watson a hint about a law of Newton at which point Watson said something like, "Here, here, Holmes, you don't mean to say he fell out of a window." Holmes sensing the gravity of the situation proceeded to explain, as he always did with Watson(!), how he did his analysis.

1. Using a differential equation model show exactly the analysis needed to come to this the conclusion Holmes offered and offer up Holmes's answer. Spare no details, for Holmes ALWAYS tried to make his explanations, "Elementary, my dear Watson!" State any and all assumptions clearly and precisely.
2. At the autopsy later that day it was discovered that the dead man had a bacterial infection at the time of death which, when interpreted by the medical staff, suggested that he was running a high fever of around 104°F at the time of death. Use this information to revise the estimated time of death.