

WORKSHEET - separable ODE

Math 0290 *Differential Equations* - RUBIN - January 7, 2009

1. The Body: A dead body is discovered at midnight on a 70°F night. Since foul play is evident, Detective MacGyver is called in, and he finds that the body temperature is 85°F . The body is slipped into an insulated bag and taken to the morgue, where it is kept at 40°F . After a leisurely two hour dinner break, Detective MacGyver goes in and finds the body temperature is 55°F . Meanwhile, the police pick up the owner of a bloody glove found at the scene, but witnesses state he was at a party until 11 PM. Can he be the killer?

2. The Dorm: Detective MacGyver's next case involves the mass illness of students living in a university dormitory. His team is called in 5 days after the outbreak occurs, and after a painstaking search, they identify deadly oobleck spores in one of the dorm showers, which features ideal conditions for oobleck growth. Detective MacGyver estimates that 300 spores are present at the initial discovery and checks back to find 350 spores one day later. Detective MacGyver then prepares a report on the case, indicating (1) the estimated half-life of oobleck in dorm showers, and (2) whether or not the quantity of oobleck in the shower would have exceeded a toxic level of 100 spores when the outbreak occurred. What answers does he give?