

# Halloween Problem

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Solving differential equations is perhaps one of the most important concepts to truly understanding physics, it is also what makes calculus so powerful: the fact that we can break situations down to the infinitesimal, notice not zero, but smaller than any value you can think of which is the essence of integration. The following problem takes the ability of solving differential equations a step farther by relating two changing qualities together forming a coupled differential equation:

**Problem** What is the maximum amount of candy which a trick or treater can hope to attain in a trick or treating session? Assume that all the candies are fun-sized Milky Way bars with mass of 17 grams.

**Remark.** *Time spent trick or treating is two hours. Each house in a suburban neighborhood is ten meters apart and there are sufficiently many houses in existence. Do not consider the amount of time taken at each house. Mass of candy collected is homogeneous and not negligible nor is the change in candy influx.*