# Homework 7

## Due 10/22/15

## October 15, 2015

Hiram, an apprentice jeweler, was working late one night preparing an ornamental headpiece for the queen. The headpiece was to be set with 25 identical opals, arranged in a concentric pattern.

Unfortunately, immediately after preparing the gems, he dropped the entire set of 25 on the floor. On picking them up, Hiram discovered that there was a opal chip on the floor—one of the gems had chipped, but in the poor light, he could not tell which one.

Fortunately, Hiram had a scale at hand and realized that he could find the marred gem by identifying which gem was lighter than the others.

1. Prove that Hiram cannot identify the chipped gem in 2 or fewer weighings.

2. Prove that Hiram can identify the chipped gem in 3 weighings.