Examples of the Sampling Distribution of sample mean

1. *Ski Gondola Safety* A ski gondola in Bogus Basin Ski Resort carries skiers to the top of the mountain. Assume that it bears a plaque stating that the maximum capacity is 12 people or 2004 pounds. That capacity will be exceeded if 12 people have weights with a mean greater than 2004/12=167 pounds. Because men tend to weigh more than women, a “worst” scenario involves 12 passengers who are all men. Men have weights that are normally distributed with a mean of 172 lbs and a standard deviation of 29 lbs (based on data from the National Health Survey).

a. Find the probability that if an individual man is randomly selected, his weight will be greater than 167 lbs.

b. Find the probability that 12 randomly selected men will have a mean weight that is greater than 167 lbs (so that their total weight is greater than the gondola maximum capacity of 2004 lbs).
2. *(Body Temperature)* Assume that the population of human body temperatures has a mean of 98°F, as is commonly believed. Also assume that the population standard deviation is 0.62°F (based on the data from a researcher in the department of Biology, BSU). If a sample of size \( n = 106 \) is randomly selected, find the probability of getting a sample mean of 98.2°F or lower.

3. *(Air Boise)* When an airliner is loaded with passengers, baggage, cargo, and fuel, the pilot must verify that the gross weight is below the maximum allowable limit, and the weight must be properly distributed so that the balance of the aircraft is within safe acceptable limits. “Air Boise” has established a procedure whereby extra cargo must be reduced whenever a plane filled with 200 passengers includes at least 120 men. Find the probability that among 200 randomly selected passengers, there are at least 120 men. Assume that the population of potential passengers consists of an equal number of men and women.