STAT 205, Spring 2015

Homework 4

Out: Thursday February 19. Due in: Thursday February 26

- 1. The heights of a certain population of corn plants follow a normal distribution with mean 145 cm and standard deviation 22 cm.
 - (a) What percentage of the plants are between 135 and 155 cm tall?

 $\Pr\{135 < Y < 155\} = 0.3506$

> pnorm(155,145,22)-pnorm(135,145,22)
[1] 0.3505637

(b) Suppose we were to choose at random from the population a large number of samples of 16 plants each. In what percentage of the samples would the sample mean height be between 135 and 155 cm? (Hint: the random variable here is sample mean.)

 $\overline{Y} \sim N(145, 22/\sqrt{16} = 5.5) \Longrightarrow \Pr\{135 < \overline{Y} < 155\} = 0.9310$ > pnorm(155,145,5.5)-pnorm(135,145,5.5)

- [1] 0.9309637
- (c) If \overline{Y} represents the mean height of a random sample of 36 plants from the population, what is $\Pr\{135 \le \overline{Y} \le 155\}$?

 $\overline{Y} \sim N(145, 22/\sqrt{36} = 3.67) \Longrightarrow \Pr\{135 < \overline{Y} < 155\} = 0.9936$ > pnorm(155,145,3.67)-pnorm(135,145,3.67) [1] 0.9935659