

6.21: Normal Random Variables (3 of 6)

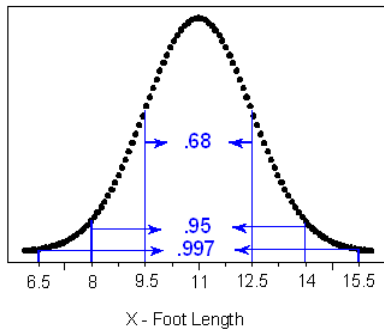
Learning Objectives

- Use a normal probability distribution to estimate probabilities and identify unusual events.

Example

The Empirical Rule in a Context

Suppose that foot length of a randomly chosen adult male is a normal random variable with mean $\mu=11$ and standard deviation $\sigma=1.5$. Then the empirical rule lets us sketch the probability distribution of X as follows:



(a) What is the probability that a randomly chosen adult male will have a foot length between 8 and 14 inches?

Answer 0.95, or 95%

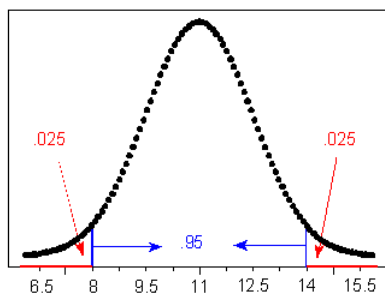
(b) An adult male is almost guaranteed (0.997 probability) to have a foot length between what two values?

Answer 6.5 and 15.5 inches

(c) The probability is only 2.5% that an adult male will have a foot length greater than how many inches?

Answer 14 inches

Ninety-five percent of the area is within 2 standard deviations of the mean, so 2.5% of the area is in the tail above 2 standard deviations. The x -value 2 standard deviations above the mean is 14 inches.



Now you should try a few: questions (d), (e), and (f) are presented in the Learn By Doing activity. Use the figure preceding question (a) to help you.

Learn By Doing

<https://assessments.lumenlearning.co...ssessments/3567>

Comment

Notice that there are two types of problems we may want to solve: those like (a) and, from the Learn By Doing activity, (d) and (e), in which a particular interval of values of a normal random variable is given and we are asked to find a probability; and those like (b), (c), and, from the Learn By Doing, (f), in which a probability is given and we are asked to identify values of the normal random variable.

CC licensed content, Shared previously

- Concepts in Statistics. **Provided by:** Open Learning Initiative. **Located at:** <http://oli.cmu.edu>. **License:** *CC BY: Attribution*

This page titled [6.21: Normal Random Variables \(3 of 6\)](#) is shared under a [CC BY 4.0](#) license and was authored, remixed, and/or curated by [Bill Pelz](#) via [source content](#) that was edited to the style and standards of the LibreTexts platform.