

Finding Probability Between Two Values

Male adult foot lengths can be modeled with $\text{Norm}(26, 2)$ (cm). We want to find the proportion of the population with foot lengths between 24 cm and 28 cm.

Reflection: The Friction of the Pencil: Slicing the Normal

1. Draw three separate bell curves below to visualize the subtraction logic:

- (a) Sketch the total area to the left of 28 cm. Label this area $P(X \leq 28)$.
- (b) Sketch the total area to the left of 24 cm. Label this area $P(X \leq 24)$.
- (c) Sketch the target "slice" (the area between 24 and 28).

2. Based on your sketches, write a sentence explaining how the area of the "slice" in plot (c) is derived from the areas in (a) and (b).

Check that your answer for Step 2 agrees with Theorem 7.2 in Section 7.2 of your textbook.

Coding Corner: The Slice Calculation

3. Use R to calculate the probability of a random foot length falling between 24 cm and 28 cm. The **Coding Template** immediately following Theorem 7.2 should be a great help here. Don't forget to give R the values for μ (mean) and σ (sd)!

Code: _____

Result: _____

Sally the Statypus says: Don't forget Bill's warning from the last worksheet! A result only has value if you can interpret it. Please write a full sentence explaining the result you found in Step 3.

St. Louis, MO has the distinction of having been the team for the smallest Major League Baseball player in history and sharing a border on the Mississippi river with Alton, IL, which was the home of the tallest human in recorded history.

Eddie Gaedel has the distinction of being the shortest person to ever appear in a Major League Baseball game. Eddie stood 3 foot 7 inches (or 43 inches) tall when he appeared for the St. Louis Browns in 1951. This was played at Sportsman Park III which was on Grand Blvd just under 2 miles from SLU's North Campus!

Robert Wadlow, often known as the "Alton Giant," had the distinction of being the tallest person in recorded history. Upon his death, he was measured to stand 8 foot 11.1 inches and he was, in fact, still growing!

Coding Corner: The Local Extremes

4. Use R to calculate the probability of a random US adult male having a height falling between Eddie and Robert. Assume that US adult male height can be modeled with $\text{Norm}(69, 3)$ (in).

Code: _____

Result: _____

Reflection: That's a lot

Write a full sentence explaining the result from Step 4.

Bill the Statypus says: To be precise, the probability isn't *really* 1. It is just so close that R cannot display a number between the real value and 1.

Coding Corner: That's rare.

5. Use R to calculate the probability of a random US adult male having a height that is either shorter than Eddie or taller than Robert. Report your answer in decimal form.

Code: _____

Result: _____