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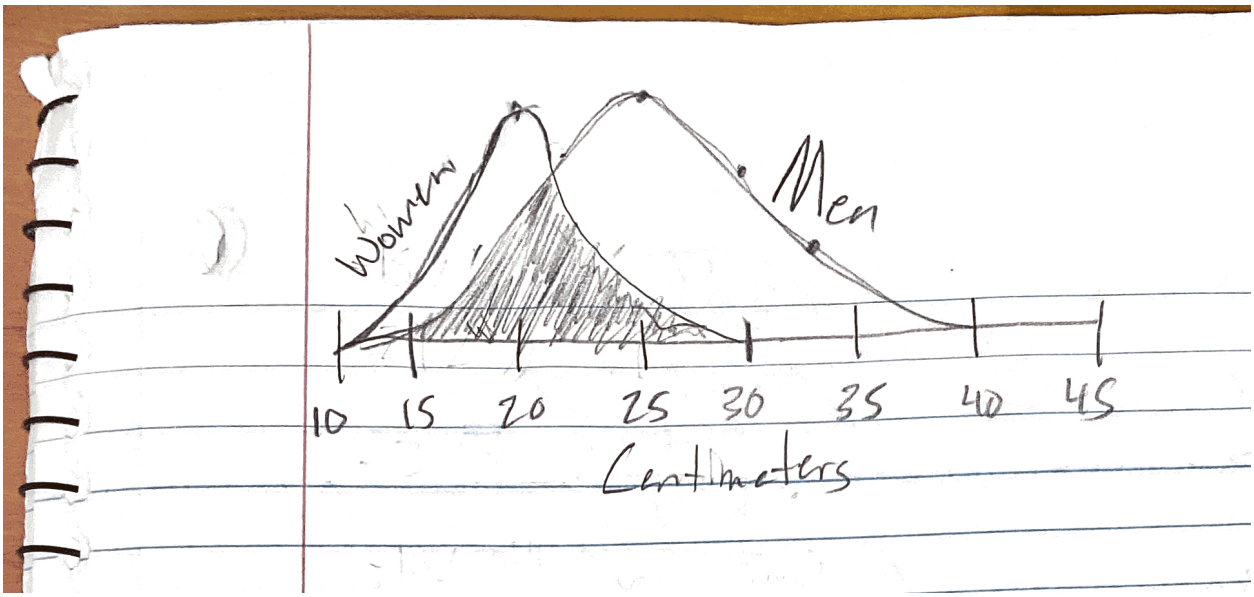
Math-1040-410-F20

Footprints Activity

1. Sketch the two normal curves on the same axis, and label them (the curves and the axis) clearly. Measure your foot length in centimeters and plot that value on your sketch.



2. Compute the probability of mistakenly identifying a footprint as a man's using your foot length as the cut-off. In other words, find the probability of obtaining a footprint of your length or shorter, using the mean and standard deviation for men. Label this probability on your drawing. Include the calculator commands you used to compute the probability.

   Normalcdf(-999999, 20, 25, 4) = .106

3. Compute the probability of mistakenly identifying a footprint as a woman's using your foot length as the cut-off. In other words, find the probability of obtaining a footprint of your length or longer, using the mean and standard deviation for women. Label this probability on your drawing. Include the calculator commands you used to compute the probability.

Normalcdf(-999999, 20, 19, 3) = .067

4. Suppose you want to change the probability of mistakenly identifying a footprint. Choose whether you want to change the probability of misidentifying a man's footprint as a woman's or misidentifying a woman's footprint as a man's. Choose the probability you want and determine the cut-off value that would satisfy your new probability. Hint: You need to find a data value from a given percent. Include the calculator commands you used to compute the cut-off value

   I would like to lower the error of a man's footprint to .10, so it would be a 90% chance that the footprint would be a man's. I used the function InvNorm(.10, 25, 4) = 19.873 with this new length if I put into a function for a woman's foot it would be Normcdf(19.873, 9999999999, 19, 3) = .385

5. Comment on how changing the cut-off value affected the two kinds of error probabilities. Which one got bigger and which one got smaller? Explain why it makes sense that the probabilities changed as they did.

   The probability of a man's foot got smaller because I made it smaller, but it made the probability of a woman's foot larger. This happens because the new cutoff mean for a man's foot is a lot closer to the original mean of the woman's foot.