

Warm Up



I ranked in the 89th percentile for height and the 31st percentile for weight among males (source: US Census 2007-08). What does that mean?

Objective: SWBAT use the standard normal distribution and a z-table to describe an observation

Agenda:

- Warm Up
- Notes
- Calculator Tips
- Practice
- Reflection

HW: pg. 131
#41, 43, 47, 53 (multiple parts)

Notes: Normal Distributions

Generally, a normal distribution is any density curve that is unimodal, symmetric, and bell shaped. All normal distributions can be described just from their mean μ and standard deviation σ .



Many, many things can be approximated by a normal distribution. For instance:

- test scores
- features of a biological population
- measurements of a manufactured part
- chance outcomes

Notes: Empirical Rule

approximately

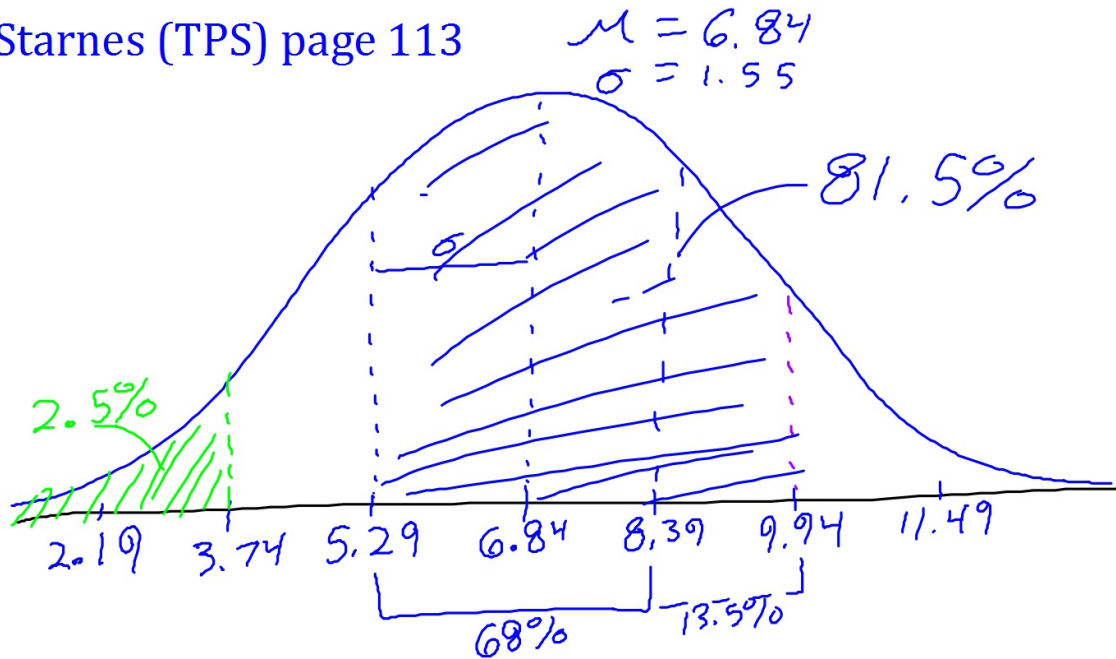
68% of the curve is within 1 standard deviation of the mean

95% of the curve is within 2 standard deviations of the mean

99.7% of the curve is within 3 standard deviations of the mean

Example

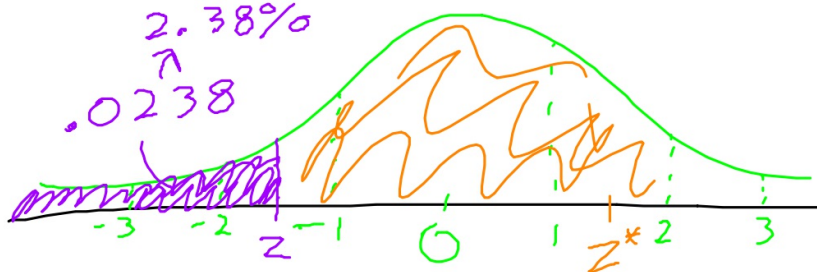
Starnes (TPS) page 113



Notes: Standard Normal

The standard normal is a special normal distribution with $\mu = 0$ and $\sigma = 1$.

When we standardize (find z-scores), we fit data to this.



Example

Starnes (TPS) page 117

Solving Problems

1. **State:** express the problem in terms of a variable (like x)
2. **Plan:** draw a picture and shade the area you need
3. **Do:** (the calculations)
4. **Conclude:** Write your answer in context.

Example

Starnes page 120

X = distance the ball flies
 $\mu = 304$, $\sigma = 8$; look for $X \geq 290$



$$z = \frac{290 - 304}{8} = -1.75$$

below: 0.0401
above: $1 - 0.0401 = 0.9599 \approx 96\%$

Notes: Going Backwards

Given a proportion & stats,

1. Convert the proportion to a decimal

ex) pg. 122

$$z = -0.67$$

2. Find it in the z-table

$$= \frac{x - 170}{30}$$

3. Use the z-score formula to get the observed value

$$x = 149.9 \approx 150$$

Calculator Talk

normal distribution calculations:

[2nd]->[VARs]->normalcdf(
using: normalcdf((lower), (upper), mean, std. dev.)

going backwards to the number:

[2nd]->[VARs]->invnorm(
using: invNorm(proportion, mean, std. dev.)

Practice

work on the sheets titled "Extra Practice" and "Investigating Normal Distributions"

Reflection

What do we need to know before we use a z-table?