AP Test Review – Modeling Distributions of Data

I. Measuring Position

A. Percentiles – p % of the observations are *less than* it.

B. Cumulative Relative Frequency Graph

C. z-scores

a) standardizes observations from distributions

b) tells how many standard deviations from the mean and in which direction

c) $z = \frac{x - mean}{standard\ deviation}$

You can calculate a z-score for any distribution, but area/proportion/p-value are for Normal Distributions

D. Transformations of Data

A. Adding (Subtracting) a constant

a) adds (subtracts) to a measure of center or location

b) does not change measure of spread nor the shape of distribution

B. Multiplying (Dividing) a constant

a) multiplies (divides) measure of center or location and spread

b) does not change shape of distribution

II. Density Curves

A. Total Area = 1

B. Area = proportion of observations in the interval of the values

C. Always above or on x axis

D. Mean

a) μ

b) located by eye, it is the balancing point

c) equal to median in symmetric curve, further out on skewed curves

E. Median divides the area of the curve in half

F. Standard Deviation

a) σ

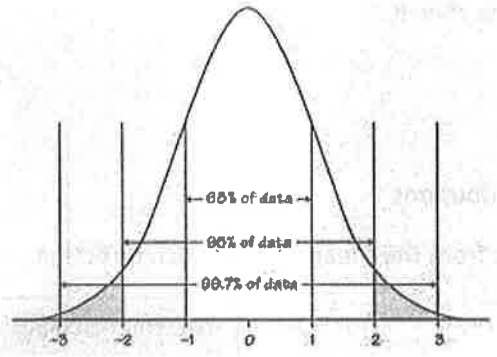
b) turning point in symmetric curve, can't be located if it isn't symmetric

III. Normal Distribution

A. bell shaped, symmetric density curve

B. has mean μ and standard deviation σ

C. 68-95-99.7 rule



D. $z = \frac{x-\mu}{\sigma}$

E. Table A – Gives the area to the **LEFT** of a z-score under the Normal curve

Common Mistakes:

- all z-scores do not need to come from a Normal distribution
- z-scores do not have the same units as the distribution they come from. Rather, a z-score of 2.3 means "2.3 standard deviations from the mean".
- Notation: a Normal distribution with mean, μ, and standard deviation, σ, can also be written as $N(\mu,\sigma)$
- When calculating proportions/percentiles/area/probabilities from the Normal curve using technology or Table A, watch out for the direction (think inequality symbol) you are measuring.