Define Terms:

UOA/Case
Variable
Value

4 Levels of measurement

Definition of a term:

Reliability
Validity

UOA/Case – A specific item within a population
Variable – One descriptor which is being measured in a population.
Value – The data within a variable for a particular case.

Nominal (Discrete) – Names are assigned to categories.

Ordinal – Categories can be ranked (1^{st}, 2^{nd}, 3^{rd}).

Interval – Differences can be meaningfully compared, but no 0 on the scale.

Ratio – Meaningful ratios between pairs of numbers

Reliability – The consistency of a set of measurements or measuring instrument.

Validity - A variable or measure is valid if its values are close to the true values of the thing that the variable or measure represents. In plain language, it's valid if it measures what it's supposed to.

Mean
Median
Mode
Variance
Standard deviation

The following is a sample of 4, from a full population of 100. Identify the standard deviation:

1
4
7
3

A civil service exam is administered to a new group of 100 job applicants. By past experience the mean for new applicants is 65 and the standard deviation is 10, with an approximately normal distribution. a) About what percent of the new job applicants would you expect to pass the minimum qualification standard of 55?

Mean - Average
Median – Center of population by # of units
Mode – Most number of cases with the same value

Variance –

s^2 - Sample | σ^2 - Population

Standard deviation –

s - Sample | σ - Population

$$s = \sqrt{s^2} \qquad s^2 = \frac{\Sigma (X - \bar{X})^2}{n-1}$$

$\bar{X}$ = (1+4+7+3)/4 = 3.75

$$\frac{(1-3.75)^2 + (4-3.75)^2 + (7-3.75)^2 + (3-3.75)^2 = 18.75}{3} = 6.25 = s^2$$

$$s = \sqrt{6.25} = 2.5$$

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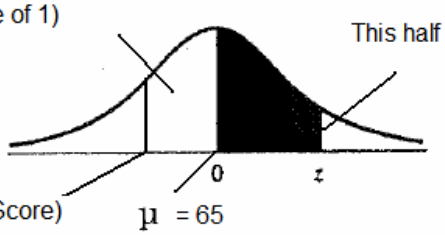
n = 100 $\qquad z = \frac{(x - \mu)}{\sigma} = \frac{(55-65)}{10} = 1 \qquad \sigma = 10$

This area is .3413 (calculated using a z-score of 1)

This half is .5



55 (Passing Score) $\mu = 65$

Total area is .8413, or 84%.

Therefore, about 84% of new job applicants will pass the minimum standard of 55.

A civil service exam is administered to a new group of 100 job applicants. By past experience the mean for new applicants is 65 and the standard deviation is 10, with an approximately normal distribution. b) About how high a score is required to score in the top 10%?

Understand basic idea of a control chart and be able to determine upper and lower control limits given the mean and standard deviation

a variable
sample mean
population mean
sample standard deviation
sample variance
population standard deviation
population variance
sample proportion
population proportion

n = 100 $X = \mu + z\sigma$ $\sigma = 10$

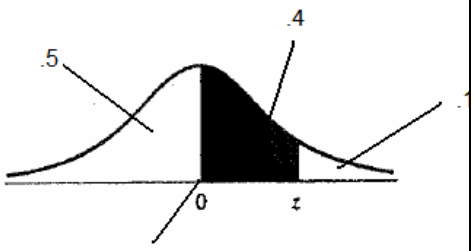
$X = 65 + z * 10$

$z = 1.29$ (got this by looking up the z-score for a probability of approximately .4)

$X = 65 + 1.29 * 10$

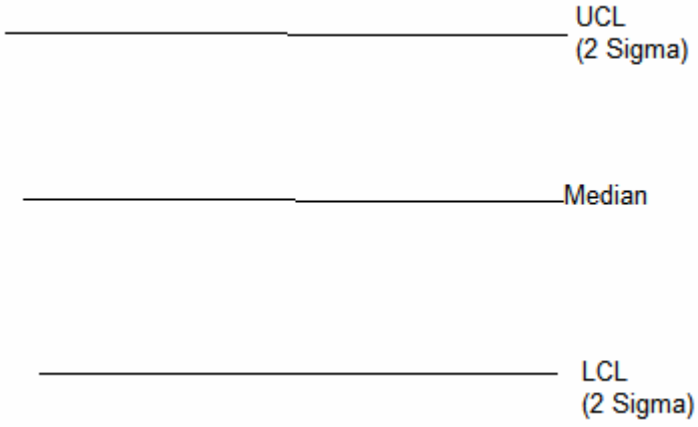
$X = 65 + 12.9$

$X = 77.9$



$\mu = 65$

A score of approximately 78 is required to score in the top 10%.



X	a variable
$\bar{x}$	sample mean
μ	population mean
s	sample standard deviation
s^2	sample variance
σ	population standard deviation
σ^2	population variance
$\hat{p}$	sample proportion
p	population proportion