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MATH 1342
Statistics
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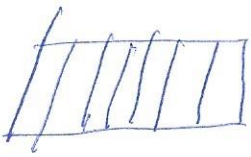
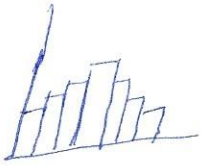
* Describing the shape of histograms:

Symmetric distributions - if we split our histogram the left and right sides look like mirror images.

- uniform distributions:
  * classes with same frequency or relative frequency.

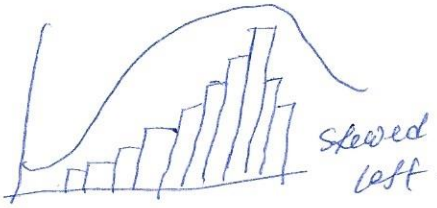


- bell-shaped distributions:
  Highest frequency occur in the middle and the frequencies fall off evenly on both sides.



skewed right: longer tail to the right of the peak.

skewed left: longer tail to the left of the peak



* Measures of central tendency

Mean
Median
mode

* population mean (parameter)

if $x_1 \cdots x_N$ are the N observations of a variable from a population. Then the population mean is

$$\mu = \frac{x_1 + x_2 + \cdots + x_N}{N} = \frac{\Sigma x_i}{N}$$

* sample mean (statistic)

if $x_1, x_2, \ldots x_n$ are the n observations of a variable from a sample, then the sample mean is

$$\bar{x} = \frac{x_1 + x_2 + \cdots + x_n}{n} = \frac{\Sigma x_i}{n}$$

Example 1: (a) $\mu = \dfrac{82+77+90+71+62+68+79+84+94+88}{10}$

$$= \frac{790}{10} = \boxed{79}$$

(c) $\bar{x} = \dfrac{62+88+77+68}{4}$

$$= \frac{295}{4} = \boxed{73.75}$$

Median:

Step 1: Arrange data in ascending order.

Step 2: Determine the number of observations, n.

Step 3: Determine the observations in the middle of the data set.

if n is odd the median is the data value in $\frac{n+1}{2}$ position.

if n is even, the median is the average of the data values in position $\frac{n}{2}$ and $\frac{n}{2}+1$

~~Mean~~: A numerical summary is said to be resistant if extreme values (very large or very small) relative to the data set do not affect its value substantially

Mean is not resistant

Median is resistant.

Mode: value that occurs the highest number of times.

No mode: occurs when no observations appears more than once.

one mode: occurs when one observation appears more than the others.

two modes — if a data set has two modes we call it bimodal.

More than two modes — multimodal.