

Range= largest value—smallest value

Population Mean

$$\mu = \frac{\sum x_i}{N}$$

Sample Mean

$$\bar{x} = \frac{\sum x_i}{n}$$

Population Variance

$$\sigma^2 = \frac{\sum (x_i - \mu)^2}{N} = \frac{\sum x_i^2 - \frac{(\sum x_i)^2}{N}}{N}$$

Sample Variance

$$s^2 = \frac{\sum (x_i - \bar{x})^2}{n-1} = \frac{\sum x_i^2 - \frac{(\sum x_i)^2}{n}}{n-1}$$

Pop. Std. Dev.

$$\sigma = \sqrt{\sigma^2}$$

Sample. Std. Dev.

$$s = \sqrt{s^2}$$

Weighted Mean

$$\bar{x}_w = \frac{\sum w_i x_i}{\sum w_i}$$

Pop. Mean from grouped data

$$\mu = \frac{\sum x_i f_i}{\sum f_i}$$

Sample Mean from grouped data

$$\bar{x} = \frac{\sum x_i f_i}{\sum f_i}$$

$$\sigma = \sqrt{\sigma^2} = \sqrt{\frac{\sum (x_i - \mu)^2 f_i}{\sum f_i}} = \sqrt{\frac{12793.13}{112.4}} = 10.67$$

Sample Var. from grouped data

$$s^2 = \frac{\sum (x_i - \bar{x})^2 f_i}{(\sum f_i) - 1}$$

Pop. z-score

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

Sample z-score

$$z = \frac{x - \bar{x}}{s}$$

Data: 5,12,21,32,41,49

Median: (middle value) (21+32)/2=26.5

Mean: (avg. sum the data/# of data) 160/6= 26.667 $mean = \bar{x} = \frac{\sum x_i}{n}$

Mode: (the data point that appears most) = none

5 number summary: (min, q1, med, q2, max) =5,12,26.5,41,49

x_i	x_i^2	$x_i - \bar{x}$	$(x_i - \bar{x})^2$
5	25	-21.67	469.59
12	144	-14.67	215.21
21	441	-5.67	32.15
32	1024	5.33	28.41
41	1681	14.33	205.35
49	2401	22.33	498.53
$\sum x_i = 160$	$\sum x_i^2 = 5716$	$\sum (x_i - \bar{x}) = -0.02$	$\sum (x_i - \bar{x})^2 = 1449.334$
$\bar{x} = \frac{\sum x_i}{n} = 26.667$			

Mean = 26.67

Sample std. dev. = 17.025

Pop. Std. dev. = 15.542

(Use calculator or equations to Calculate)

$$s = \sqrt{\frac{1449.334}{5}} = \sqrt{\frac{5716 - \frac{(160)^2}{5}}{5}} = 17.025$$

$$\sigma = \sqrt{\frac{1449.334}{6}} = \sqrt{\frac{5716 - \frac{(160)^2}{6}}{6}} = 15.54$$

Given:

age	25-34	35-44	45-54	55-64
Number (millions)	29.9	31.4	30.2	20.9

Find the class midpoint, label the frequency:

age	25-34	35-44	45-54	55-64	
Class midpoint	30	40	50	60	
Frequency f_i	29.9	31.4	30.2	20.9	$\sum f_i = 112.4$

Compute $x_i f_i$ and $\sum x_i f_i$

age	25-34	35-44	45-54	55-64	
Class midpoint	30	40	50	60	
Frequency f_i	29.9	31.4	30.2	20.9	$\sum f_i = 112.4$
$x_i f_i$	897	1256	1510	1254	$\sum x_i f_i = 4917$

Compute $\mu = \frac{\sum x_i f_i}{\sum f_i} = \frac{4917}{112.4} = 43.75$

age	25-34	35-44	45-54	55-64	
Class midpoint	30	40	50	60	
Frequency f_i	29.9	31.4	30.2	20.9	$\sum f_i = 112.4$
$x_i f_i$	897	1256	1510	1254	$\sum x_i f_i = 4917$
mean, μ	43.75	43.75	43.75	43.75	
$x_i - \mu$	-13.75	-3.75	6.25	16.25	
$(x_i - \mu)^2 f_i$	5652.97	441.56	1179.69	5518.91	$\sum (x_i - \mu)^2 f_i = 12793.13$

Standard Deviation: $\sigma = \sqrt{\sigma^2} = \sqrt{\frac{\sum (x_i - \mu)^2 f_i}{\sum f_i}} = \sqrt{\frac{12793.13}{112.4}} = 10.67$