Exercise # 3

How to use calculator

Mode (3:stat) ___ Then ___(1: 1- VAR)

يظهر جدول لإدخال البيانات

Example: 2, 4,6, 9

2 = , 4= , 6 = , 9=

نضغط (AC)

To find mean , standard deviation and variance

نضغط

Shift (1)

وتختار الرقم

5:Var (or 4:Var)

ويظهر في الشاشة

1:n	2: $\overline{X}$
3: xσn (or σ_x)	4: $x\sigma_{n-1}$ (or S_x)

*** ملاحظة : بين كل خطوة وخطوة نضغط AC *******

For mean : Push 2

For Sample standard deviation :Push 4

For Population standard deviation :Push 3

*To find sample variance = square (Sample standard deviation)

* To find Population variance = square (Population standard deviation)

For each of the data sets in the following exercises compute:

a) The mean
b) The median
c) The mode
d) The range
e) The variance
f) The standard deviation
g) The coefficient of variation

1- Porcellini et al. studied 13 HIV- positive patients who were treated with highly active antiretroviral therapy (HAART) for at least 6 months. The CD4 T cell counts at baseline a sample of 13 subjects are listed below:

230 205 313 207 227 245 173
58 103 181 105 301 169

a) $The\ mean\ = \frac{\sum_{i=1}^{n} x_i}{n} = 193.6153$
b) The median = 205
c) There is no mode
d) Range= 313-58=255
e) $Variance\ = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1} = 5568.0897$
f) The Standard Deviation= 74.6196
g) $C.V\ = \frac{S}{\bar{x}} * 100\% = 38.54\%$

2- For the following population

41 37 51 32 48 53 44 32 38 42 46 48 49 51

32 32 37 38 41 42 44 46 48 48 49 51 51 53

a) $The\ mean\ = \frac{\sum_{i=1}^{N} X_i}{N} = 43.7143$
b) The median $\frac{44+46}{2} = 45$
c) mode = 32 / 48 /51

d) Range=53-32= 21

e) $Variance = \frac{\sum_{i=1}^{N}(X_i-\mu)^2}{N} = 44.633$

f) The Standard Deviation= 6.6808

g) C.V = $\frac{6.6808}{43.7143} * 100\% = 15.28\%$

3- Shair and Jasper investigated whether decreasing the venous return in young rats would affect ultrasonic vocalizations (USVs). Their research showed no significant change in the number of ultrasonic vocalizations when blood was removed from either the superior vena cava or the carotid artery. Another important variable measured was the heart rate (bmp) during the withdrawal of blood. The data below presents the heart rate of a sample of seven rat pups from the experiment involving the carotid artery:

500 570 560 570 450 560 570

a) The mean = 540

b) The median = 560

c) mode = 570

d) Range= 570-450= 120

e) Variance = 2200

f) The Standard Deviation= 46.9042

g) C.V = $\frac{46.9042}{540} * 100\% = 8.69\%$

4- Cardosi et al. performed a 4-year retrospective review of 102 women undergoing radical hysterectomy for cervical or endometrial cancer. Gatherer-associated urinary tract infection was observed in a sample of 12 of the subjects. Below are the numbers of postoperative days until diagnosis of the infection for each subject experiencing an infection:

16 10 49 15 6 15 8 19 11 22 13 17

a) The mean = 16.75

b) The median = 15

c) mode = 15

d) Range= 43

e) Variance = 124.0227

f) The Standard Deviation= 11.1365

g) C.V = $\frac{11.1365}{16.75} * 100\% = 66.49\ \%$

5- H.W

According to strach et al, hamstring tendon grafts have been the "weak link" in anterior cruciate ligament reconstruction. In a controlled laboratory study, they compared two techniques for reconstruction: either an interference screw or a central sleeve and screw on the tibial side. For eight cadaveric knees, the measurements below represent the required force (in Newtons) at which initial failure of graft strands occurred for the central sleeve and screw technique:

172.5 216.63 212.62 98.97 66.95 239.76 19.57 195.72

a) The mean = 152.84

b) The median = 184.11

c) There is no mode

d) Range= 220.19

e) Variance = 6494.724

f) The Standard Deviation= 80.5899

g) C.V = 52.73%

6- H.W

The purpose of a study by Nozawa et al. was to evaluate the outcome of surgical repair of pars interarticularis defect by segmental wire fixation in young adults with lum-bar spondylolysis. The authors found that segmental wire fixation historically has been successful in the treatment of nonathletes with spondylolysis, but no information existed on the results of this type of surgery in athletes. In a retrospective study, the authors found 20 subjects who had the surgery between 1993 and 2000. For these subjects, the data below represent the duration in months of follow-up care after the operation:

103	68	62	60	60	54	49	44	42	41
38	36	34	30	19	19	19	19	17	16

a) The mean = 41.5
b) The median = 39.5
c) The mode = 19
d) Range= 87
e) Variance = 490.264
f) The Standard Deviation= 22.1419
g) C.V = 53.35%

7- H.W

Butz et al. evaluated the duration of benefit derived from the use of noninvasive positive-pressure ventilation by patients with amyotrophic lateral sclerosis on symptoms, quality of life, and survival. One of the variables of interest is partial pressure of arterial carbon dioxide (PaCO2). The values below (mm of Hg) reflect the result of baseline testing on 30 subjects as established by arterial blood gas analyses:

40.0	47.0	34.0	42.0	54.0	48.0	53.6	56.9	58.0	45.0
54.5	54.0	43.0	44.3	53.9	41.8	33.0	43.1	52.4	37.9
34.5	40.1	33.0	59.9	62.6	54.1	45.7	40.6	56.6	59.0

a) The mean = 47.416
b) The median = 46.35
c) The mode = 33, 54
d) Range= 29.6
e) Variance = 76.537
f) The Standard Deviation= 8.7485
g) C.V = 18.45%

Question 1:

Suppose two samples of human males yield the following data (which is more variation)?

	Sample 1 25 years	Sample 2 11 years
Mean weight	135 pounds	60 pounds
Standard deviation	10 pounds	10 pounds
Coefficient of variation (C.V)	$C.V_1 = \frac{S}{\bar{X}} \times 100$ $= \frac{10}{135} \times 100$ $= 7.41\%$	$C.V_2 = \frac{S}{\bar{X}} \times 100$ $= \frac{10}{60} \times 100$ $= 16.67\%$

Sample 2 has more variation tan sample 1

Question 2:

The following values are calculated in respect of heights and weights for sample of students, can we say that the weights show greater variation than the heights.

	Sample 1 height	Sample 2 weight
Mean	162.6 cm	52.36 kg
variance	127.69 cm^2	23.14 kg^2
Coefficient of variation (C.V)	$C.V_1 = \frac{S}{\bar{X}} \times 100$ $= \frac{\sqrt{127.69}}{162.6} \times 100$ $= 6.95\%$	$C.V_2 = \frac{S}{\bar{X}} \times 100$ $= \frac{\sqrt{23.14}}{52.36} \times 100$ $= 9.19\%$

Since CV_2 greater than CV_1 , therefore we can say the weights show more variability than height.