Start Date: 5:00pm, November 28, 2020
Due Date: 5:00pm, November 5, 2020

Problem 1:

A sample of 10 transistors is selected from a production line and the gains are measured. The measured gains are provided in the table below.

X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
112	77	113	83	95	105	102	120	73	95

(a) What is the sample mean $\bar{X}$?
(b) What is the sample standard deviation S_X ?

Problem 2:

Consider the pair of measurements in the table below.

X_i	0.77	4.39	4.11	2.91	0.56	0.89	4.09	2.38	0.78	2.52
Y_i	14.62	22.21	24	19.42	14.69	15.23	24.48	16.88	8.56	16.24

Compute the following statistics:
(a) The sample means $\bar{X}$ and $\bar{Y}$
(b) The sample variances S_x^2 and S_y^2
(c) The covariance C_{xy}
(d) The correlation coefficient ρ_{xy}

Problem 3:

A machine produces metal pieces that are cylindrical in shape. A sample of pieces is taken, and the measured diameters are given by the following table:

1.01	0.97	1.03	1.04	0.99	0.98	0.99	1.01	1.03

Find a 99% confidence interval for the mean diameter of all pieces from the machine, assuming Gaussian distribution.

Problem 4:

A random sample of 100 automobile owners in Alberta shows that an automobile is driven on average 23,000 kilometers per year with a standard deviation of 3900 kilometers.
(a) Find a 99% confidence interval for the average number of kilometers driven by car owners in Alberta.
(b) What is the possible size of the error if we estimate the number of kilometers driven by car owners in Alberta to be 23,500 kilometers per year?