

Task 1. The annual salaries (in thousands of dollars) of seven employees working in a small government department are as follows:

28, 60, 26, 32, 30, 26, 29

Find the mean, median and mode salary. What can you say about its' skewness?

Task 2. The following data represent the number of product defects found during each 8-hour shift of each day for a weak. Find the mean number of defects found per shift. Compare the dispersion among these shifts.

	M	T	W	TH	F
SHIFT 1	24	17	35	15	19
SHIFT 2	21	13	15	20	18

Task 3. The ages of employees of a fast-food outlet are as follows:

19, 19, 65, 20, 21, 18, 20

Compute the mean, first quartile, median, third quartile and the mode of the ages.

Task 4. The cash compensation (excluding such benefits as stock options) received in 1986 by the highest-paid executives of Canadian companies having shares listed on a U.S. stock exchanges is shown in the accompanying table (other Canadian companies need not disclose executive compensation, since disclosure laws in Canada are less strict than those in the United States). Find the mean, first quartile, third quartile and the median compensation of the executives.

EXECUTIVE	COMPANY	COMPENSATION (IN \$1,000S)
F. STRONACH	Magna International	\$2,215
E.M. BRONFMAN	Seagram	1,888
P.E. BEEKMAN	Seagram	1,477
E.B. FITZGERALD	Northern Telecom	1,059
A.J. DE GRANDPRE	Bell Canada Enterprises	977
M. GINGL	Magna International	956
G.H. DRABINSKY	Cineplex Odeon	947
M.I. GOTTLIEB	Cineplex Odeon	924
C.R. BRONFMAN	Seagram	899
J.R. MCALPINE	Magna International	856
M.R. HOTTINGER	Magna International	856

Source: *Finanacial Post*, 13 April 1987, p. 16.

Task 5. Canada's third most important crop is rapeseed, almost half of which is grown in the province Alberta. The accompanying table gives the number of acres planted in rapeseed and the average yield per acre, broken down by agricultural reporting area (ARA) 1984. Find the number of bushels of rapeseed grown in ARA 1 in 1984. Find the average rapeseed yield (bushels per acre) for the entire province in 1984.

1984

ARA	Yield (bushels/acre)	Area (thousands of acres)
1	16.3	18.0
2	18.4	246.1
3	11.4	216.0
4	21.8	1,070.8
5	26.2	351.4
6	22.9	229.4
7	15.4	768.3

Source: Alberta Agriculture (Statistics Branch), *Agricultural Statistics*, January 1985.

Task 6. A compilation of the number of sales calls made during the past week by a sample of twenty salesmen for a large computer firm produced the following data. Create a frequency table with equal class intervals. Use 4 as the lower boundary for the first class. For each interval class calculate the relative frequency and cumulative relative frequency. The number of sales calls are as follow:

10, 12, 8, 15, 7, 12, 9, 14, 10, 6,

8, 9, 9, 8, 11, 4, 13, 10, 8, 8.

Task 7. The president of a local consumer-advocacy group is concerned about the reports that similar generic drugs are being sold at widely different prices at local drug stores. Upon surveying thirty stores, she collected the following set of prices at which one drug was being sold. Construct the frequency table with six equal class intervals, with \$5 as the lower boundary of the first class.

Prices:

6.49 10.75 10.29 7.69 5.61

5.25 7.15 9.20 6.89 9.49

8.34 7.60 7.99 8.65 7.19

7.75 6.29 5.99 7.69 7.90

8.75 6.09 7.20 10.99 8.09

7.15 9.89 8.35 7.35 6.25

Task 8. The prices of article A, B, and C are \$30, \$42 and \$65. Find the mean price, if the three articles are given weights of 5, 3 and 2 respectively. (Hint: use the weighted average)

Task 9. Two machines, A and B, are used to pack biscuits. A random sample of ten packets was taken from each machine and the mass of each packet was measured to the nearest gram and noted. Which machine is more reliable?

Data: x - machine A, y - machine B. $\sum_{i=1}^{10} x_i = 2000$ $\sum_{i=1}^{10} (x_i - \bar{x})^2 = 56$ $\sum_{i=1}^{10} y_i = 2000$ $\sum_{i=1}^{10} (y_i - \bar{y})^2 = 240$.

Task 10. Cartons of orange juice are advertised as containing 1 litre. A random sample of 100 cartons gave the following results for the volume, x : $\sum x = 101.4$ $\sum x^2 = 102.83$. Calculate the mean and the standard deviation of the volume of orange juice in these 100 cartons. (Hint: use the alternative formula for standard deviation:

$$s = \sqrt{\frac{\sum x^2}{n} - \bar{x}^2}.$$

Task 11. From the information given about each of the following sets of data, work out the missing values in the table:

N	$\sum x$	$\sum x^2$	\bar{x}	S
63	7623	924 800
...	152.6	...	10.9	1.7
52	...	57 300	33	...

(Hint: use the alternative formula for standard deviation: $s = \sqrt{\frac{\sum x^2}{n} - \bar{x}^2}$.)

Task 12. For a set of 20 numbers $\sum x = 300$ and $\sum x^2 = 5500$. For a second set of 30 numbers $\sum x = 480$ and $\sum x^2 = 9600$. Find the mean and the standard deviation of combined set of 50 numbers. (Hint: use the general

formulas for combined set of numbers $mean = \frac{\sum x + \sum y}{n_1 + n_2}$ $variance = \frac{\sum x^2 + \sum y^2}{n_1 + n_2} - (mean)^2$)

Task 13. The manager of a car showroom monitored the number of cars sold during the successive five-days period. During the first five days the number of cars sold per day had the mean 1.8 and variance 0.56. During the next five days the number of cars sold per day had mean 2.8 and variance 1.76. Find the mean and the variance of the numbers of cars sold per day during the full ten days. (Hint: use the general formulas for combined set of

numbers $mean = \frac{\sum x + \sum y}{n_1 + n_2}$ $variance = \frac{\sum x^2 + \sum y^2}{n_1 + n_2} - (mean)^2$)

Task 14. For a skewed distribution, the mean is 16, the median is 20 and the standard deviation is 5. Calculate the Pearson's (standard) coefficient of skewness and sketch the curve.

Task 15. Whig and Penn, solicitors, monitored the time spent on consultations with a random sample of 120 of their clients. The times, to the nearest minute, are summarized in the following table. Find the mean, standard variation, moment coefficient of skewness and kurtosis. Estimate the first quartile, median, third quartile and mode. Interpret the results.

TIME	NUMBER OF CLIENTS
10-15	2
15-20	5
20-25	17
25-30	33
30-35	27
35-40	25
40-45	7
45-50	3
50-55	1
TOTAL	120

Hint:

x_i	n_i	\dot{x}_i	$\dot{x}_i n$	$\dot{x}_i - \bar{x}$	$(\dot{x}_i - \bar{x})^2$	$(\dot{x}_i - \bar{x})^2 n$	$(\dot{x}_i - \bar{x})^3$	$(\dot{x}_i - \bar{x})^3 n$	$(\dot{x}_i - \bar{x})^4$	$(\dot{x}_i - \bar{x})^4 n$
10-15	2	12,5	25	-18,42	339,17	678,35	-6246,45	-12492,9	115038,7	230077,5
15-20	5	17,5	87,5	-13,42	180,02	900,03	-2415,09	-12075,5	32402,5	162012,5
20-25	17	22,5	382,5	-8,42	70,84	1204,29	-596,24	-10136,1	5018,35	85311,86
25-30	33	27,5	907,5	-3,42	11,67	385,23	-39,88	-1316,2	136,27	4497,015

30-35	27	32,5	877,5	1,58	2,51	67,69	3,97	107,17	6,28	169,69
35-40	25	37,5	937,5	6,58	43,34	1083,51	285,32	7133,09	1878,38	46959,49
40-45	7	42,5	297,5	11,58	134,17	939,22	1554,18	10879,24	18002,56	126017,9
45-50	3	47,5	142,5	16,58	275,01	825,02	4560,53	13681,6	75628,82	226886,5
50-55	1	52,5	52,5	21,58	465,84	465,84	10054,39	10054,39	217007,2	217007,2
Total	120		3710		1522,56	6549,17	7160,72	5834,86	465119,1	1098940

Task 16. In a transport survey, the number of passengers in each of 523 cars travelling into a town centre on a particular morning was recorded. The results are summarized in the following table. Find the mean, standard variation, moment coefficient of skewness and kurtosis. Estimate the first quartile, median, third quartile and mode. Interpret the results.

NUMBER OF PASSENGERS IN A CAR NUMBER OF CARS

0	183
1	160
2	108
3	63
4	8
5	1

Hint:

x_i	n_i	$x_i n_i$	$x_i - \bar{x}$	$(x_i - \bar{x})^2$	$(x_i - \bar{x})^2 n_i$	$(x_i - \bar{x})^3$	$(x_i - \bar{x})^3 n_i$	$(x_i - \bar{x})^4$	$(x_i - \bar{x})^4 n_i$
0	183	0	-1,15	1,32	242,46	-1,53	-279,08	1,76	321,24
1	160	160	-0,15	0,02	3,65	-0,003	-0,55	0,00005	0,08
2	108	216	0,85	0,72	77,84	0,61	66,08	0,52	56,1
3	63	189	1,85	3,42	215,37	6,32	398,21	11,69	736,27
4	8	32	2,85	8,12	64,93	23,12	184,99	65,88	527,02
5	1	5	3,85	14,81	14,81	57,02	57,02	219,47	219,47
Total	523	602		28,42	619,07	85,55	426,66	299,31	1860,18