

## Problem 1.59

Last year a small accounting firm paid each of its five clerks \$25,000, two junior accountants \$60,000 each and the firm's owner \$255,000. What is the mean salary paid at the firm? How many of the employees earn less than the mean? What is the median salary?

## Problem 1.61

This year, the firm in problem 1.59 gives no raises to the clerks and junior accountants, while the owner's take increases to \$455,000. How does this affect the mean? How does it affect the median?

## Problem 2.11

Metabolic rate, the rate at which the body consumes energy, is important in studies of weight gain, dieting and exercise. The table below gives data on lean body mass and resting metabolic rate for 12 women and 7 men who are subjects in a study of dieting. Lean body mass, given in kilograms is a person's weight leaving out all fat. Metabolic rate is measured in calories burned per 24 hours, the same calories used to describe the energy content of foods. The researchers believe that lean body mass is an important influence on metabolic rate.

Gender	Mass	Rate
M	62.00	1792
M	62.90	1666
F	36.10	995
F	54.60	1425
F	48.50	1396
F	42.00	1418
M	47.40	1362
F	50.60	1502
F	42.00	1256
M	48.70	1614
F	40.30	1189
F	33.10	913

M	51.90	1460
F	42.40	1124
F	34.50	1052
F	51.10	1347
F	41.20	1204
M	51.90	1867
M	46.90	1439

(a). Make a scatterplot of the data, using different symbols or colors for men and women.

(b). Is the association between these variables positive or negative? What is the form of the relationship? How strong is the relationship? Does the pattern of the relationship differ for women and men? How do the male subjects as a group differ from the female subjects as a group?

## Problem 2.18

The presence of harmful insects in farm fields is detected by erecting boards covered with a sticky material and examining the insects trapped on the boards. Some colors are more attractive to insects than others. In an experiment aimed at determining the best color for attracting cereal leaf beetles, six boards of each of four colors were placed in a field of oats in July. The table below gives data on the number of cereal leaf beetles trapped. (Color 1 = Lemon Yellow, Color 2 = White, Color 3 = Green, Color 4 = Blue)

BoardColor	InsectsTrapped
1	45
1	59
1	48
1	46
1	38
1	47
2	21
2	12
2	14
2	17

2	13
2	17
3	37
3	32
3	15
3	25
3	39
3	41
4	16
4	11
4	20
4	21
4	14
4	7

- (a). Make a plot of the counts of insects trapped against board color (space the four colors equally on the horizontal axis). Compute the mean count for each color, add the means to your plot, and connect the means with line segments.
- (b). Based on the data, state your conclusions about the attractiveness of these colors to the beetles
- (c). Does it make sense to speak of a positive or negative association between board color and insect count?

## Problem 2.20

Problem 2.11 gives data on the lean body mass and metabolic rate for 12 women and 7 men.

- (a). If you did not do Problem 2.11, make a scatterplot. Use different symbols or colors for women and men. Do you think the correlation will be about the same for men and women or quite different for the two groups? Why?
- (b). Find the correlation for women alone and also for men alone.

(c). Calculate the mean body mass for the women and for the men. Does the fact that the men are heavier than the women on the average influence the correlations? If so, in what way?

(d). Lean body mass was measured in kilograms. How would the correlations change if we measured body mass in pounds? (there are about 2.2 pounds in a kilogram.)

## Problem 2.21

A student wonders if tall women tend to date taller men than do short women. She measures herself, her dormitory roommate and the women in adjoining rooms; then she measures the next man each woman dates. Here are the data (heights in inches):

Women(x)	Men(y)
66	72
64	68
66	70
65	68
70	71
65	65

(a). Make a scatterplot of these data. Based on the scatterplot, do you expect the correlation to be positive or negative? Near +1 or -1 or not?

(b). Find the correlation  $r$  between the heights of the men and women.

(c). How would  $r$  change if all the men were 6 inches shorter than the heights given in the table? Does the correlation tell us whether women tend to date men taller than themselves?