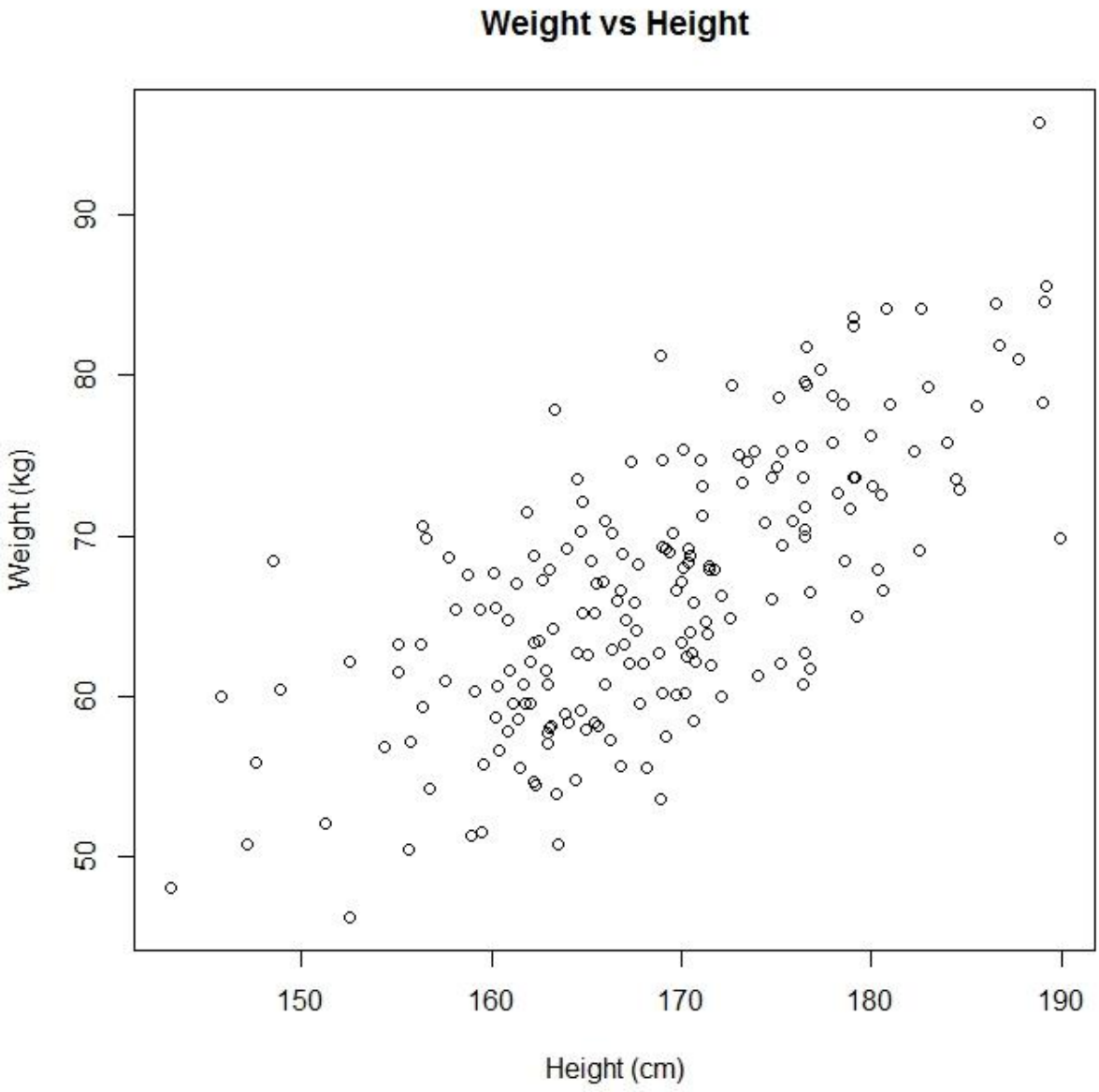
GER1000 Quiz 2



1. The scatter diagram plots weight against height for several hundred adults in a village. The correlation coefficient is closest to:

    a. -0.5
    b. 0
    c. 0.2
    d. 0.6
    e. 1

Answer: d

2. In an attempt to figure if there is a relationship between exercising and intelligence, researchers obtained the exercise duration and IQ scores of each participant. The correlation coefficient of the data was computed to be 0.9. Based on this information alone, which of the following statements is true?

    a. The data show that increasing exercise duration causes one's IQ to improve
    b. There is a strong association between exercise duration and IQ
    c. There is no association between exercise duration and IQ

    Answer: b

    The correlation coefficient 0.9 shows that there is a strong positive linear association between exercise duration and IQ. Option A concludes that exercise duration causes one's IQ to improve and this may not be true (association does not imply causation).

3. (Excel question) A student wanted to compute the correlation coefficient of a set of data (x-variables are contained from cell A2 to A15, y-variables are contained from cell B2 to B15). Instead of typing the formula "=CORREL(A2:A15,B2:B15)" which gives the value of 0.67, she accidentally swapped the x-values for the y-values, i.e. "=CORREL(B2:B15,A2:A15)". What will EXCEL produce?

    a. The reciprocal, i.e., 1/0.67 ≈1.49.
    b. 1 – 0.67 = 0.23.
    c. -1 x 0.67 = -0.67.
    d. 0.67
    e. A software error.

    Answer: d

    In general, when given a set of values for both x and y variables, the correlation coefficient between x-variables and y-variables is the same as the correlation coefficient between y-variables and x-variables. Thus for this question, EXCEL will produce the same value.

4. The contingency table of a study was extracted as follows:

	Brain tumour	Healthy	Total
Nootropic drug user	2600	2400	5000
Non-nootropic drug user	2400	2600	5000
Total	5000	5000	10000

From the table, there is _ association between nootropic drug use and brain tumour.

a. a positive
b. a negative
c. no

Answer: a

From unit 6, there is a positive association between nootropic drug use and brain tumour if Rate(Nootropic drug user| Brain tumour)>Rate(Nootropic drug user|Healthy).
For this case, Rate(Nootropic drug user| Brain tumour)=2600/5000
and Rate(Nootropic drug user|Healthy)=2400/5000.

Alternatively, you can compute Rate(Brain tumour |Nootropic drug user)=2600/5000
and Rate(Brain tumour |Non-nootropic drug user)=2400/5000 and see that
Rate(Brain tumour |Nootropic drug user)> Rate(Brain tumour |Non-nootropic drug user) to conclude that there is a positive association between nootropic drug use and brain tumour.

5. You were reading a set of notes regarding a study about the possible association between alcoholism and dementia. The notes contain the following incomplete contingency table.

	Dementia	No Dementia
Alcoholic	214	105
Non-alcoholic	198	?

Based on the table, the researchers derived an odds ratio (of dementia, between alcoholics and non-alcoholics) of 1.75, thus concluding there is a positive association between being an alcoholic and dementia. What should be the missing number in the table?

a. 170
b. 199
c. 706

Answer: a

Let x be the number of people in the sample who are non-alcoholic and have no dementia. Then odds ratio is 1.75 = (214x / (105 * 198)). Moving the numbers around, we get x = (1.75 * 105 * 198) / 214 = 170.