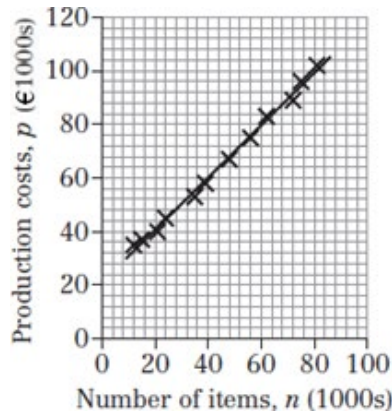# Statistics 1   Solution Bank

P Pearson

Exercise 5B

1 a and **b**

c If the number of items produced is zero, the production costs will be approximately €21 000. If the number of items produced increases by 1000, the production costs increase by approximately €980.

d The prediction for 74 000 is within the range of the data (interpolation) so is more likely to be reliable. The prediction for 95 000 is outside the range of the data (extrapolation) so is less likely to be reliable.

2 a
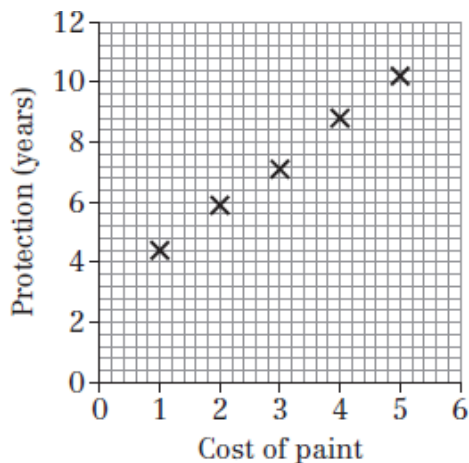
b There are two key problems with Joti's statement:

First, 10 coats of paint is very far outside our range of given data, and we cannot assume that this linear relationship continues as we extrapolate, so using the regression line is not necessarily valid.

Second, even if we accept the extrapolation as valid, a gradient of 1.45 means that, for every extra coat of paint, the protection will increase by 1.45 years. Therefore, if 10 coats of paint are applied, the protection will be 14.5 years longer than if no paint were applied. Joti has, however, forgotten to include the constant 2.93 years, which is the weather resistance if no paint were applied. After 10 coats of paint the protection will last approximately 2.93 + 14.5 = 17.43 years.

3 a
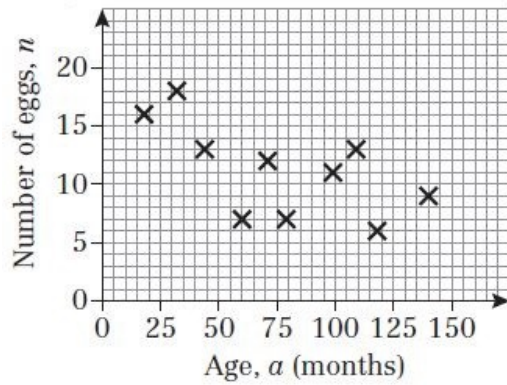
b The scatter diagram shows weak negative correlation, therefore the gradient in the regression equation, given as 0.063, should be negative.

4   This is not a reasonable statement as there are unlikely to be any houses with no bedrooms, so she is extrapolating outside of the range of data, where the linear relationship is unlikely to continue.

5 a   Each visitor spends €740.

b   When $V = 2\,200\,000$
$$-467 + 0.740V = -467 + 0.740(2200)$$
$$= €1161 \text{ million}$$

c   Since the answer involves extrapolation it is not reliable.