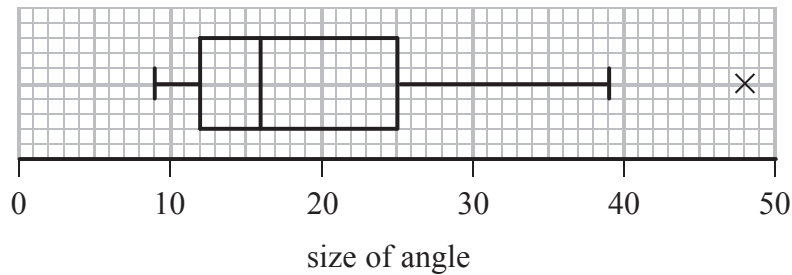


1. Each of 60 students was asked to draw a 20° angle without using a protractor. The size of each angle drawn was measured. The results are summarised in the box plot below.



- (a) Find the range for these data. (1)
- (b) Find the interquartile range for these data. (1)

The students were then asked to draw a 70° angle.
The results are summarised in the table below.

Angle, a , (degrees)	Number of students
$55 \leq a < 60$	6
$60 \leq a < 65$	15
$65 \leq a < 70$	13
$70 \leq a < 75$	11
$75 \leq a < 80$	8
$80 \leq a < 85$	7

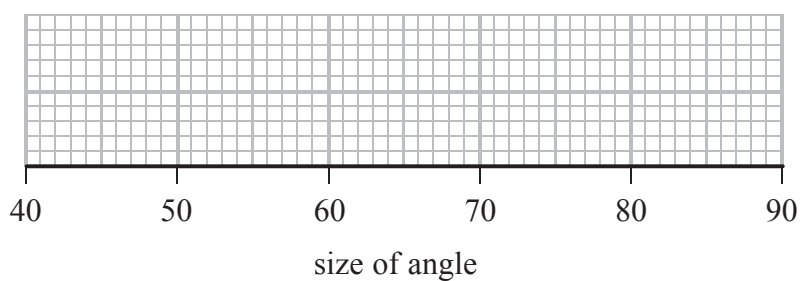
- (c) Use linear interpolation to estimate the size of the median angle drawn. Give your answer to 1 decimal place. (2)
- (d) Show that the lower quartile is 63° (2)

For these data, the upper quartile is 75° , the minimum is 55° and the maximum is 84°

An outlier is an observation that falls either
more than $1.5 \times$ (interquartile range) above the upper quartile or
more than $1.5 \times$ (interquartile range) below the lower quartile.

- (e) (i) Show that there are no outliers for these data.
- (ii) Draw a box plot for these data on the grid on page 3. (5)
- (f) State which angle the students were more accurate at drawing. Give reasons for your answer. (3)







4. Statistical models can provide a cheap and quick way to describe a real world situation.

- (a) Give two other reasons why statistical models are used. (2)

A scientist wants to develop a model to describe the relationship between the average daily temperature, x °C, and her household's daily energy consumption, y kWh, in winter.

A random sample of the average daily temperature and her household's daily energy consumption are taken from 10 winter days and shown in the table.

x	-0.4	-0.2	0.3	0.8	1.1	1.4	1.8	2.1	2.5	2.6
y	28	30	26	25	26	27	26	24	22	21

[You may use $\sum x^2 = 24.76$ $\sum y = 255$ $\sum xy = 283.8$ $S_{xx} = 10.36$]

- (b) Find S_{xy} for these data. (3)

- (c) Find the equation of the regression line of y on x in the form $y = a + bx$

Give the value of a and the value of b to 3 significant figures. (4)

- (d) Give an interpretation of the value of a (1)

- (e) Estimate her household's daily energy consumption when the average daily temperature is 2°C (2)

The scientist wants to use the linear regression model to predict her household's energy consumption in the summer.

- (f) Discuss the reliability of using this model to predict her household's energy consumption in the summer. (2)



x	30	15	0	-15
$P(X=x)$	0.216			0.064

- In a bonus round of 3 questions, a team gains 20 points for every question it answers correctly and loses 5 points for every question it does not answer correctly.

- (f) Find the expected number of points scored in the bonus round. (3)

This image shows a full page of blank, lined paper. It features approximately 20 evenly spaced horizontal grey lines across its entire width, providing a template for handwriting practice or general note-taking. The margins are consistent on all sides.

