

Bar Charts and Histograms

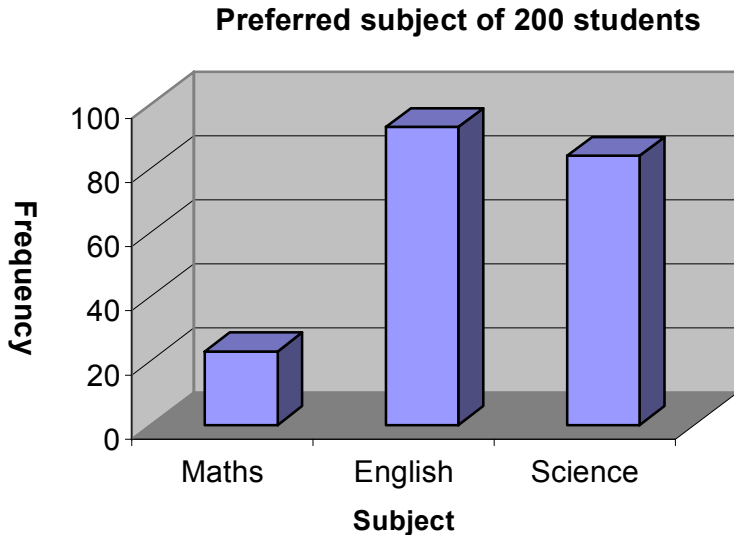
Bar charts and histograms are commonly used to represent data since they allow quick assimilation and immediate comparison of information.

Normally the bars are vertical, but may sometimes be horizontal.

Bar Charts

Used with categorical data.

E.g. 200 students might be asked to indicate their favourite subject at school out of Maths, English and Science.



Key point

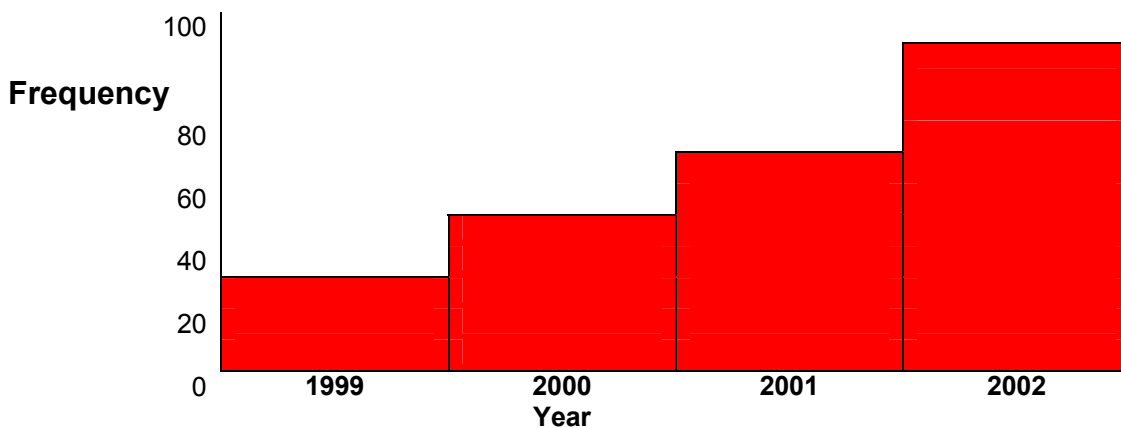
- Categories are usually on the horizontal axis.
- The bars should be separated from each other by a gap (not always adhered to).
- Number of people (frequency) is on the vertical axis – this could be presented as a percentage rather than the actual number of people.

Histograms

Looks like a bar chart with the bars together.

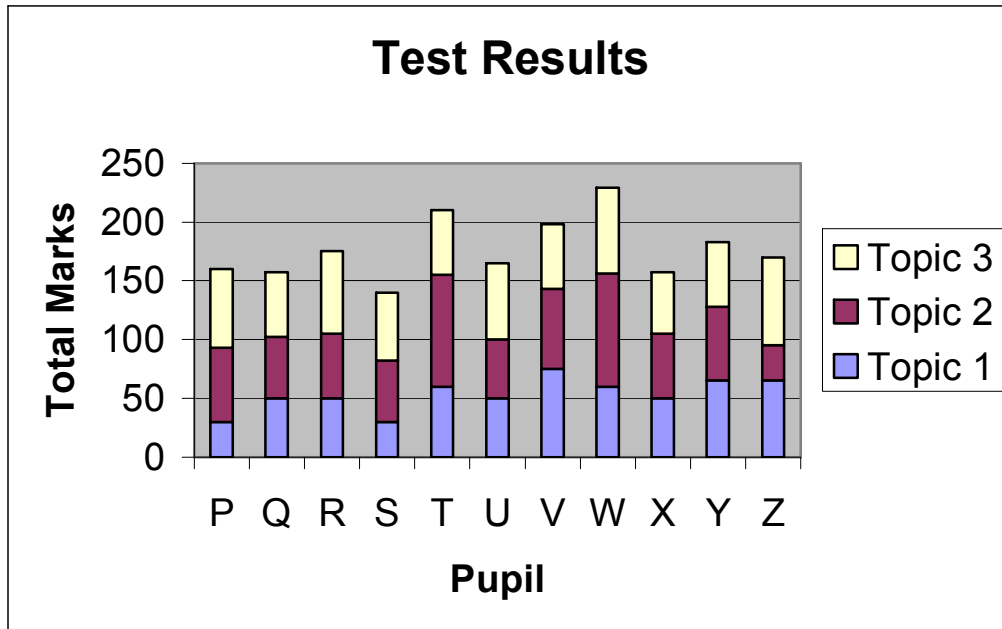
The difference is that the data collected is either discrete or continuous data. This means that the categories of data are related to each other along a continuum.

E.g. 100 hundred students were studied to see how many would develop to be level 4 or above at English between the years of 1999-2002.



Some bar charts will be composite, i.e. show more than one set of data.

E.g. Look at the following chart and decide if the statements are true or false.



- Pupil S had the lowest total mark for all three tests.
- Pupil V had the highest total mark in Topic 1.
- None of the pupils scored 200 or more marks.

What percentage of the pupils scored 50 or less on Topic 1?

Make sure you

- read the title of the chart
- consider the total number in the population represented

Line Graphs

A line graph is a way of visually representing related data where individual items of data are plotted and joined by a line. They are useful for presenting data over time to compare changes to a variable over a set period. Joining up the points gives an instant picture of past trends (increases or decreases) and can be used to extrapolate those trends to make predictions for the future.

- The variable represented is continuous; i.e. it is something that can be measured.
- You will be expected to be able to read graphs for specific measurements and trends.
- A graph is set within 2 axes: x and y. The vertical one is the y-axis and the horizontal one is the x-axis.

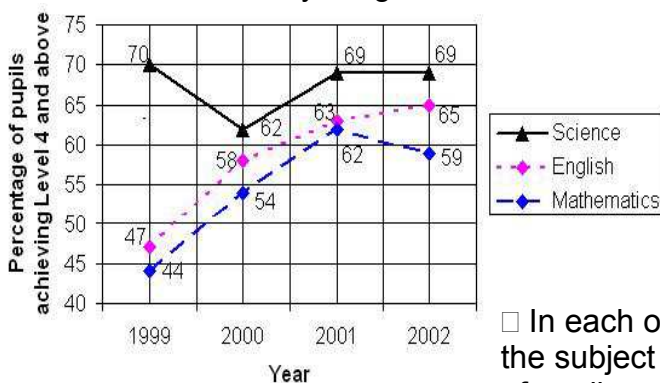
The axes will not always start measuring from 0. If they don't this is called the suppression of zero, This will affect the appearance of the line(s) on the graph making them steeper than they would be if the scale started at 0 and occupied the same space as the scale would be smaller.

Make sure you:

- Read the title of the graph to check what it represents.
- Check where the axes start.
- Check which units are being used on each axis.
- Check the scale on each axis.

Example 1.

Teachers considered a chart of national results for pupils achieving Level 4 and above in end of Key Stage 2 tests.



Indicate all the true statements:

- The percentage of pupils achieving Level 4 or above in English increased year on year.
- In each of the four years, science was the subject with the highest percentage of pupils achieving Level 4 and above.
- The highest mean percentage, across all three subjects, was achieved in 2002.

Pie Charts

A pie chart is a way of illustrating information by using a circle as the whole and sections of the circle to represent parts of the whole.

- A pie chart provides the proportions of the data at a glance.
- They are useful for representing categorical data (e.g. colour of hair).

Always work out the total/whole.

Remember **a proportion is always part of the whole.**

I.e. If the whole represented in a pie chart is 250 pupils (either explained in the question or worked out by adding up the separate sections of the pie) and the part of the pie you are interested in consists of 25 pupils, you can write it as a proportion (always write it as a fraction first).

- 1) As a fraction: Part/Whole = $25/250 = 1/10$
- 2) As a decimal: $25 \div 250 = 0.1$
- 3) As a percentage: $25 \div 250 \times 100 = 10\%$

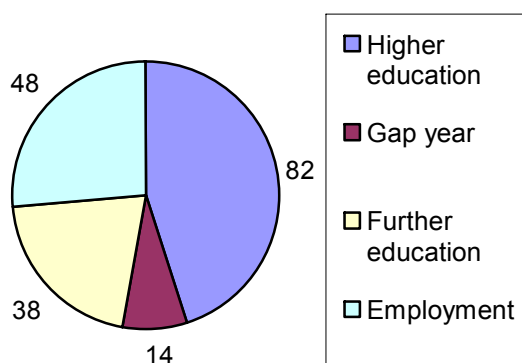
N.B Sometimes the pie chart sections may be indicated by degrees rather than number of people/cost, etc. All you need to remember is that in this case the whole is 360, as there are 360 degrees in a circle. You can then work out your answer in the same way.

Make sure you:

- Read the title of the chart so that you know what it represents.
- Know what the whole pie represents in terms of numbers, especially when comparing pie charts. (I.e. do not directly compare sizes of sections)

Example 2.

The head of careers supplied the following chart showing the destination of Year 13 leavers.



Indicate which one of the following is true:

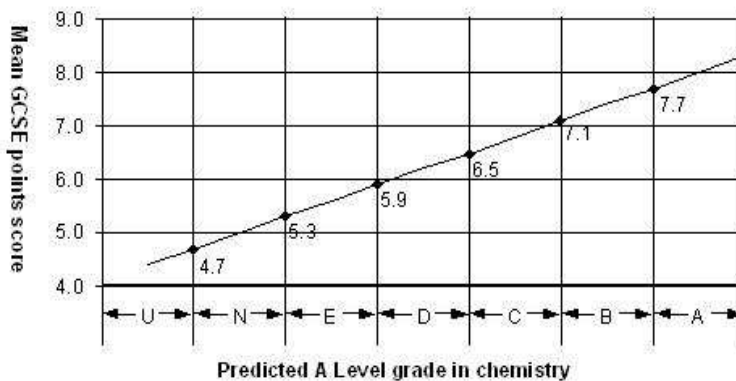
- 3/7 went to higher education
- 1 in 13 took a gap year
- 2/7 went on to further education

1.

The table below shows the mean GCSE points scores for 8 pupils in an A Level chemistry class.

Pupil	Mean GCSE points score
F	6.6
G	7.8
H	5.4
I	6.4
J	6.2
K	6.4
L	4.8
M	5.4

The conversion graph shows predicted A Level grades for chemistry from the mean GCSE points scores.



Indicate all the true statements:

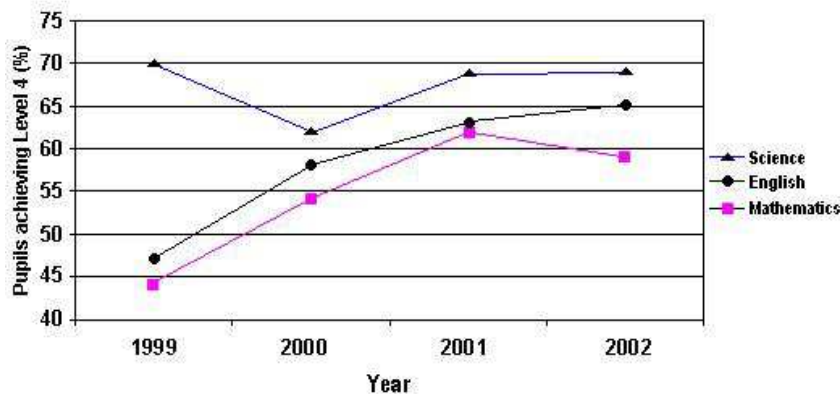
Pupil J and K were predicted to achieve the same grade for A Level chemistry.

1/3 of pupils in the group were predicted to achieve grade C and above.

the mode of the predicted grades for the group of pupils is grade D.

2.

In order to inform discussions, teachers considered LEA trends for pupils achieving at Level 4 in end of Key Stage 2 tests.



Indicate all true statements:

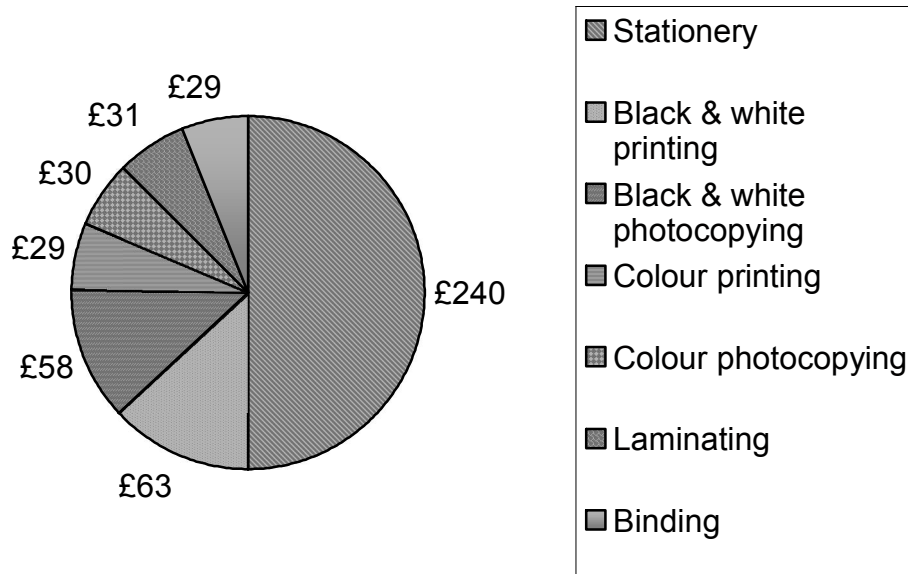
a higher percentage of pupils achieved at Level 4 in science than in mathematics and in English in each year 1999-2002.

the percentage of pupils achieving at Level 4 in English increased by more than 15 percentage points during the period 1999-2002.

pupils showed an improvement in achievement each year in 2 out of 3 subjects.

3.

A teacher created a pie chart to show the team how the departmental budget for stationery and reprographics had been spent. The total budget was £480.



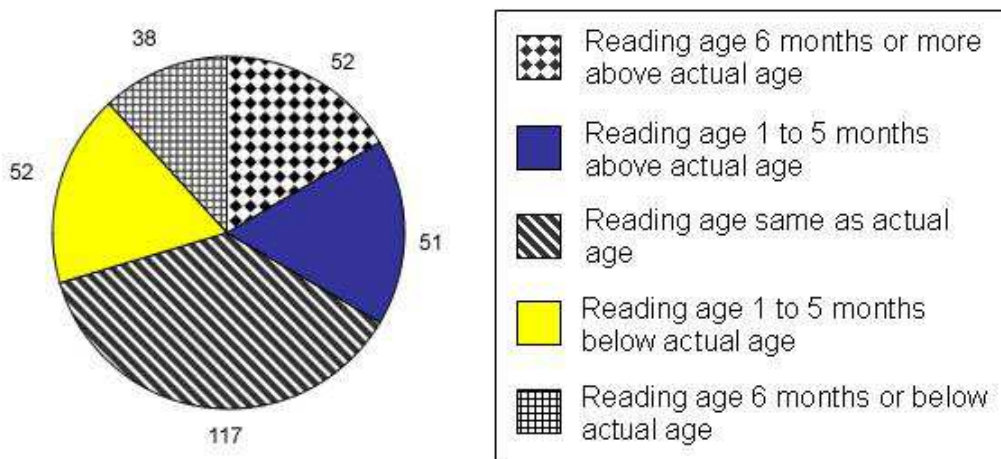
What proportion was spent on laminating and binding together?

- 0.06
- 0.125
- 0.25
- 0.31

4.

To develop a reading support strategy, a teacher analysed the reading ages of the pupils in a primary school.

The pie chart shows the reading ages of 310 pupils at a primary school.



What percentage of the pupils had a reading age **below** their actual age? Give your answer correct to the nearest whole number.

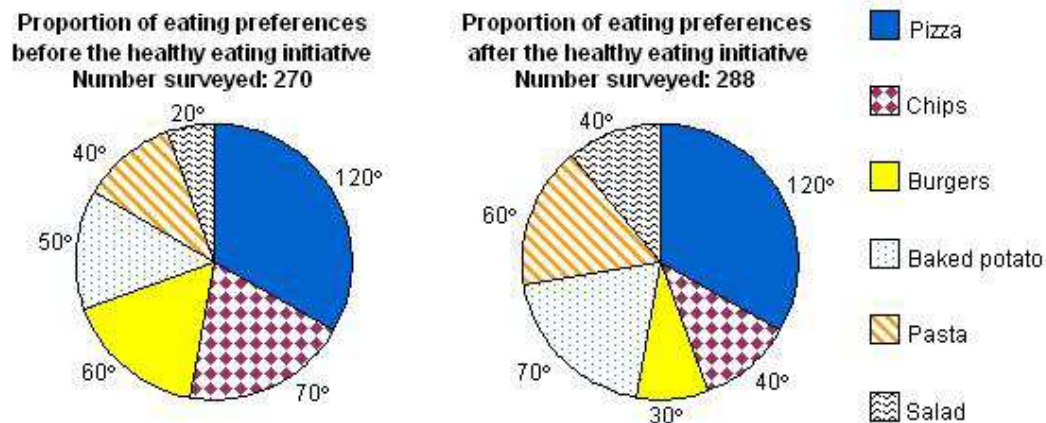
Prepared with reference to and examples from:

<http://www.canteach.gov.uk/support/skillstests/index.htm> All questions cut and pasted from website with permission.

Patmore, M. (2001) *Passing the Numeracy Skills Test*. Exeter: Learning Matters Ltd.

5.

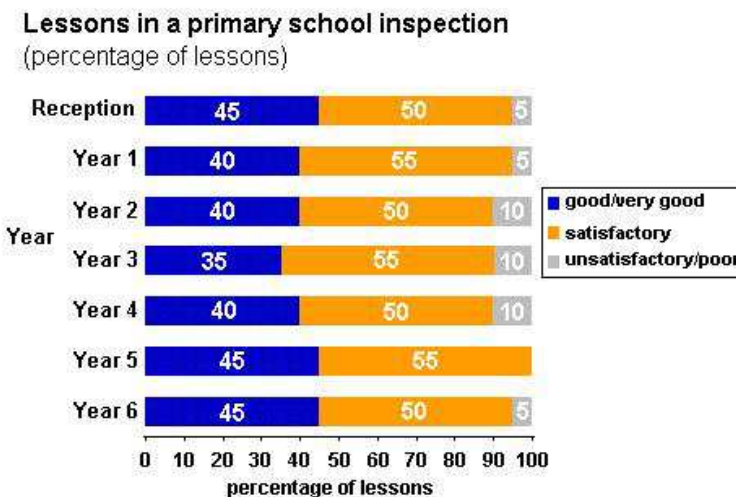
For a food technology project, a teacher used pie charts showing pupils' eating preferences before and after a school's healthy eating initiative.



How many more pupils chose pasta after the school's healthy eating initiative than before?

6.

The chart below shows the grading of lessons in a large primary school following an inspection in which 20 lessons for each year group were graded.



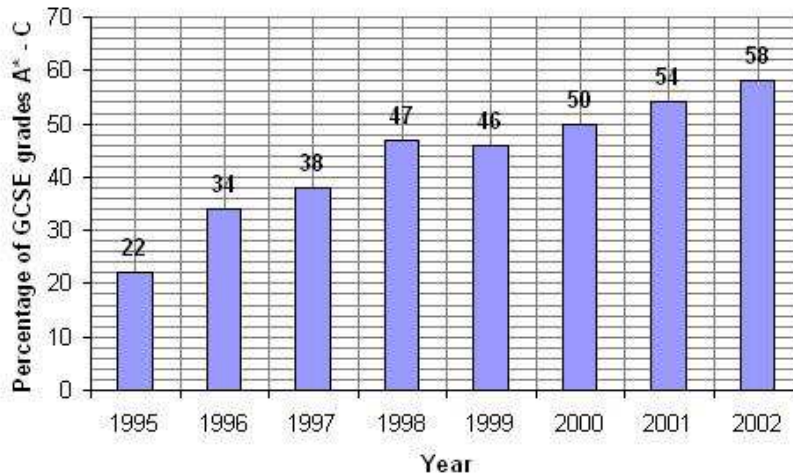
As part of the school's improvement plan the staff analysed the results of the inspection.

Indicate all the true statements:

- the Reception Year had 2 fewer lessons graded unsatisfactory/poor than Year 2
- in Year 3, 7 lessons were graded as good/very good
- the ratio of good/very good:unsatisfactory/poor in Year 6 was 5:1

7.

To set targets for the following year, the mathematics department analysed the percentage of mathematics GCSE grades A* - C achieved by pupils in the school.



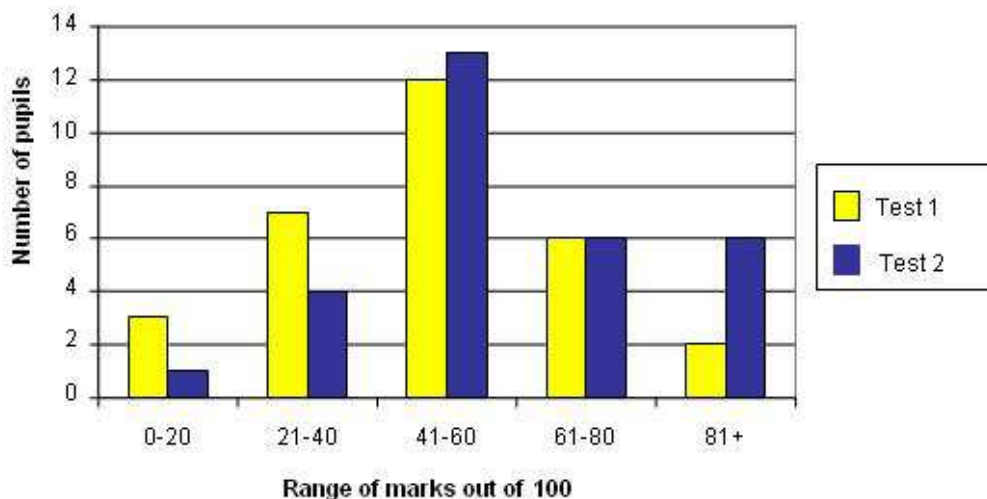
Indicate all the true statements:

- the mean percentage of GCSE grades A* - C for the last 5 years was 51%
- the percentage of GCSE grades A* - C increased each year from 1995 to 2002
- the percentage of mathematics GCSE grades A* - C more than doubled from 1995 to 2002

8.

A science class of 30 pupils was given two tests. Test 1 was given at the start of the term and Test 2 at the end of the term.

As part of a review of pupil progress, a teacher prepared a bar chart showing pupil achievement in the two tests.

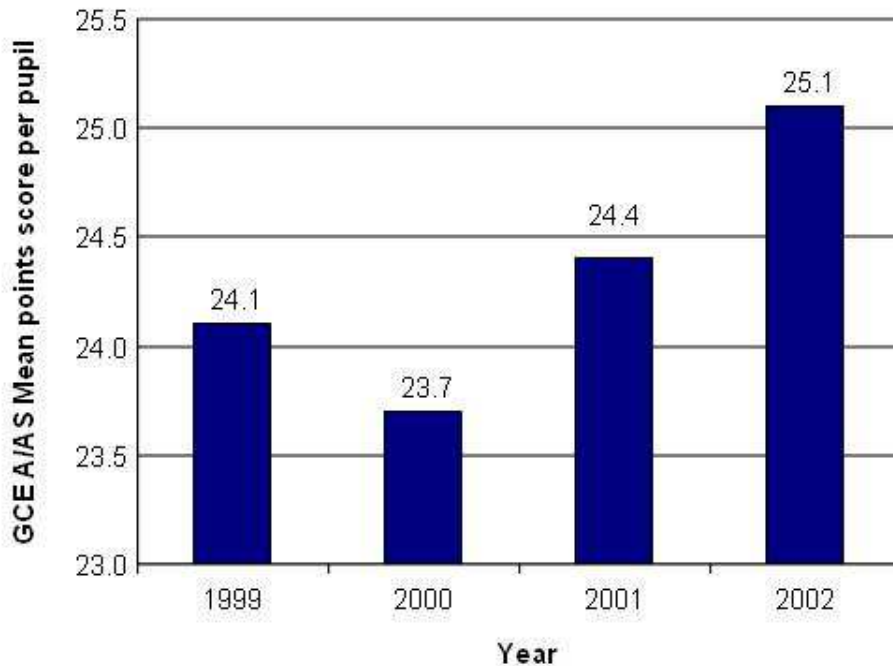


Indicate all the true statements:

- the number of pupils achieving 81+ marks increased by 50% from Test 1 to Test 2
- more than 80% of pupils achieved more than 40 marks in Test 2
- 1/3 of pupils achieved fewer than 41 marks in Test 1

9.

The chart below shows the GCE A/A S Level mean points score per pupil at a school.



Assuming the trend from 2000 to 2002 continues at the same rate, a projected mean points score for 2003 can be calculated.

The school has set an achievement target of 5% above this value.

What is the school's target mean points score per pupil? Give your answer correct to one decimal place.

Answers

1. Statements 1&3 were true
2. Statements 1&2 were true
3. 0.125
4. 29%
5. 18 more pupils
6. Only statement 2 was true
7. Statements 1 & 3 were true
8. Statements 2 and 3 were true
9. 27.1 points