Spring Progress Check Revision Material

Year 9 Set 1 - 3

Higher

Test Date: Friday 26 Jan

How to revise for Maths?

- *Practise is key! Attached you will find some questions to help you do that.*
- *Once you've answered the questions – mark your work.*
- *If you get something wrong, look back on what you did and try work out where your mistake is. Unsure? Take your answers to your teacher or to Maths club on a Thursday and get help ahead of the test!*
- *Good luck!*

3 Knowledge check

- ⊙ A **back-to-back stem and leaf diagram** compares two sets of results. On the left-hand side the numbers are read backwards. ....
- ⊙ A **frequency polygon** is a graph made by joining the midpoints of the tops of the bars in a bar chart with straight lines. ....
- ⊙ A quicker way of drawing a frequency polygon is to plot the frequency against midpoints of each group. ....
- ⊙ The **modal class** (or modal group) has the highest frequency. ....
- ⊙ To estimate a mean from a grouped frequency table, add together the products of class midpoints and their frequencies, and divide by the total frequency. ......
- ⊙ If the total frequency in a grouped frequency table is n, then the median lies in the group containing the $\dfrac{n+1}{2}$ th item of data. ....
- ⊙ A **time series** graph is a line graph with time plotted on the horizontal axis.
- ⊙ **Bivariate data** is data that has two variables. Points can be plotted on a **scatter diagram** to see if there is a link between them. ....
- ⊙ Data displays positive correlation if the points on a scatter diagram lie close to an upward-sloping straight line. Data displays negative correlation if the

- ⊙ **A line of best fit** is the line that passes as close as possible to the points on a scatter graph. ....
- ⊙ Using a line of best fit to predict data values within the range of the data given is called **interpolation** and is usually reasonably accurate. ....
- ⊙ Using a line of best fit to predict data values outside the range of the data given is called **extrapolation** and may not be accurate. ....
- ⊙ Individual points which are outside the overall pattern of a scatter diagram are called **outliers**. They can be removed from a data set provided a reason for their removal is given. ....
- ⊙ The line of best fit passes through the mean point, $(\overline{x}, \overline{y})$. ....
- ⊙ Means of time series data from several consecutive periods are called moving averages. ....

NAME

1 The time series graph shows the rate of inflation in the UK in 2014.

UK inflation rate
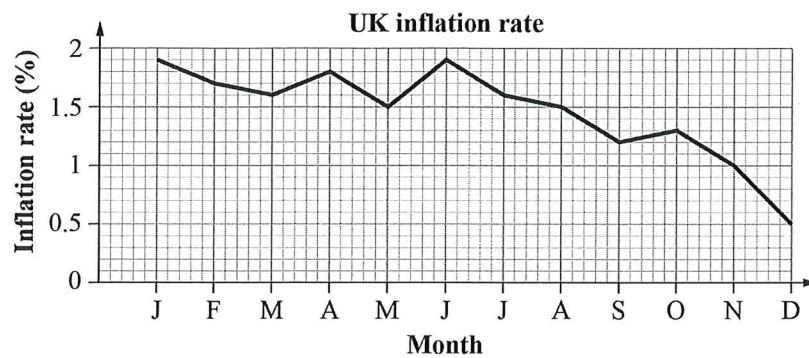
a What was the rate of inflation in September 2014?

Give your answer correct to 1 decimal place.

(1 mark)

b Which month experienced the greatest rise in the rate of inflation?

(1 mark)

c Describe what this time series suggests about the trend in inflation over 2014.

(1 mark)

2　The back-to-back stem-and-leaf diagram shows the numbers of male and female students who study A-level Maths in a sample of colleges.

Males		Females
	0	8 9
8 8 6 2	1	2 2 3 5 5 6 7 8
9 8 6 3 3	2	1 2 5 8
8 8 5 1	3	
2	4	

Key:

Males	Females
2 | 1 represents	0 | 8 represents
12 students	8 students

a　How many males students are there?

(1 mark)

b　Find the range of the number of female students.

(1 mark)

c　Find the median number of male students.

(1 mark)

3 The table shows the time spent waiting at a doctor's surgery for 120 patients.

Time t (minutes)	Frequency
$0 \leq t < 5$	23
$5 \leq t < 10$	46
$10 \leq t < 15$	35
$15 \leq t < 20$	9
$20 \leq t < 25$	3
$25 \leq t < 30$	2
$30 \leq t < 35$	2

a Estimate the mean waiting time.
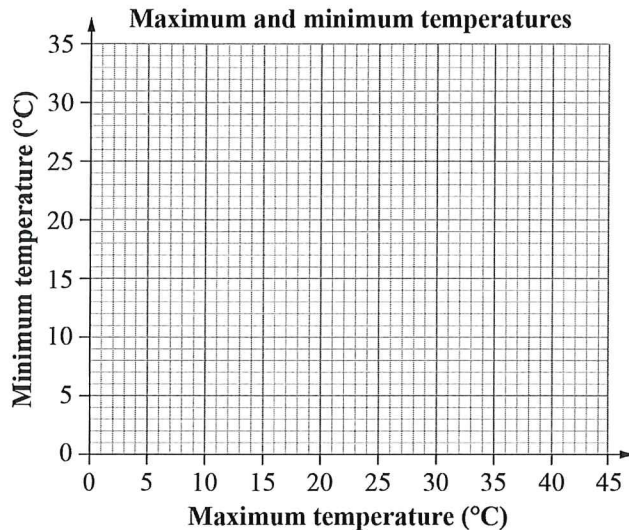
(3 marks)

b In which group is the median time?

(1 mark)

c One of the patients waited for 7 minutes but their time was incorrectly recorded as 16 minutes. Without doing any calculations, state whether your answers to parts **a** and **b** will increase, decrease or stay the same.

(2 marks)

4   The table shows the maximum and minimum temperatures for seven cities recorded on 1 September 2014.

	Athens	Edinburgh	Rome	Reykjavik	Orlando	Doha	Moscow
Maximum temperature (°C)	30	19	25	12	34	41	17
Minimum temperature (°C)	20	13	17	10	25	31	8

a   Plot this data on a scatter diagram.

Maximum and minimum temperatures

(3 marks)

b   Describe the correlation and explain what it means in this context.

(2 marks)

c   Draw a line of best fit on your diagram.

Use the line to estimate the minimum temperature of a city when the maximum temperature is 15°C.

(2 marks)

d   Is it sensible to use the graph to estimate the maximum recorded temperature in a desert where the minimum recorded temperature is –4°C? Give a reason for your answer.

(1 mark)

5 A box office keeps a record of the types of shows they take bookings for in a one-hour period.

musical		comedian	play	concert		comedian	concert
	musical		concert		concert	play	concert
musical		concert	comedian	play		concert	
	musical		comedian	concert		comedian	

a Explain why it is not possible to present this information using a frequency polygon.

(1 mark)

b Draw a pie chart for this data.

(3 marks)

c The bookings taken in the next hour are also displayed on a pie chart.

The angle for the sector representing musicals is 90°.

Does this show that more bookings have been taken for musicals than in the previous hour?

Explain your answer.

(1 mark)

6   180 Year 10 students all study one language from a choice of French, Spanish or Italian.

89 of the students are male. 12 of the male students study Italian.

46 of the female students study Spanish. 29 of the 55 students who study French are male.

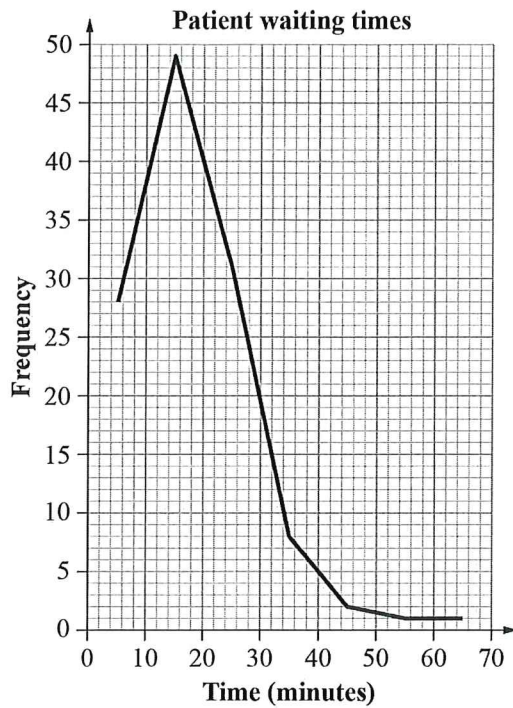a   Draw a two-way table for this data.

(3 marks)

b   What fraction of the students study Spanish?

(1 mark)

7   The frequency polygon shows the distribution of the waiting times for patients in a hospital.

Patient waiting times

a How many patients were there in total?

(1 mark)

b How many patients waited between 20 and 30 minutes to be seen?
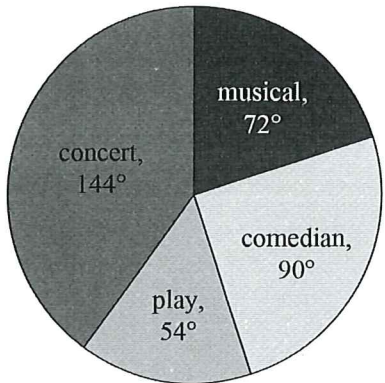
(1 mark)

c State the modal class.

(1 mark)

Overall mark	/32

Q	Answer	Mark	Comment
1a	1.2%	A1	
1b	June	A1	
1c	During 2014, the inflation rate decreased overall.	A1	
2a	377	A1	
2b	20	A1	
2c	27	A1	
3a	$2.5 \times 23 + 7.5 \times 46 + 12.5 \times 35 + 17.5 \times 9 + 22.5 \times 3 + 27.5 \times 2 + 32.5 \times 2$	M1	
	$1185 \div 120$	M1	
	9.875 minutes	A1	
3b	$5 \leq t < 10$	A1	
3c	The answer to part **a** (the mean) decreases.	A1	
	The answer to part **b** (the median) stays the same.	A1	
4a		M1	Attempt to plot points on axes.
		A1	At least three points plotted correctly.
		A1	All points plotted correctly.
4b	Positive correlation.	A1	
	The higher the maximum recorded temperature for each city, the higher the minimum recorded temperature.	A1	
4c	Line of best fit with positive gradient drawn.	A1	
	11°C	A1	ft their line of best fit.
4d	No because it is outside the range of the data.	A1	

Q	Answer	Mark	Comment
5a	Frequency polygons cannot be drawn for qualitative data.	A1	
5b		A1	Angles for the pie chart seen: musical 72°, comedian 90°, play 54° and concert 144°.
		A1	A labelled pie chart attempted with at least one sector drawn correctly.
		A1	A correctly labelled pie chart.
5c	The angle for musicals does not show us an increase in bookings because we don't know how many bookings there were in total.	A1	
6a		A1	Two-way table with correct column and row headings.
		A1	180, 89, 12, 46, 29 and 55 entered correctly in the table.
		A1	Completely correct table.
b	$\dfrac{47}{90}$	A1	
7a	120	A1	
7b	31	A1	
7c	$10 \le t < 20$	A1	

Two-way table for 6a:

	French	Spanish	Italian	Total
Male	29	48	12	89
Female	26	46	19	91
Total	55	94	31	180

Progression Step Boundaries

Mark boundary	Step
0	U
2	4th
5	5th
12	6th
19	7th

Question	1	2	3	4	5	6	7
Objective	Interpreting a time series graph.	Interpreting a back-to-back stem and leaf diagram; finding the range and median using a back-to-back stem and leaf diagram.	Estimating the mean from a grouped frequency table; finding the median with the interval in; knowing how a change in the data affects the mean and median.	Drawing and interpreting a scatter diagram; understanding correlation; drawing and using a line of best fit.	Drawing and comparing pie charts.	Constructing a two-way table.	Interpreting a frequency polygon.
Step	6th	6th	7th	7th	6th	6th	7th
Marks	3	3	6	8	5	4	3

3