Worksheet 12: Algebra, Averages, Charts

A mixed bag of stuff including some work on statistics

Algebra recap

Make sure you can do all of these...

1) Solve $\frac{x}{5} = 4$

2) Expand $3(4x + 7)$

3) Solve $5(2x - 3) = 15$

4) Rearrange $y = 4x - 3$ to make x the subject

5) Factorise $21p - 14$

6) Timothy has n packets of pencils
   Each packet contains 12 pencils
   Write an expression in terms of n for the total number of pencils that Timothy has

7) Solve $5x + 10 = 6$
   Hint: could be negative, could be a mixed number

8) Expand and simplify $2(5x - 6) + 3(2x + 5)$

9) Algernon is Y years old
   Bertram is 2 years older than Algernon
   Cuthbert is double Algernon's age
   a) Write an expression for the total age of the three friends
   b) The total age of the three is 62 years.
      Work out how old Algernon is

10) Multiply out $(x + 4)(x - 2)$

11) Solve $3x - 4 = 2x + 1$

12) (*) Solve $(x - 2)(x + 3) = 0$
    Hint: two solutions

Mean, mode, median and range

1) Work out the mean of 10, 9, 11, 10, 100
   Is the answer a good 'typical value' for the data? Write a sentence.

2) Below are the temperatures in ºC recorded outside one December
   –6, 2, –4, 3, 7, –1
   a) Find the range of the temperatures
   b) Work out the mean of the temperatures
   c) Find the median temperature

3) The annual wages in a small company are shown below
   £12 500 £14 749 £14 750 £21 800 £49 500
   a) Calculate the mean wage for the company
   b) Calculate the median wage for the company
   c) Which average is the best for this data? Write a sentence
   d) All the wages are increased by 3%
      Which of the following statements are true and which false?
      "The mean wage increases by 3%"
      "The range of the wages increases by 3%"

4) The table below shows some information about the heights of cress seeds during a biology experiment

Height h / mm	**Frequency**			
$0 < h \leq 20$	3			
$20 < h \leq 40$	18			
$40 < h \leq 60$	15			
$60 < h \leq 80$	11			
$80 < h \leq 100$	8			

   a) Calculate an estimate of the mean height

   b) Write down the median interval

   c) Write down the modal interval

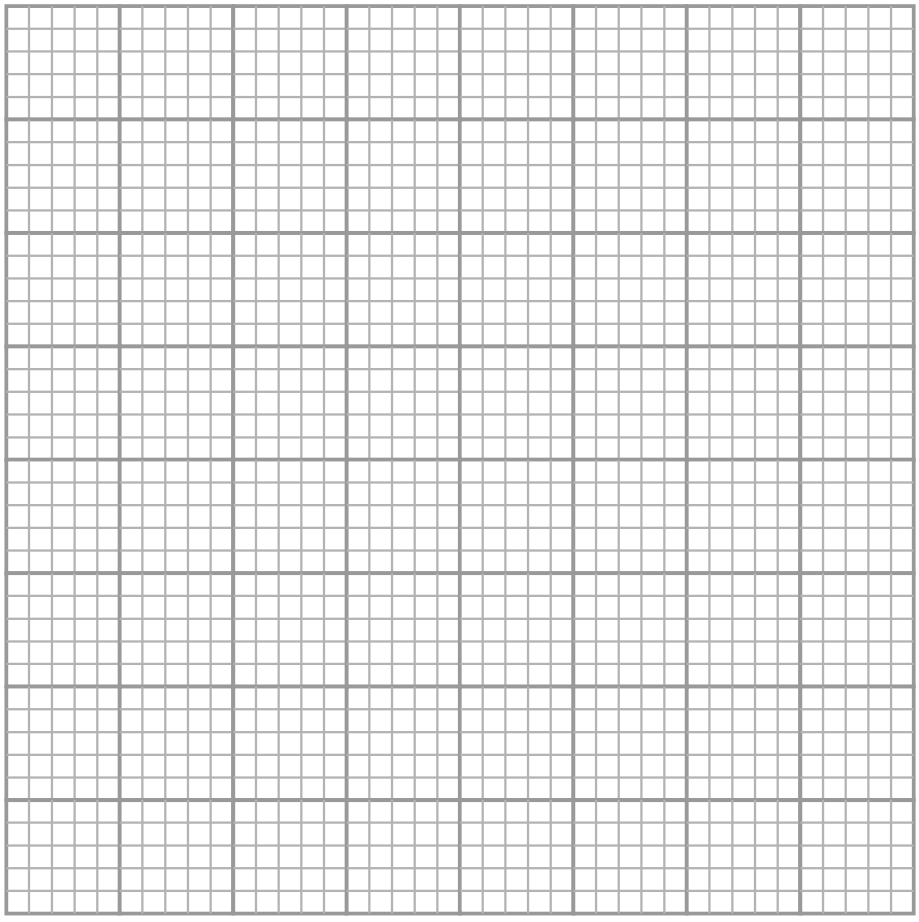
Charts and chart interpretation

Question 1

The table below summarises the journey times at 3pm from Birmingham New Street station to Northfield station

Journey time	Number of journeys
$20 < t \leq 25$	35
$25 < t \leq 30$	15
$30 < t \leq 35$	8
$35 < t \leq 40$	1
$40 < t \leq 45$	1

a) Use the grid below to plot a frequency polygon of the data



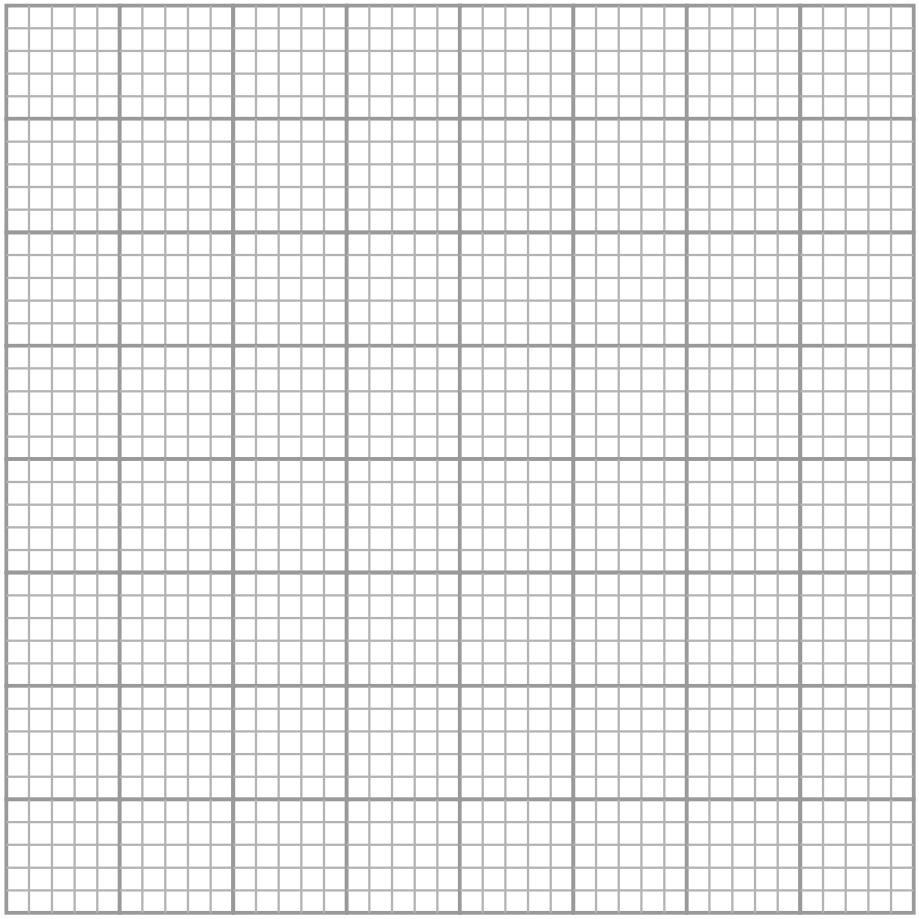
b) What percentage of journeys took *longer* than 30 minutes?

Question 2

Below is some data on the domestic electricity use from 12 noon to 8pm in a small town somewhere in the UK

At	12	1	2	3	4	5	6	7	8
Power /MW	12	15	14	18	25	50	74	48	40

a) Use the grid below to plot a time series graph of the data

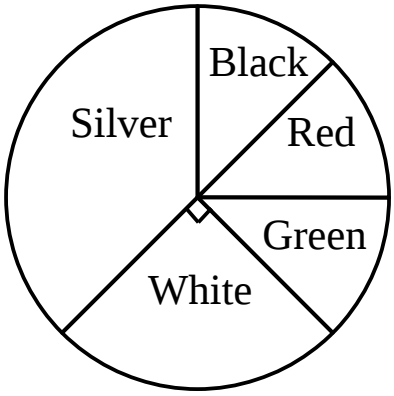


b) Explain the pattern shown by the time series plot in words

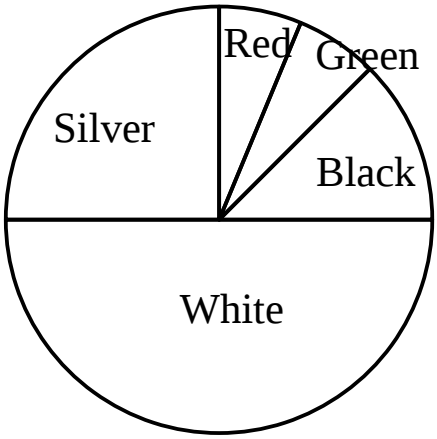
Question 3

Below are two pie charts comparing the number of cars of each colour in the car park in Selly Oak Centre and the car park in Walsall College

Colour of cars in Selly Oak car park



Colour of cars in Wallsal Car Park



a) There are two white cars in the Selly Oak car park.
What is the total number of cars in the Selly Oak car park?

b) Estimate the number of silver cars in the Selly Oak car park

c) What percentage of the cars on Walsall College car park are white?

d) Algernon says “the pie charts show that there are more red cars in the Selly Oak car park than in the Walsall College car park”

Algernon is correct [ ]

Algernon is wrong [ ]

There is not enough information to say [ ]

Question 4

Below is a stem and leaf diagram showing the weights of a group of people.

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5 | 7 9              key 5|7 represents 57 Kg
6 | 0 0 1 8 8 9
7 | 1 2 4 7
8 | 3 6 9
9 | 1
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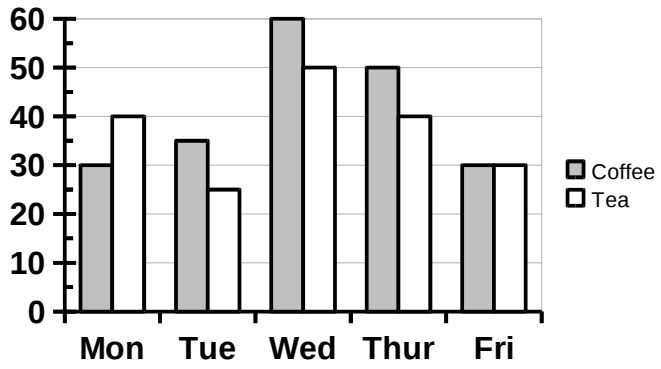
a) How many people weighed less than 70Kg?

b) Find the median weight of the people

c) Find the range of weights

Question 5

Below is a bar chart that shows the number teas and coffees sold at a snack bar each day over 5 days last week.



a) On which day was the number of teas sold the same as the number of coffees?

b) Which was the only day where more teas were sold than coffees?

c) What was the mean number of coffees sold per day?

d) How many more coffees than teas were sold for the whole 5 day period?