

**3748-119 (Evolve) and 3748-319 (Paper-based)**  
**Functional Skills Mathematics Level 1**  
Guidance for Delivery

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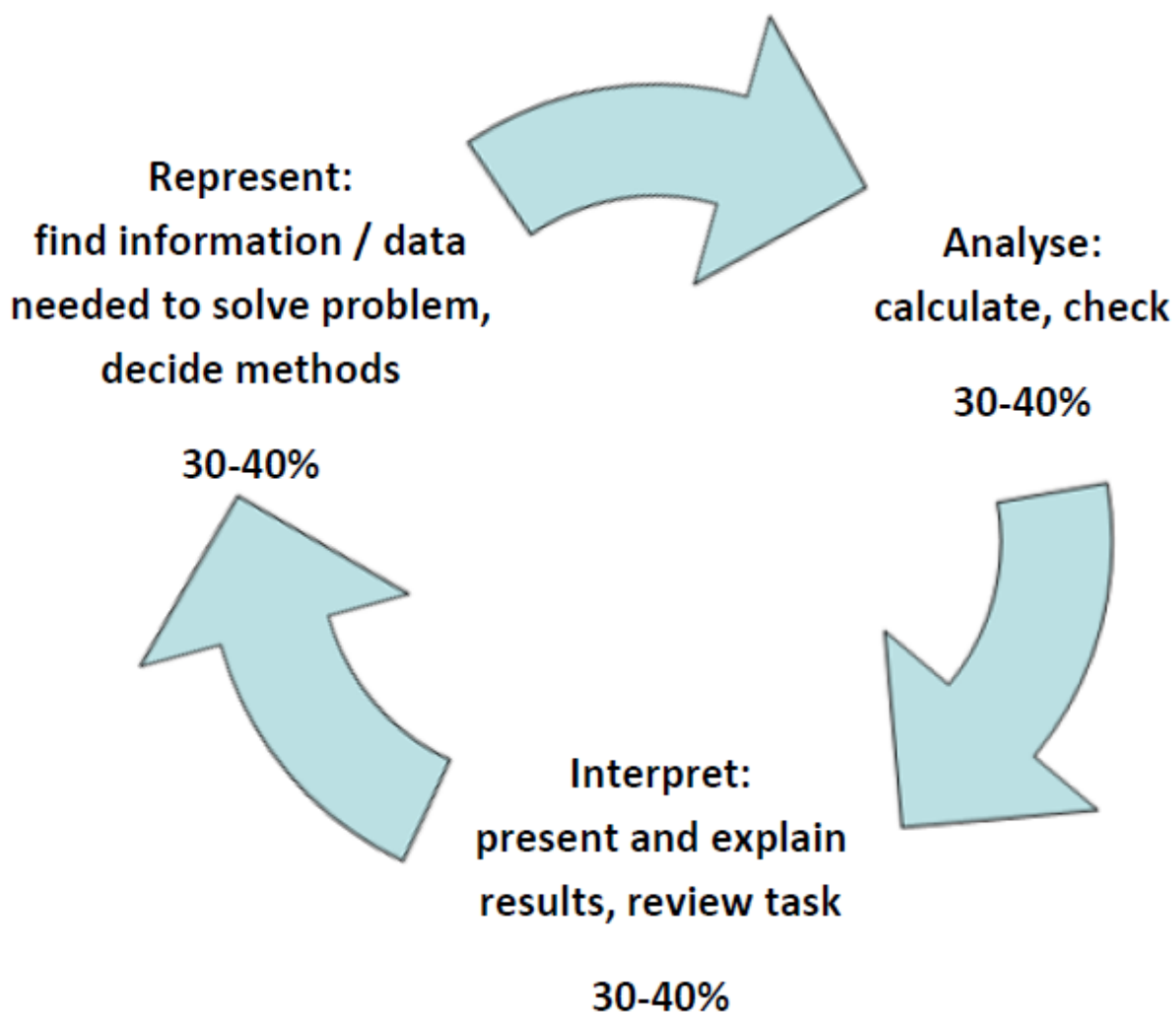
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## 1. Structure of the assessment

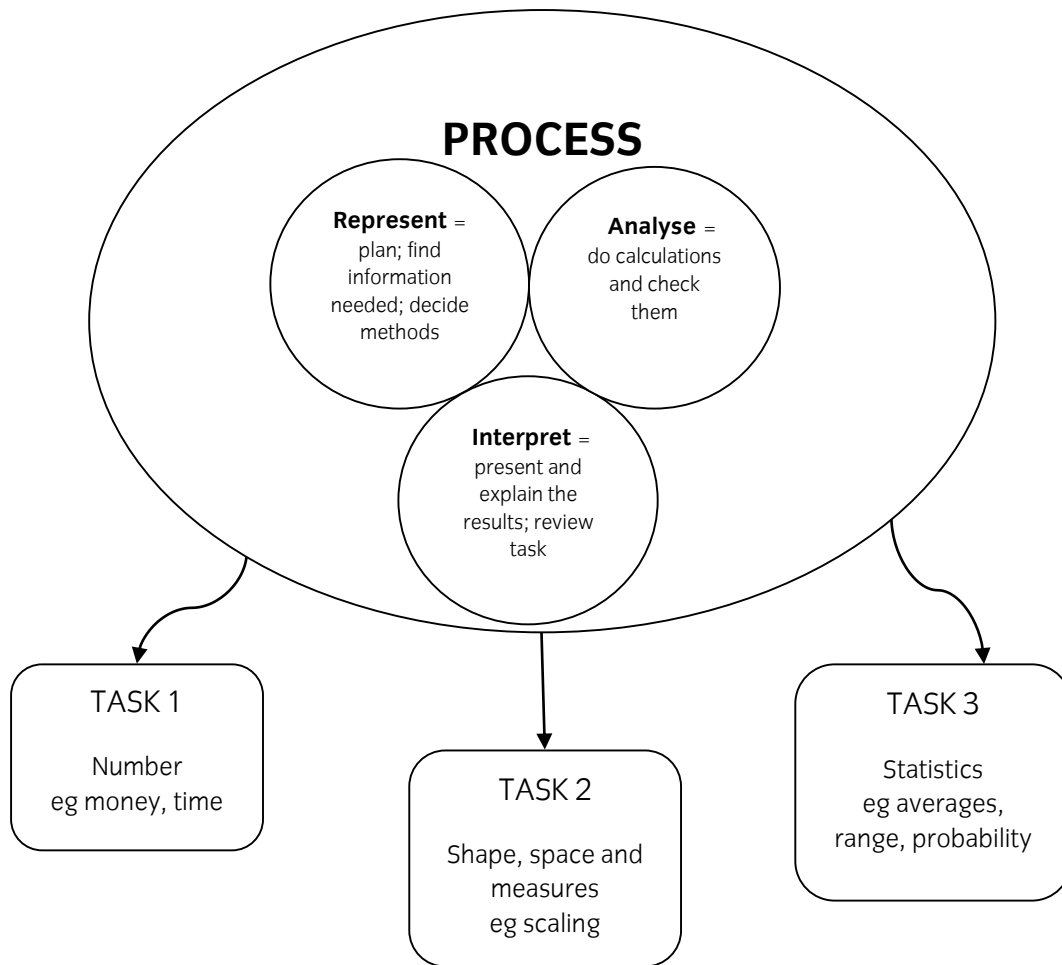
The test specification requires candidates to demonstrate their competence (functionality) in mathematics at the appropriate level.

Assessment covers the three areas of the qualification specification, ie, **represent**, **analyse** and **interpret**. Equal weighting (approximately) is given to each area.



The assessments are generic rather than vocationally based. Content of the specification broadly fits the adult numeracy core curriculum (found [here](#)).

Functional Mathematics papers comprise three holistic tasks, each covering one area of technical content and skills within the following areas: number; shape, space and measure; and handling data / statistics. All the task also cover the three process skills: **represent**, **analyse** and **interpret**.



There are two options for assessment:

- an onscreen test (E-volve)
- a paper-based test

Both options are on demand.

## 2. General

Centres should be aware that the Functional Skills Mathematics specification must be read in conjunction with the Adult Numeracy standards at level 1 (found [here](#)). The assessment test is based in the context of this specification and teaching should reflect the specification contents.

Regardless of which assessment option is chosen, candidates should be familiar with sample papers, which are indicative of content. Both onscreen (E-volve) and paper-based samples will assist this process. Samples of both types are available on the [City and Guilds website](#). It is also important that candidates are aware of the format of the option they have chosen.

**E-volve** candidates should be given the opportunity to practise onscreen samples. They should be aware that answers must be recorded in the answer boxes where provided and working should be shown in the space provided for working. Candidates who fail to do these things will be unable to access compensation marks if their final answer is incorrect. Candidates should practise presentation skills using the navigation tool found [here](#). Practise with options 1 (calculator and work box), 5 (table), 7 (diagram), 8 - 11 (charts and graphs) will be of particular value to Level 1 candidates.

Candidates opting for paper-based assessment should also be given the opportunity to practise sample papers. They must also answer in spaces provided and are advised to show working. They must have rulers and calculators in order to successfully attempt some of the tasks.

Some candidates lose marks by not reading all of the instructions carefully, including the introduction to the task. The tasks are holistic in nature and it is important that candidates grasp the overall problem set and follow instructions carefully.

### 3. Represent (finding information, methodology)

Functional Skills assessment is not simply about doing calculations. It is also concerned with testing the ability of a candidate to make choices about the data required to solve a task, about planning an approach and deciding which method(s) to use.

#### 3.1 Finding information

Information will be found in the introduction to a task, the text in the question itself, in table format and in a variety of other presentations, including timetables, 'advertisements', diagrams, sketches and charts. Some candidates do not properly assess this data, which may contain both information required for a task, but also other information that is not specifically required. These candidates need practice in the problem solving aspect of the assessment, ie, relating the objectives of a task to the data supplied and discerning what data is and is not relevant.

Some candidates have particular difficulties in extracting information from timetables, confusing times of departure and arrival. Scale diagrams are sometimes misinterpreted often because there is no understanding of the scale used.

Misunderstanding units; particularly relating to linear dimensions (mm, cm, m and km) and time, prevents some candidates from successfully completing their search for information needed to complete a task.

#### Examples of data presentation

##### Table

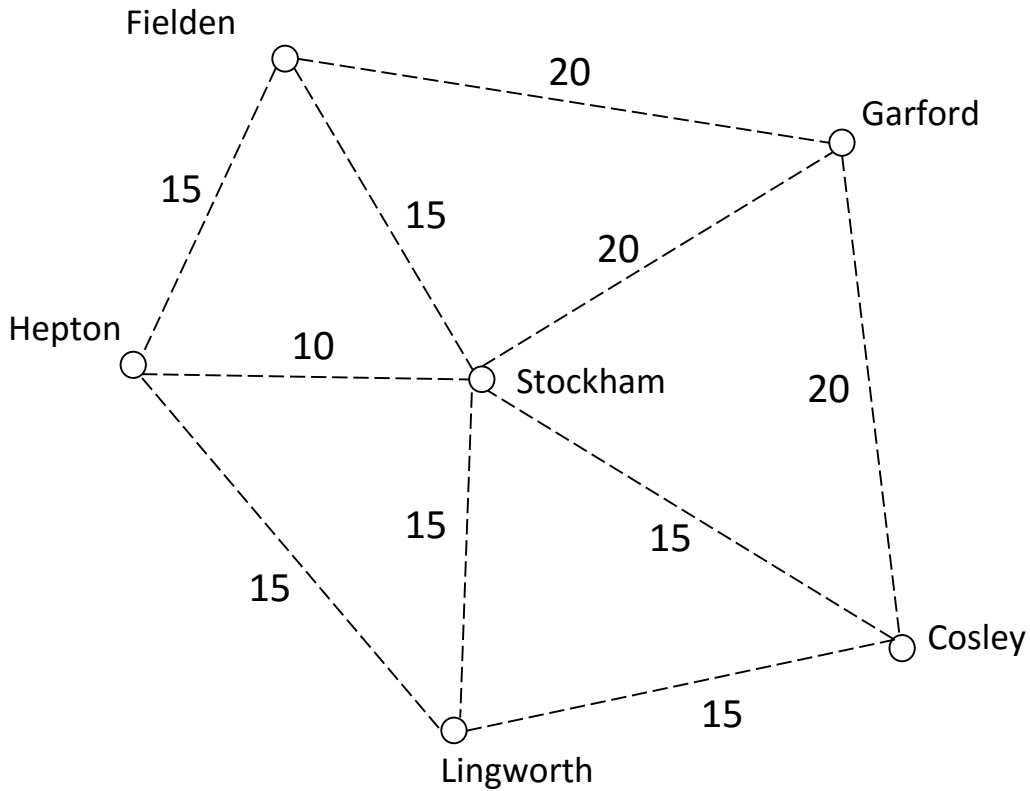
Note that some information may not be required. Candidates are expected to select the information they need.

Memory size (gigabytes)	Brand	
	MemStic	StoreSafe
		
1GB	Not in stock	£2.36
2GB	£3.98	£4.12
4GB	£6.48	£7.24
8GB	£11.46	Not in stock

## Diagram

In this example, candidates must choose a route and then use the travel times given to work out a total travel time.

Diagram to show travel time in minutes between towns and villages



**Key** ○ Pick up points

**Example** ○  $\overset{10}{\text{---}}$  ○ means that it takes **10 minutes** to drive between the two pick up points



## Train timetable

Candidates are expected to understand departure and arrival times and be able to work out the time taken for a journey, eg leave Derby and arrive at Birmingham International by 11:30.

	★	★				
<b>Derby</b>	<b>0936</b>	<b>0953</b>	<b>1010</b>	<b>1028</b>	<b>1037</b>	<b>1110</b>
<b>Burton</b>	<b>0947</b>	---	<b>1021</b>	---	<b>1048</b>	<b>1121</b>
<b>Tamworth</b>	<b>1000</b>	---	<b>1032</b>	<b>1048</b>	<b>1100</b>	<b>1136</b>
<b>Wilnecote</b>	---	---	<b>1036</b>	---	---	<b>1146</b>
<b>Birmingham New Street</b>	<b>1024</b>	<b>1027</b>	<b>1054</b>	<b>1108</b>	<b>1124</b>	<b>1154</b>
<b>Birmingham International</b>	<b>1049</b>	<b>1055</b>	<b>1119</b>	<b>1139</b>	<b>1149</b>	<b>1219</b>
★ Minimum train fare £12 with railcard						
<b>Train times from Derby to Birmingham International</b>						

## Advertisement

In this example, candidates must extract the information they need to find the cost of a journey.

Easy-travel airport minibuses

Book your minibus to and from the airport

We charge:  
£75 for the first 75 miles of **each** journey  
and £1.90 for **each mile** over 75 miles.

## Part of a 'catalogue'

Candidates must choose and extract information. In this example, a choice of hutch is made and the price and dimension used to answer the problem set.



Daisy hutches	
small	large
£56.00	£63.00
	
Size 150cm long	Size 175cm long
60cm wide	60cm wide
60cm high	60cm high

Diagram (unscaled)

Candidates must understand how to read off the dimensions and use in calculations eg, area.

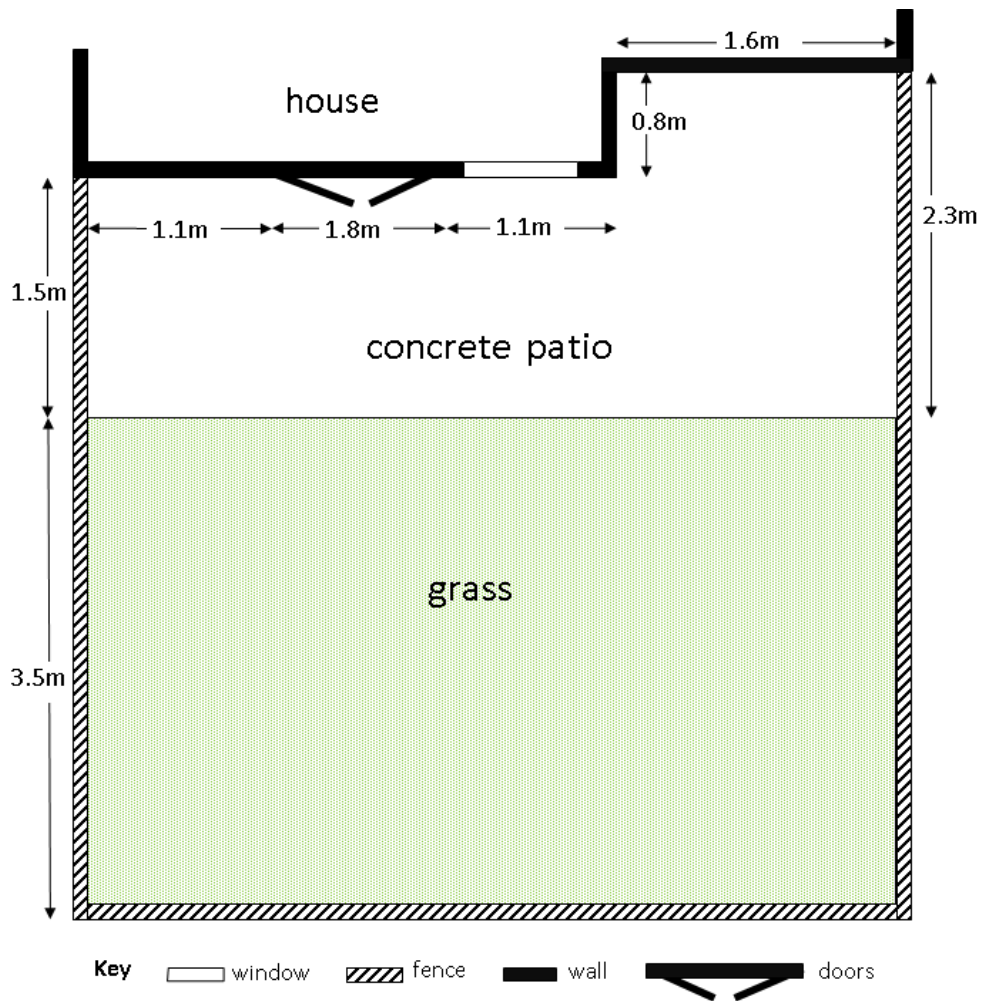
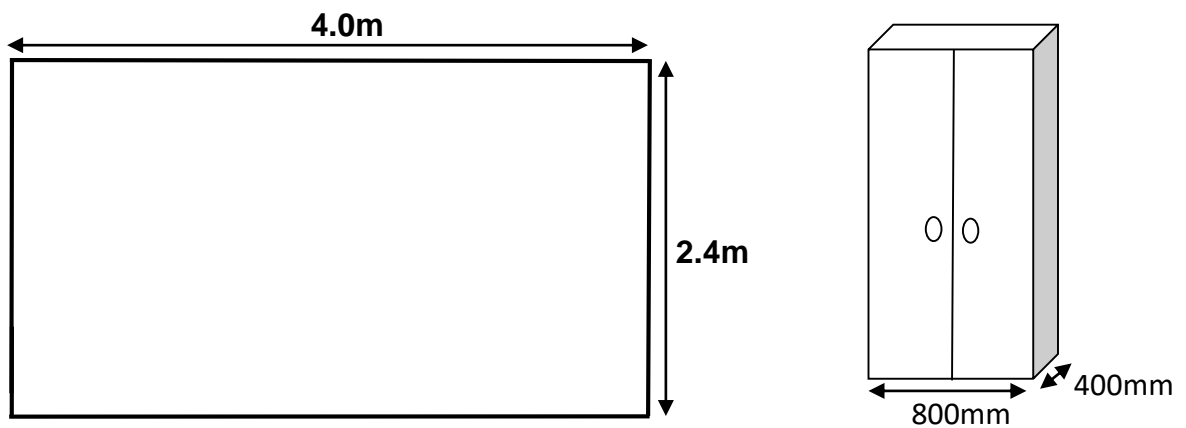


Diagram (unscaled)

The example below is information for drawing a scale diagram. Note the different units.



### Tabulated data for a statistics calculation

In this example, candidates must recognise not only how many testers there are, but that the number of testers varies and therefore, in calculating a mean, the divisor may be different for each game tested.

Scores for new games			
Game	Sun Spot 	Planet Race 	Other World 
Price	£17.99	£32.99	£34.99
Tester	Score		
Adam	Did not test	10	13
Bill	14	9	Did not test
Claire	Did not test	10	12
Chris	11	18	19
Elena	16	19	16
Ivo	8	12	Did not test
Joe	Did not test	19	11
Karim	Did not test	11	8
Miri	15	16	20
Nia	9	10	Did not test
Pablo	6	10	17
Rocco	14	20	16
Sarah	Did not test	17	Did not test
Tasha	8	12	Did not test
Vladimir	9	17	18

Candidates should be able to extract scores in various forms for statistical calculations.

Film	No Memory	The Long Drive	Best Friends	The Flood
viewers' ratings	★★★★★	★★★★★★	★★★★	★★
	★★★	★★★★	★★★	★
	★	★★★★★★	★★★★	★
	★★	★★★★	★★★	★
	★	★★	★★★★	★★
	★★	★★★★★★	★★★	★★
	★★	★★★★★★	★★★	★
	★	★	★★★	★★
	★★★	★★★★	★★★★	
	★★	★★★★★★	★★★★	
	★			
	★★			
	★			
	★★			

**Key for ratings**  
 ★★★★★ = brilliant  
 ★★★★ = good  
 ★★★ = okay  
 ★★ = poor  
 ★ = terrible

## 4. Analyse (calculating and checking)

### 4.1 General

Many candidates do not show units either in their answers or workings. Although a candidate will not be repeatedly penalised for this, the absence of units can lead to confusion for the candidate as her/his answer develops, eg when drawing scale diagrams. Many candidates ignore the need to make use of the £ sign or give answers in incorrect money format eg an answer £35.10 written as £35.1 will be penalised.

The misreading or misinterpretation of answers from calculators causes problems for a number of candidates. This particularly applies to the position of the decimal point leading in certain cases to clearly inappropriate solutions.

Candidates must understand order of operations conventions (BODMAS) and apply them to calculations. Note that the E-volve calculator does not currently automatically apply BODMAS to numbers inserted and candidates must take this into account if they are making continuous calculations.

Some candidates have difficulty using simple formulae. They are expected to use simple formulae in words.

eg

All measurements must be in metres.

**Length of liner you need = length of pond + (2 x depth of pond) + 0.6m**

**Width of liner you need = width of pond + (2 x depth of pond) + 0.6m**

### 4.2 Specific types of calculation

The following are examples of calculations that are not understood by a number of candidates:

- Percentages eg recognition that 20 out of 50 (customers) is 40%  
eg recognition that 30% is the same as 3/10
- Fractions eg calculation of one fifth as a price reduction
- Ratio eg use of ratio 1 : 5 to make dilution
- Time eg recognition that 38.5 hours is 38 hours 30 minutes
- Weight conversions eg 1.25kg = 1250g
- Calculation of area eg of rectangle 5m x 7m = 35m<sup>2</sup>
- Scaling down eg use of 1cm represents 1m
- Linear conversion eg recognition that 10mm = 1cm, 1000m = 1km

Candidates generally calculate means and ranges accurately. A few confuse range with the mean or another type of average.

### 4.3 Checking calculations

As part of a general checking process, candidates should be taught to ask themselves whether or not their answers make sense in the context of the task, eg, the average price of a product cannot be more than the highest price in a list of prices.

Candidates are expected to be able to demonstrate simple checks of calculations or parts of calculations they have used. Checks must not be straightforward repeats of calculations and candidates are expected to use reverse checks, approximation or a different method. Candidates must have shown the original calculation in the relevant part of the task. Some candidates show checks of answers where no working has been shown – such checks are not awarded marks as the check required must specifically relate to a previous calculation shown.

eg original calculation is  $105.6 \div 2.75 = 38.4$

acceptable checks:  $38.4 \times 2.75 = 105.6$  or  $105 \div 3 = 35$  (nearly 38.4)

eg original calculation is  $96.7 \div 2 = 48.35$

acceptable checks:  $48.35 \times 2 = 96.7$  or  $96.7 \times 0.5 = 48.35$

eg original calculation is  $74 \times 3 = 222$

acceptable checks:  $222 \div 3 = 74$  or  $74 + 74 + 74 = 222$

### 4.4 Explaining scales

Some Task 2 checking relates to the scaled lengths drawn or the interpretation of a scale plan. Candidates should be able to relate the scale used to a scaled length on a diagram. Some candidates lose marks by missing either reference to the scale or reference to the scaled length.

eg 'the scale is 2 squares = 1 metre, so 3 metres is 6 squares

eg '1cm represents 50cm and 6cm is 300cm = 3m'

## 5. Interpret (presentation and explanation of results, evaluation of task)

### 5.1 Explanations

Candidates should be encouraged to put their conclusions into the context of the task brief. This makes the exercise much more meaningful and encourages candidates to appreciate the relevance of what they have calculated. Many candidates have difficulty in expressing what they have found out from the results of their calculations. Generally, what is required is a simple interpretation and reiteration of values calculated.  
eg 'Option A, it's cheaper by £10'

When interpreting statistical calculations there is often a requirement to comment on a measure of location (average) and one on a measure of dispersion (range). Most candidates use the range as the measure of dispersion but fail to conclude that a small range is normally preferable to a large range in that it shows a greater degree of consistency in the data. Candidates should understand that range is indicative of the consistency or variation of the original data.

eg 'The average waiting times at the doctor's in Nurton (10 minutes) are less than in Hamm (21 minutes). The range for Nurton (7 minutes) shows that waiting times are more consistent than for Hamm (range = 17 minutes).

### 5.2 Graphical support

Candidates must be able to summarise their results and support their explanations using a variety of techniques.

#### Task 1

Candidates are expected to summarise results in a coherent way. Results of calculations are frequently required in a table format. At Level 1, the results (and therefore headings) required are usually explicitly stated in the step instructions. A few candidates lose all marks for steps requiring a table by drawing charts or graphs. Candidates should be encouraged to plan tables to summarise results in a logical format.

#### Tables

Candidates must arrange results in headed rows and columns, draw lines to show the rows and columns (paper-based only) and accurately record results.

When tables are constructed, marks are lost by some candidates who:

- fail to delineate rows and columns (paper-based)
- do not head rows and columns with suitable labels
- do not accurately enter the results / data required

Simple timetables, time lines or flow charts may also be required.

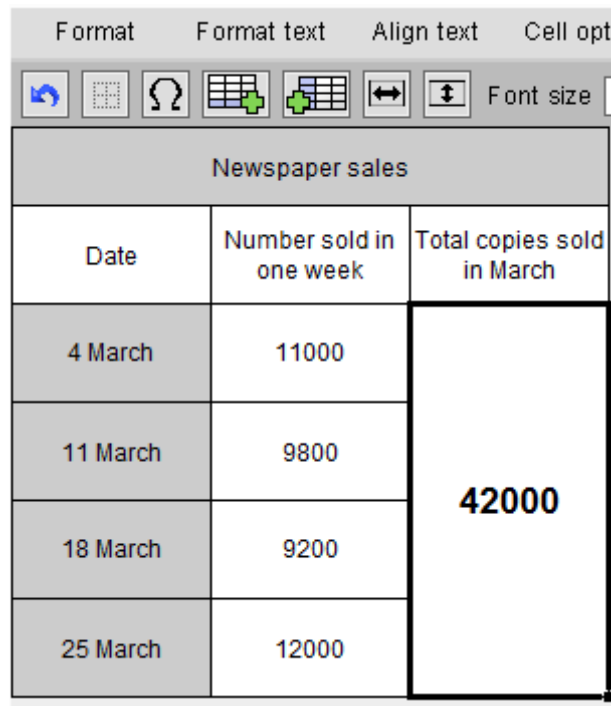


Examples of tables showing newspaper sales:

Paper-based:

<i>Newspaper sales figures</i>		
Date	Number of copies sold in a week	copies sold in March
4 March	11000	42 000
11 March	9800	
18 March	9200	
25 March	12000	

E-volve (Table Creator):



The screenshot shows a web-based table editor. At the top, there are tabs for 'Format', 'Format text', 'Align text', and 'Cell opt'. Below the tabs is a toolbar with icons for undo, redo, grid, refresh, insert table, delete table, left-align, right-align, and font size. The table being edited has a header row with the title 'Newspaper sales' and three columns: 'Date', 'Number sold in one week', and 'Total copies sold in March'. The data rows are: 4 March (11000), 11 March (9800), 18 March (9200), and 25 March (12000). The 'Total copies sold in March' cell contains the value '42000'.

Newspaper sales		
Date	Number sold in one week	Total copies sold in March
4 March	11000	<b>42000</b>
11 March	9800	
18 March	9200	
25 March	12000	

## Task 2

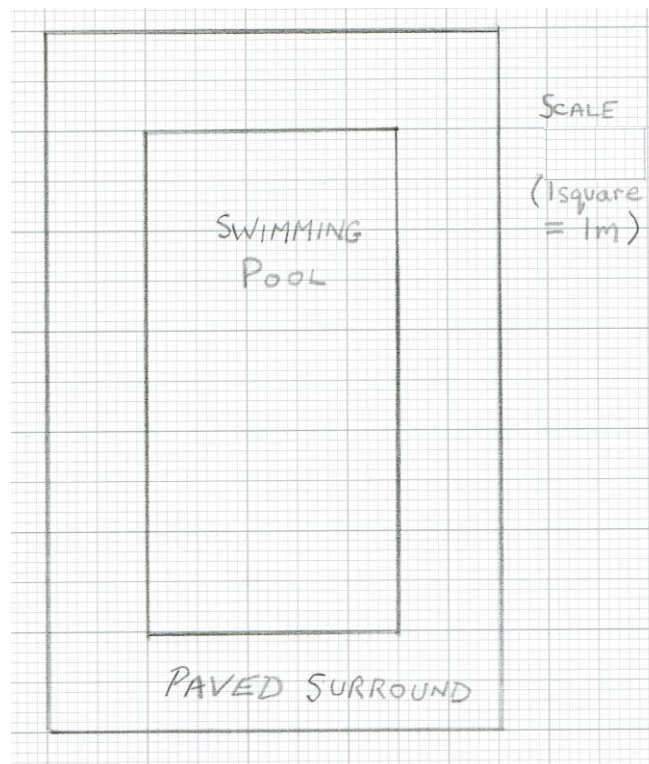
Candidates must be able to construct diagrams and plans to a given scale expressed as a number of graph paper squares, eg 'one large square represents 1metre', shown on the graph paper. Scale drawings should not be done freehand.

When diagrams and plans are drawn, marks are lost by some candidates who

- do not understand scaling
- do not write the scale on their diagram
- forget to label the diagram

## Examples of scale diagrams:

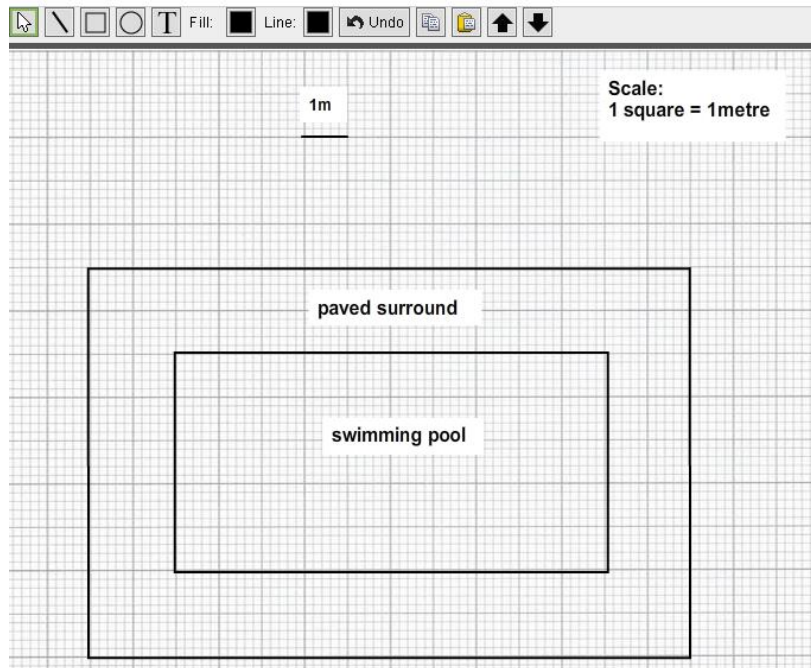
### Paper-based:



This example is a scale diagram showing a swimming pool 10m x 5m with a 2m paved surround (2mm graph paper used)

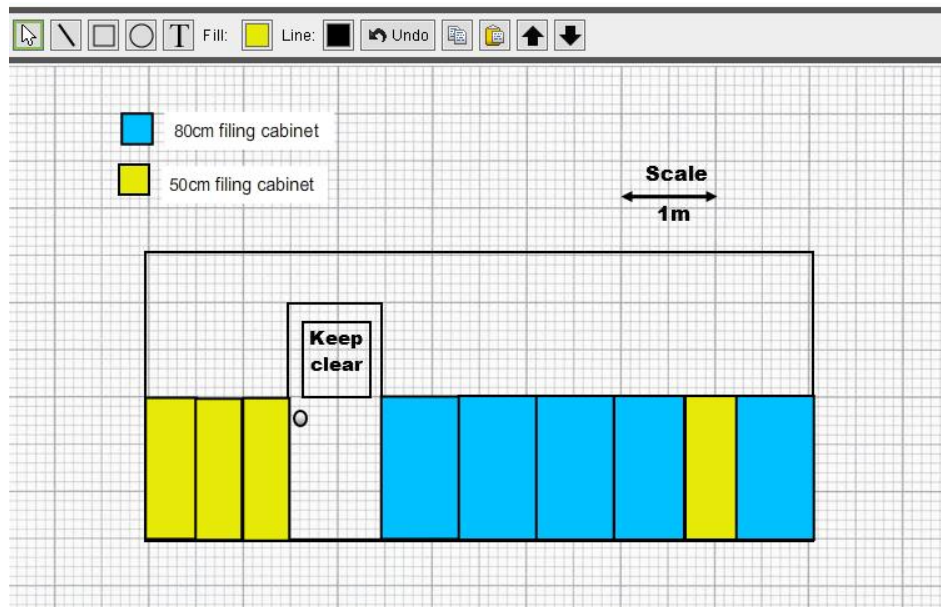
Candidates must draw to scale using a ruler (paper-based) or suitable shapes (E-volve), label the diagram and label the scale (1 square = 1m is accepted).

## E-volve (Diagram Creator):



## E-volve (Diagram Creator - template provided):

Plan to show how filing cabinets of different widths fit on wall



### Task 3

Candidates are expected to support their results with suitable charts or graphs. Some candidates lose all marks for this question because they do not produce the required graphic, eg produce a line graph or table when instructed to draw a chart. They should understand that a line graph is only an option if the data plotted is continuous data. It is not an option if the results illustrated are discrete. Pie charts are suitable only if there is an intention to show proportions. A table is not a chart.

### Bar charts

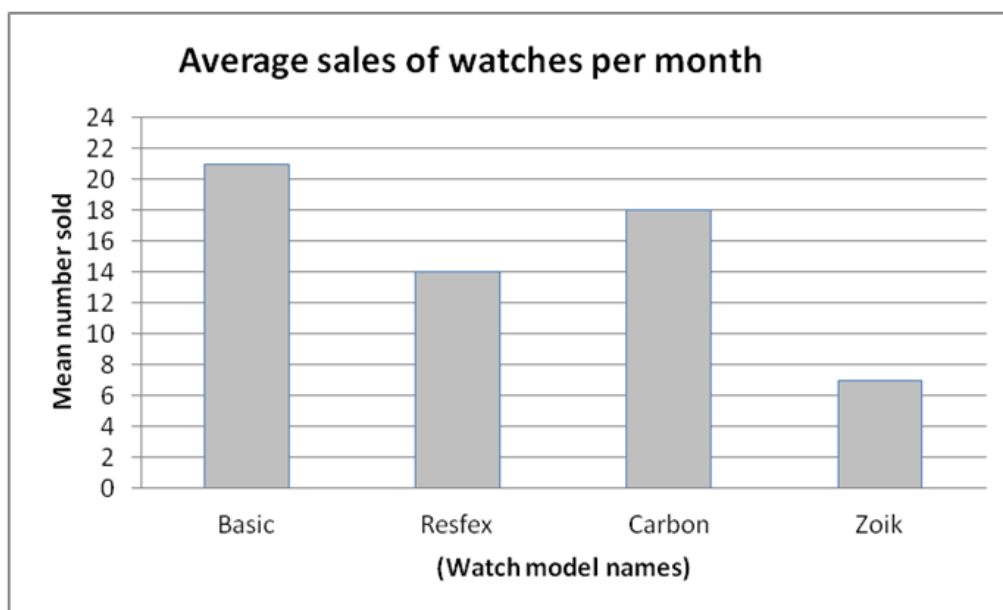
When bar charts are drawn, marks are lost by some candidates who:

- fail to label axes, particularly the vertical axis
- do not construct a continuous linear scale on the vertical axis
- fail to start the vertical scale at zero
- do not draw bar heights accurately

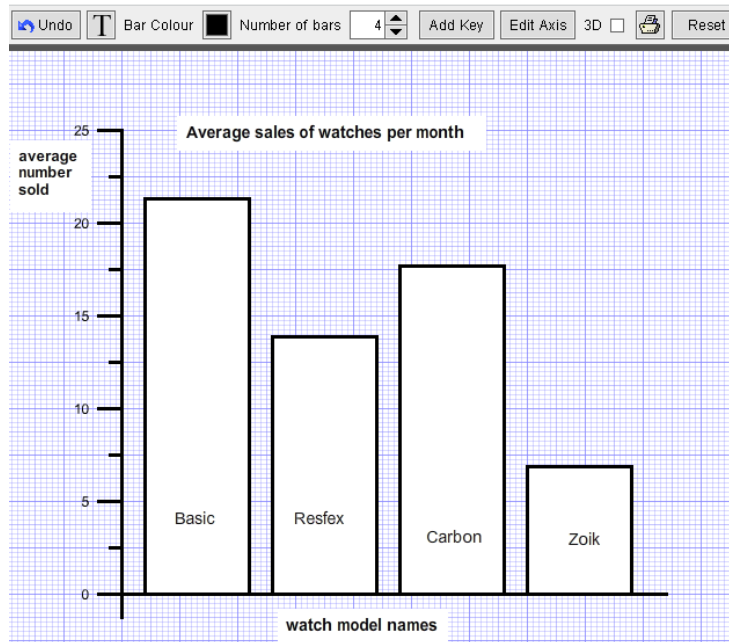
### Examples of bar charts showing watch sales

A chart should have a title, axes labelled, bars labelled (a key is also acceptable), a scale starting at zero and bar heights accurately plotted.

### Paper-based:



## E-volve (Graph Creator):



## Pie charts

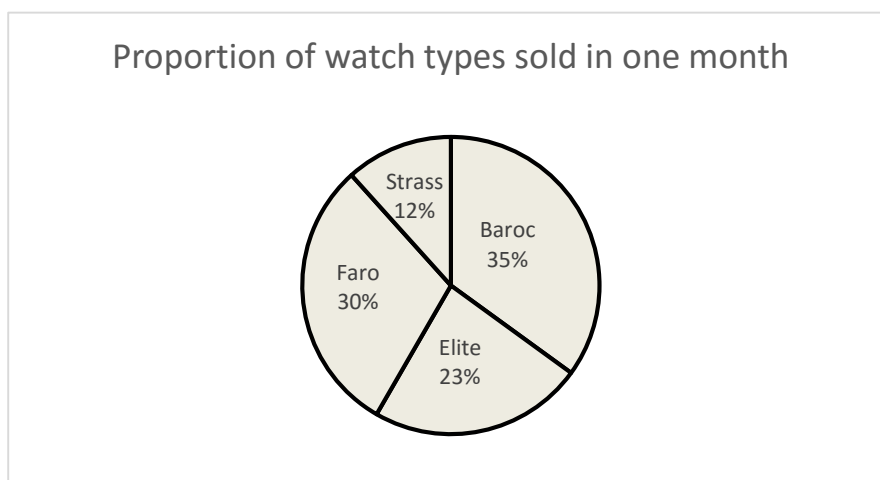
A pie chart should have a title, segments labelled or a key provided, and sector angles accurately drawn. It must only be used where the intention is to show proportion. A circular template will normally be provided and candidates will require a protractor to measure angles in paper-based assessments.

When pie charts are drawn, marks are lost by some candidates who:

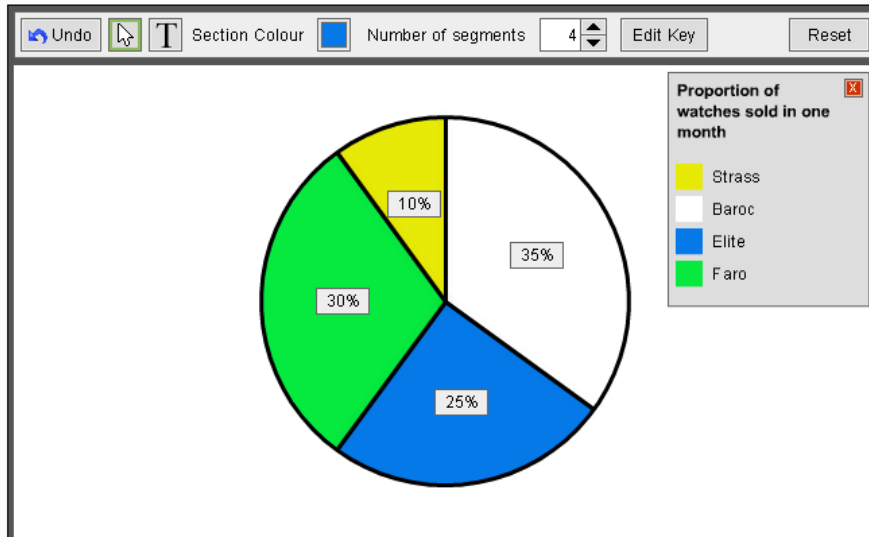
- cannot relate proportion / percentage to  $360^\circ$
- do not draw sector angles accurately.

## Examples of pie charts showing proportion of different watches sold

### Paper-based:



## E-volve (Graph Creator):



## Line graphs

A line graph should have a title, labelled axes, continuous linear scales on both vertical and horizontal axes, the vertical scale may start at zero (if it does not, a broken line symbol should be used), accurate plots shown clearly and a single line joining the plots.

When line graphs are drawn, marks are lost by some candidates who:

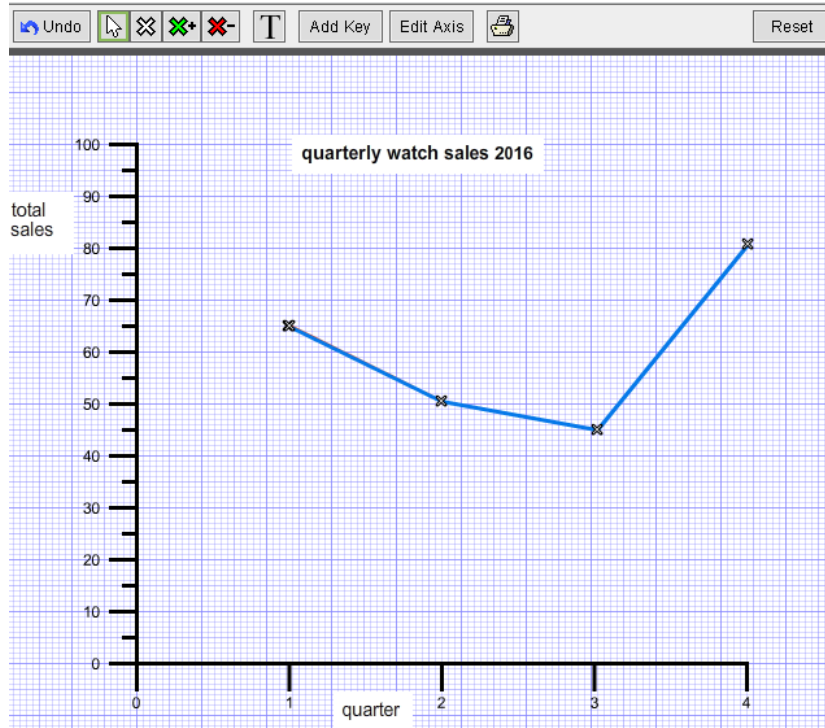
- fail to label axes, particularly the vertical axis
- do not construct a continuous linear scale on the vertical axis
- do not plot accurately.

## Examples of line graphs showing total sales per month over a continuous period (one year)

### Paper-based:



## E-volve (Graph Creator):



## 6. Example assessment tasks / section

Sample papers, worked examples, commentaries and mark schemes are available on the [City and Guilds website](#).