

# Mathematics

## Functional Skills

### Level 1

#### Study Pack

#### *Measure, Shape*

#### *and*

#### *Data Handling*

*HCUC offers courses in mathematics at Entry level, Level 1, GCSE and A level. The following resources give you a taste of some of the topics covered in Functional Skills and GCSE maths lessons. It includes some important facts along with worked examples and exam style questions. The solutions are included for your reference.*

*The purpose of this resource is to give an initial insight into an example lesson. Actual lessons may consist of more activities/use of technology and may be adapted to meet the needs of individual learners.*

## **In this pack there are three example lessons**

<b><u>Lesson 1:</u></b>	Measure: Units of Measure and Conversions	page 5-11
<b><u>Lesson 2:</u></b>	2D Shapes, properties and Angles	page 15-18
<b><u>Lesson 3 :</u></b>	Data Handling	page 24-33

# CONVERSIONS

**Measuring Length**

We use a ruler to measure very small items.  
We measure these in millimetres.  
We write this as mm.  
 $10\text{mm} = 1\text{cm}$

We use a ruler to measure some larger items.  
We measure these in centimetres.  
We write this as cm.  
 $100\text{cm} = 1\text{m}$

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ink saving Eco

**LENGTH**  
**LENGTH**

**1 Talk Time**

**A** 

**B** 

**C** 

**D** 

**E** 

**F** 

**WEIGHT**



## Contents; Conversions

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At FS level learners are expected to be learn about different units of measure and how to convert between these units. The following resources show where units of measure are used in real life situations, worked examples and exam style questions at FS level 1 are also given

## Key words

Length	How long an object is
Width	How wide an object is
Weight	How heavy an object it
Capacity	Measure used for how much liquid

## Facts & Examples

Everyday life sometimes requires us to measure length, weight or capacity (amount of liquid) when carrying out household tasks.

For example, in cooking we may need to weigh flour, measure an amount of milk or measure the diameter of a cake tin.

### **How to measure?**

Length is measured in millimetres (mm), centimetres (cm), metres(m) or kilometres (km).

Weight is measured in grams (g) or kilograms (kg).

Capacity is measured in millilitres (ml) or litres (L).

### **Measuring length: Everyday examples**



The thickness of a penny coin is about 1 mm.

One centimetre is about the width of your figure nail.



The average height of a door is 2 m, so 1 m is half the height of the door

## Measuring Weight: Everyday examples

A standard paper clip weighs about 1 g.



Some bags of flour weigh 1 kg.

## Measuring CAPACITY (amount of liquid):

A standard teaspoon holds 5ml of liquid



This carton contains 1 litre of milk.

## Conversions

Sometimes we need to convert from one unit to another unit of measure.

For example, we may need 2.5 kg of flour and the shop may have only bags containing 500 g of flour. We will need to know how many grams there are in 1.5 kg so that we buy the correct number of 500 g bags.

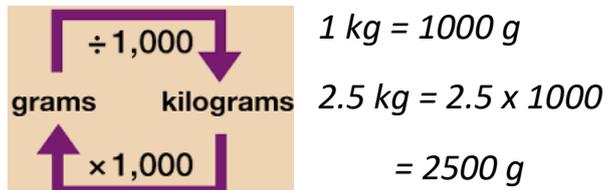
***Here is a conversion table for length, weight and capacity.***

LENGTH:	WEIGHT:	CAPACITY:
1 km = 1000 m	1 kg = 1000 g	1 L = 1000 ml
1 m = 100 cm	1 cm = 10 mm	

## Worked examples

Amy is planning a birthday party for 10 children.

- (a) She needs 2.5 kg of flour for the cake. Her local shop sells 500 g bags of flour. How many bags will she need to buy?



Number of 500 g bags needed =  $2500 \div 500 = \underline{5 \text{ bags needed}}$

- (b) Amy will make milkshakes for the 10 children.  
She needs 240 ml of milk for each child. She has bought a three-litre carton of milk. Does she have enough milk?



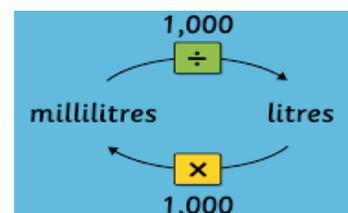
For one child we need 240 ml of milk

For 10 children we need  $240 \times 10 = 2400 \text{ ml}$  of milk

Her carton of milk contains three litres =  $3 \times 1000$

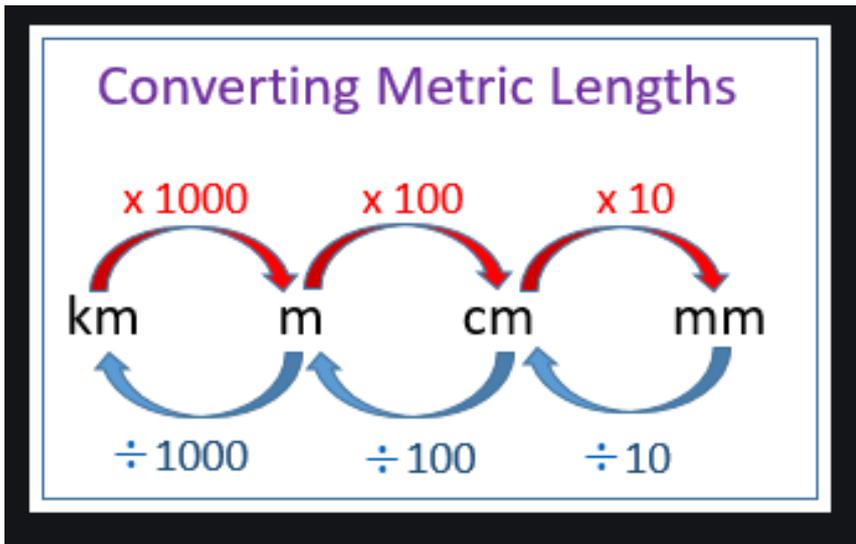
$$= 3000 \text{ ml}$$

Yes, she does have enough milk for all 10 children.



(c) Amy is going to give each child a gift box to take home.

She will use 35 cm of ribbon for each box. Ribbon comes in packs of 1.5 m. How many packs will she need?



*For 10 children she will use  $35 \times 10 = 350$  cm of ribbon*

*One pack contains  $1.5 \text{ m} = 1.5 \times 100 = 150$  cm of ribbon*

*So, she will use  $350 \div 150 = 2.333$  packs of ribbon.*

*Therefore she will need to buy 3 packs of ribbon*

*(Note: She has to buy more than 2 and have some left over)*

## Exam-Style Questions

### Q1:

John runs to keep fit. He wants to run a total of 15 km each week. Here are the three distances John ran last week:

5.25 km, 6 km 250 m and 750m

Did John run 15 km last week?

You must show how you got your answer.



### Q2:

Pixie and Dixie are two dogs. Pixie weighs 10.5 kg. Dixie weighs 700 g less.

How much does Dixie weigh in kg?

**Q3:** This jug contains 1.5 litres of juice.

How many 200ml glasses can be filled completely?



## **Answers**

### **Question 1:**

$$250 \text{ m} = 250 \div 1000 = 0.25 \text{ km}$$

$$6 \text{ km } 250 \text{ m} = 6 + 0.25 = 6.25 \text{ km}$$

$$750 \text{ m} = 750 \div 1000 = 0.75 \text{ km}$$

$$\text{Total distance run} = 5.25 + 6.25 + 0.75 = 12.25 \text{ km}$$

Therefore John did not run 15 km.

### **Question 2:**

$$700 \text{ g} = 700 \div 1000 = 0.7 \text{ kg}$$

$$\text{Dixie weighs } 10.5 - 0.7 = 9.8 \text{ kg}$$

### **Question 3:**

$$1.5 \text{ L} = 1.5 \times 1000 = 1500 \text{ ml of juice}$$

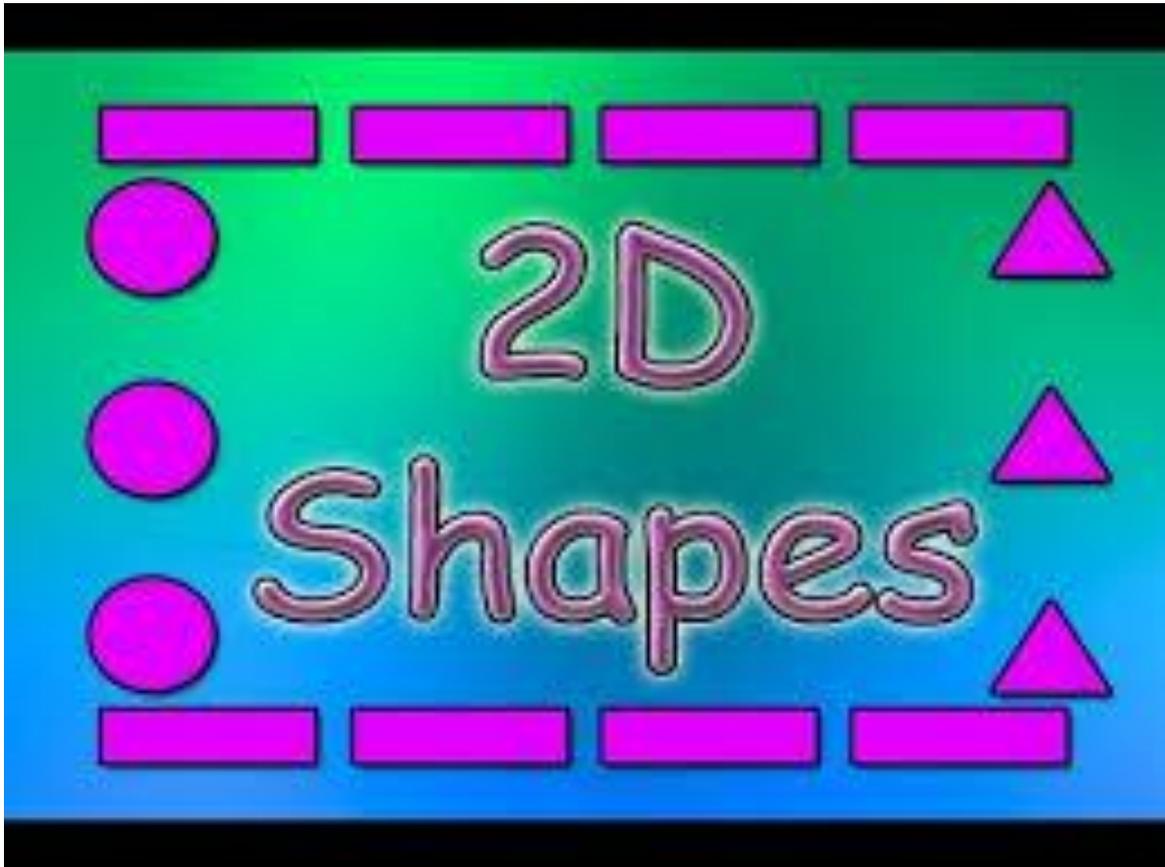
$$\text{Number of glasses} = 1500 \div 200 = 7.5$$

$$\text{Number of full glasses} = 7$$

## USEFUL LINKS

For further information and more practice questions, check out the following links.

<u>Useful links</u>	<u>Information</u>
<a href="https://www.bbc.co.uk/bitesize/guides/zthsgk7/revision/3">https://www.bbc.co.uk/bitesize/guides/zthsgk7/revision/3</a>	Good revision material at all levels
Corbett Maths: <a href="https://corbettmaths.com/wp-content/uploads/2013/02/metric-units-pdf.pdf">https://corbettmaths.com/wp-content/uploads/2013/02/metric-units-pdf.pdf</a>	Practice worksheets and their answers
Edexcel <a href="https://www.gatewayqualifications.org.uk/webinars/good-practice-in-assessing-entry-level-qualifications/">https://www.gatewayqualifications.org.uk/webinars/good-practice-in-assessing-entry-level-qualifications/</a>	Past exam papers from Edexcel
Skills workshop: <a href="https://www.skillsworkshop.org/category/link-types/learning-resources-external-links/printable-resource-sites/printable-maths-numer">https://www.skillsworkshop.org/category/link-types/learning-resources-external-links/printable-resource-sites/printable-maths-numer</a>	More practice and information on Measure



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M e a s u r e

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FS Level 1

Study Resource

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## Contents; Shapes

<b>Content</b>	<b>Page number</b>
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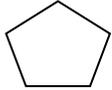
### 2-D shapes

#### Area and Perimeter

Area and perimeter are used in everyday life hence its inclusion in the Level 1 syllabus. Perimeter is used to calculate a distance around a shape for example, a fence around a garden or how much ribbon is needed to place around a cake. Area is used to calculate space for example, how many tiles needed for a bathroom floor or calculating how much paint is needed to paint a wall.

## 2-D shapes

'2D' stands for 2-dimensional. 2D shapes are any shape you can trace from an object on a flat piece of paper. Common examples of these are found below:

Name	Number of sides	Image
Square	4	
Rectangle	4	
Circle	0	
Triangle	3	
Pentagon	5	
Hexagon	6	

## Perimeter of 2D shapes

The perimeter is the measurement of length around the edge of a shape.

To work out the perimeter, you need to know the length of each side of the shape and then add them all together.

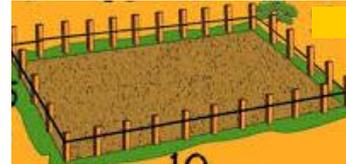


5 cm

2 cm



Think about a  
fence of a  
garden



**Perimeter of the above rectangle will be:**

$$\text{Perimeter} = 5\text{cm} + 2\text{cm} + 5\text{cm} + 2\text{cm} = 14\text{cm}$$



## Questions

### **Example question 1:**

In a fair there is a tent for refreshments

It is rectangular 10 m by 6 m.



Diagram **not**  
accurately drawn

Steve wants to put bunting around all 4 sides of the tent.  
He has 40m of bunting.

---

Has Steve got enough bunting?

### **Example question 2**

Dan wants to put draught excluder on some windows in his house.

The draught excluder goes along each edge of the window.

One of Dan's windows is 120 cm high and 90 cm wide.

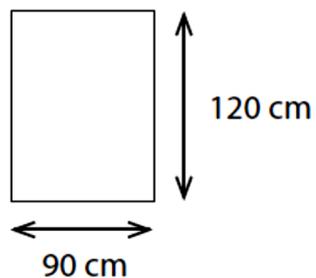


Diagram **NOT**  
accurately drawn

What total length of the draught excluder does Dan need for his window?

*Edexcel exam February 2012 (2 marks)*

**Example question 3**

Harry wants to put bunting around the walls in the main room of the cricket club.

The room is in the shape of a rectangle 12 m by 10 m.



The bunting should be at least 2 times the perimeter of the rectangle.

Harry buys 90 m of bunting.

Does Harry have enough bunting?

*Edexcel exam May 2014 (3 mark)*

## **Answers**

### **Question 1.**

***Answer: Perimeter = 6 + 10 + 6 + 10 = 32m bunting needed***

***Steve has 40m. He has enough***

### **Question 2.**

***Total length of the draught excluder needed = 120 + 120 + 90 + 90 = 420 cm = 4.2 m***

### **Question 3**

***Bunting needed = 12 + 10 + 12 + 10 = 44m***

***Needs 2 times, therefore:***

***44 \* 2 = 88m***

***Harry needs 88m and has 90m. Yes, he has enough to cover 2 times perimeter of the main room.***

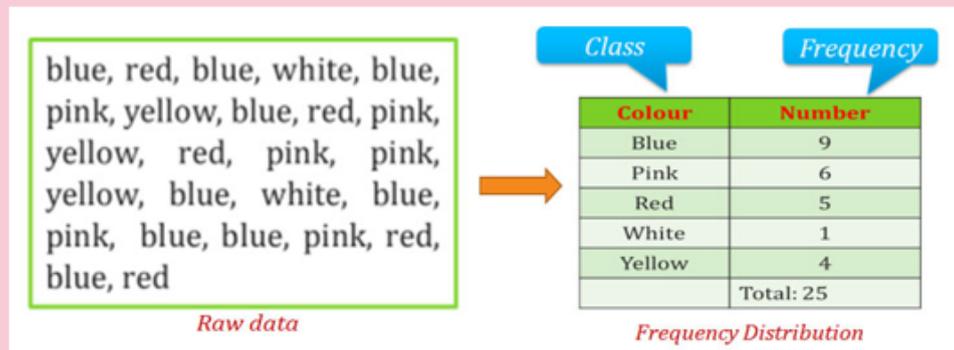
<u>Useful links</u>	<u>What can you find?</u>
<a href="https://www.primaryresources.co.uk/maths/maths.htm">https://www.primaryresources.co.uk/maths/maths.htm</a>	More resources for practice questions
<a href="https://www.bbc.co.uk/bitesize/subjects/">https://www.bbc.co.uk/bitesize/subjects/</a>	Facts about 2D shapes
<a href="https://mathsisfun.com/">https://mathsisfun.com/</a>	Fun activities for you to practice

## References:

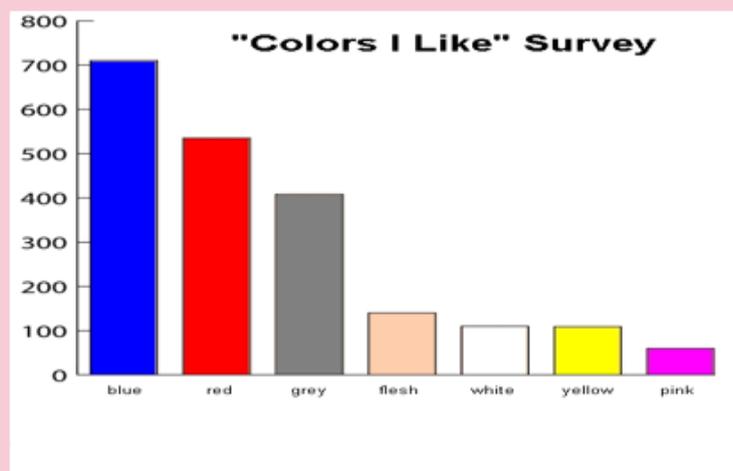
- 1) bbc bitesize
- 2) <https://www.splashlearn.com/math-vocabulary/geometry>
- 3) <https://www.bbc.co.uk/bitesize/subjects/z826n39>
- 4) <https://www.google.com/imghp?hl=en>
- 5) [www.study.com](http://www.study.com)

# Tables and Charts

## FREQUENCY TABLES



## BAR CHART



Data Handling

Tables and Charts

Level 1

Study Resource

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## **Contents; Tables and Charts**

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## Tables and Charts

*A good understanding of Maths is important and essential in life, Maths is used in day to day life with things such as managing money, planning your day, and recording data.*

*In this session we will be introducing some ways of collecting data for Level-1, to give you an idea of the course contents, we will be introducing frequency table and interpreting bar charts, and using some exam questions for extra practice.*

### Key Words for Table and charts

<b>Keyword</b>	<b>Description</b>
Data	Facts and statistics collected together for reference and analysis
Tally	A continuous count of something
Frequency	The number of times a data value occurs
Table	Data arranged into rows and columns
Chart	A graphical representation of data
Pictogram	Representation of data through pictures
Bar chart	A chart that uses bars to represent data in different categories

At FS Level 1 maths you may be required to make a Frequency table and draw a graph for the given information

### Frequency table

A **frequency table** is constructed by arranging collected data values in ascending order of magnitude with their corresponding frequencies.

When a lot of data needs to be sorted, one of the most efficient ways is to use a frequency table.

Frequency tables can help researchers to examine a complex information in a visual way, then take decisions.

### Example



The marks awarded for a paper set for a Level-1 class of 20 students were as follows:

6 7 5 7 7 8 7 6 9 7  
4 10 6 8 8 9 5 6 4 8

Present this information in a frequency table.

### Method:

Construct a table with three columns.

- Mark:** Any value/information we are measuring or collecting
- Tally:** Another method of counting. One line for each count and  $\text{||||}$  for a group of 5.
- Frequency:** A name given to the tally count bars written in number. In other words; how frequent is the value in the table?

Mark	Tally	Frequency
4		2
5		2
6		4
7		5
8		4
9		2
10		1

In the first column, write down all of the data values in ascending order of magnitude.

Place one tally mark ( | ) at the appropriate place in the second column for every data value. Continue this process until all data values in the list are tallied.

Count the number of tally marks for each data value and write it in the third column.

## Bar chart

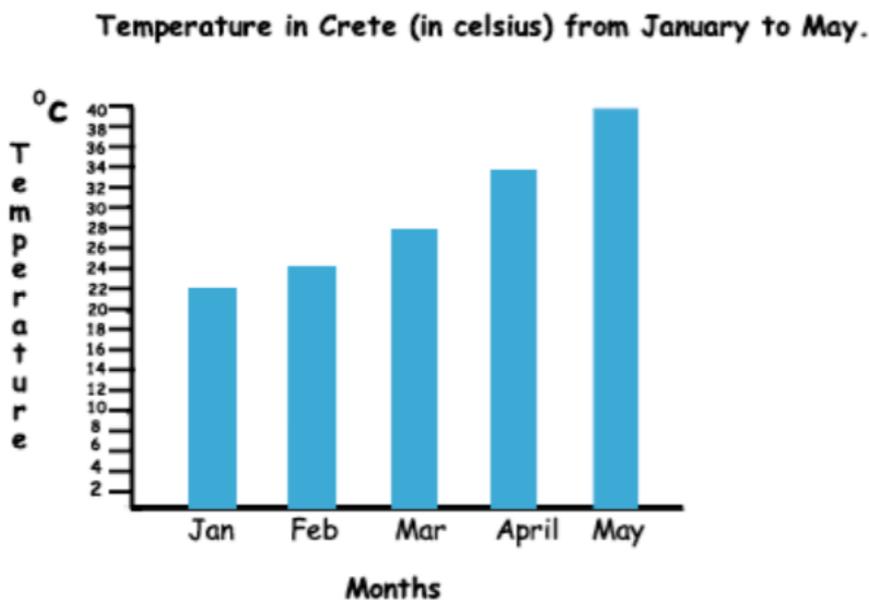
A **Bar Graph** (also called Bar Chart) is a graphical display of data using bars of different heights.

The bars can be drawn horizontally or vertically.

### **Interpreting information from bar charts**

Holiday brochures display a lot of information in the form of charts and diagrams.

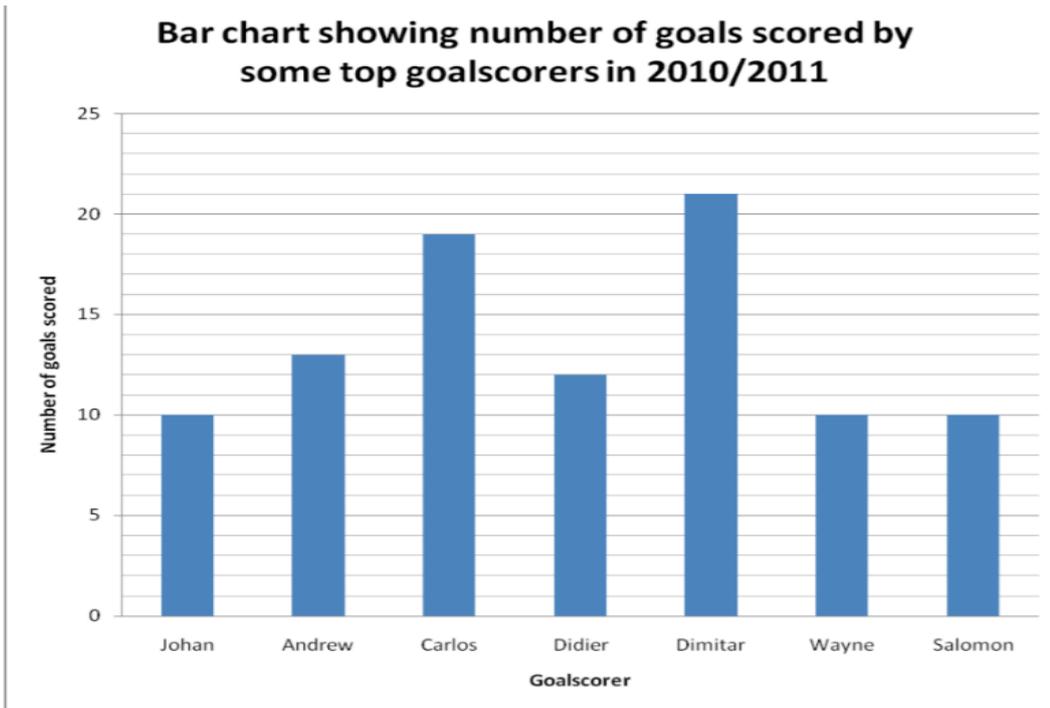
Interpreting this information might help you to make decision about your holiday.



From the bar chart above you could make decisions such as:

- When to visit Crete based on the information given on temperature?
  - For example, if you want to visit Crete but prefer to visit when the temperature isn't too hot, you could find out which months would be best to go.
  - You can see that the temperature in January is 22°C and then it rises to 40°C in May.
- What will be the temperature in April?
- What clothes to carry if I go for holiday in January?

## Example



Answer the following questions using the bar chart above:

1. Who scored the most goals?
2. How many goals did Carlos score?
3. Which three players scored ten goals?
4. How many more goals did Dimitar score than Didier?
5. How many players scored more than 15 goals?

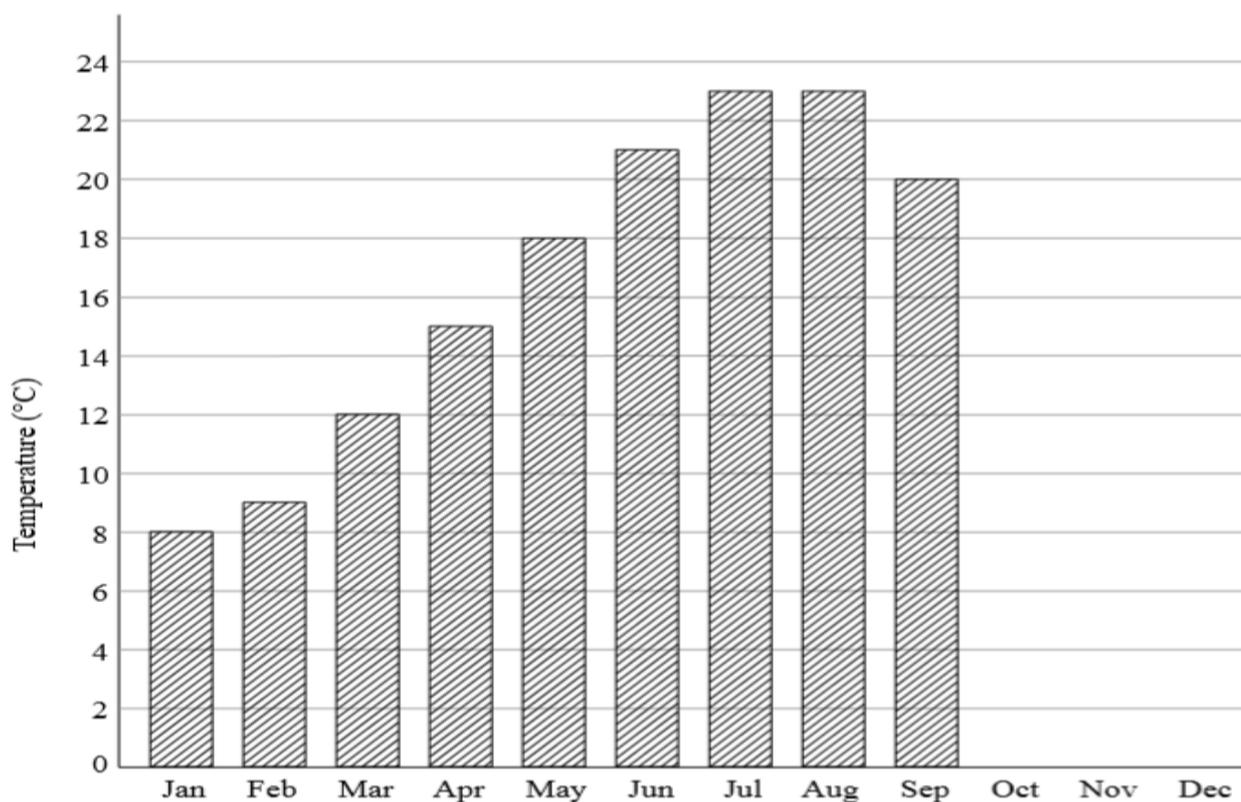
### Answers:

1. *Dimitar*
2. *19*
3. *Johan, Wayne and Solomon*
4. *21-12=19*
5. *2 players*

## Exam style questions<sup>i</sup>

Q1

Here is a bar chart showing the average maximum monthly temperature ( $^{\circ}\text{C}$ ) in Greenwich.



Here are the average monthly temperatures in October, November and December.

October	$16^{\circ}\text{C}$
November	$11^{\circ}\text{C}$
December	$8^{\circ}\text{C}$

(a) Complete the bar chart to show this information.

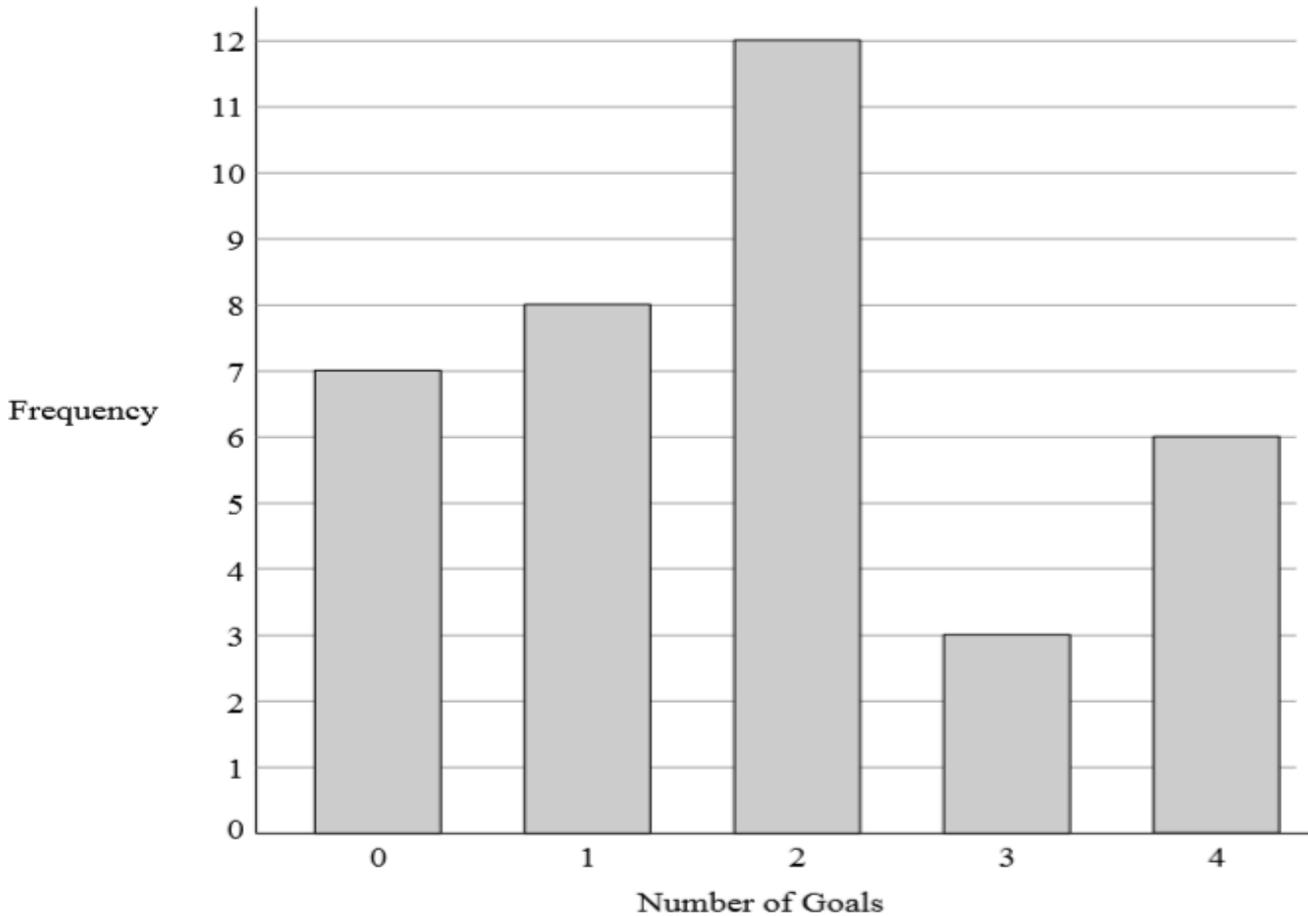
(2)

(b) In which two months were the highest average temperatures recorded?

..... and .....  
(1)

## Question 2

Here is a bar chart showing the number of goals scored in a game by a football team in a season.



a) Work out the highest number of goals scored?

(1 mark)

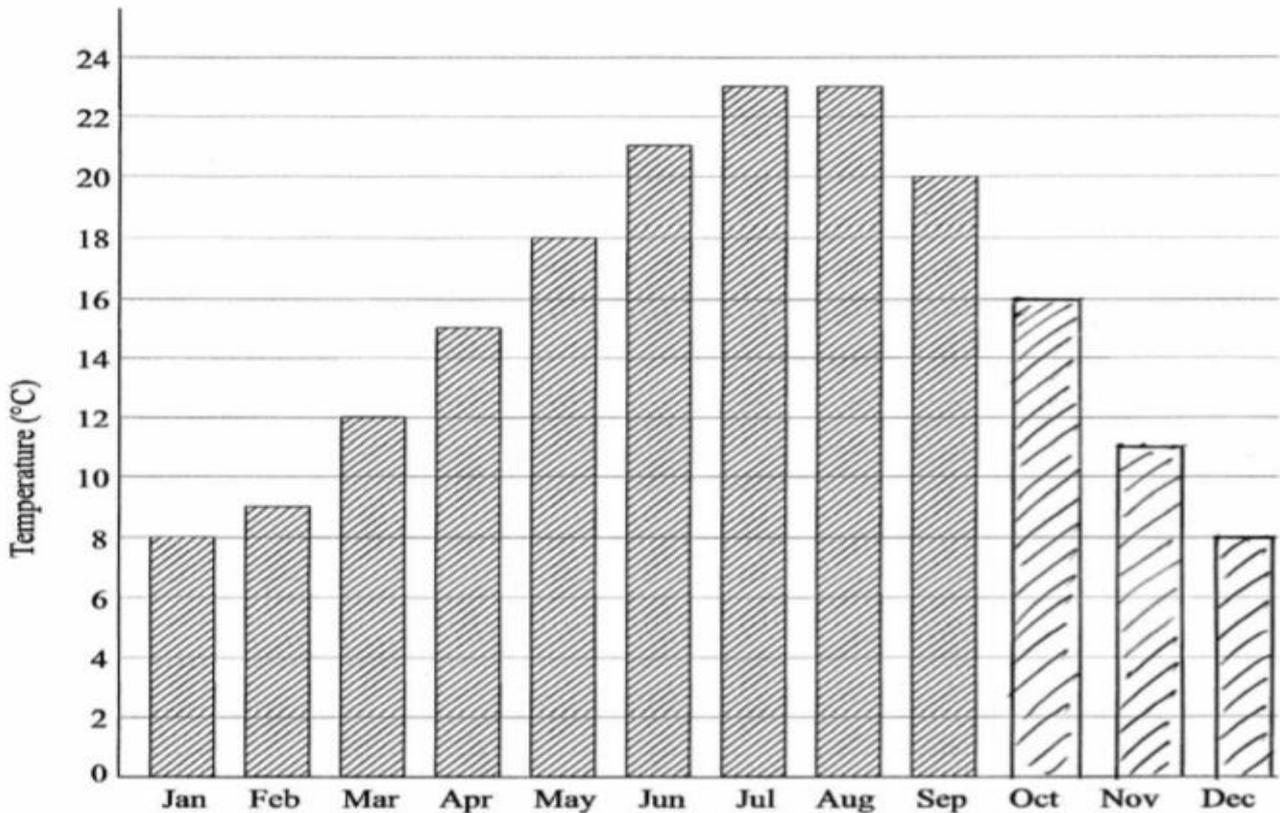
b) Calculate the total number of goals scored?

( 3marks)

# Solutions

## Q1

Here is a bar chart showing the average maximum monthly temperature ( $^{\circ}\text{C}$ ) in Greenwich.



Here are the average monthly temperatures in October, November and December.

October	$16^{\circ}\text{C}$
November	$11^{\circ}\text{C}$
December	$8^{\circ}\text{C}$

(a) Complete the bar chart to show this information.

(2)

(b) In which two months were the highest average temperatures recorded?

.....July..... and .....August.....  
(1)

Q2

a) Workout the highest number of goals scored? 2

(1 mark)

b) Calculate the total number of goals scored?

$$\begin{array}{l} 7 \times 0 = 0 \\ 8 \times 1 = 8 \\ 12 \times 2 = 24 \\ 3 \times 3 = 9 \\ 6 \times 4 = 24 \end{array}$$

$$8 + 24 + 9 + 24 = 65$$

$$\begin{array}{r} 65 \\ \hline (3) \end{array}$$

## Questions; Frequency tables

Q1

The incomplete table show information about the number of ice creams sold by a shop last week.

	Tally	Frequency
Monday	I	6
Tuesday	IIII	
Wednesday		
Thursday	II	
Friday		11

(a) Complete the tally chart.

(2)

## Solutions

Q1

The incomplete table show information about the number of ice creams sold by a shop last week.

	Tally	Frequency
Monday	I	6
Tuesday	IIII	9
Wednesday		10
Thursday	II	7
Friday	I	11

(2)

## Useful Resources

<a href="https://www.missbsresources.com/files/Revision/Key%20Topic/Revision_-_Data_Representation.pdf">https://www.missbsresources.com/files/Revision/Key%20Topic/Revision - Data Representation.pdf</a>	<i>Information about Data representation</i>
<a href="https://mathsmadeeasy.co.uk/qcse-maths-revision/bar-graphs-revision/">https://mathsmadeeasy.co.uk/qcse-maths-revision/bar-graphs-revision/</a>	<i>Worked examples</i>
<a href="https://www.mathsgenie.co.uk/resources/2-bar-charts.pdf">https://www.mathsgenie.co.uk/resources/2-bar-charts.pdf</a>	<i>Very useful website where you can revise different topics using videos and exam style question</i>
<a href="https://www.missbsresources.com/files/Data/Exam%20Questions/Tallys_and_Charts.pdf">https://www.missbsresources.com/files/Data/Exam%20Questions/Tallys and Charts.pdf</a>	<i>Some more questions for you to try</i>

## References:

<https://www.skillsworkshop.org/category/numeracy/data-handling/extract-and-interpret-information/hd1111>

[https://www.mathsteacher.com.au/year8/ch17\\_stat/03\\_freq/freq.htm](https://www.mathsteacher.com.au/year8/ch17_stat/03_freq/freq.htm)

<https://teach.files.bbci.co.uk/skillswise/ma37grap-l1-f-interpreting-info-from-bar-charts.pdf>

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