

## L1-2 Functional Maths – D Day Landings

Name \_\_\_\_\_ Date \_\_\_\_\_

During World War II (1939-1945) the Battle of Normandy, which lasted from June 1944 to August 1944, resulted in the Allied liberation of Western Europe from Nazi Germany's control. Codenamed **Operation Overlord**, the battle began on June 6, 1944, also known as D-Day, when some 156,000 American, British and Canadian forces landed on five beaches along a 50-mile stretch of the heavily fortified coast of France's Normandy region.



On the morning of the 6<sup>th</sup> of June 1944 over 5000 ships and landing craft launched from England to invade France. In addition, there were over 11,000 aircraft supporting the invasion. In total over 156,000 men landed on the Normandy beach on the first day.

There were five beaches used for the invasion and each was given a codename.



**UTAH beach 23 000 troops and OMAHA beach 24 000 troops.**



**GOLD beach 25 000 troops and SWORD beach 29 000 troops.**

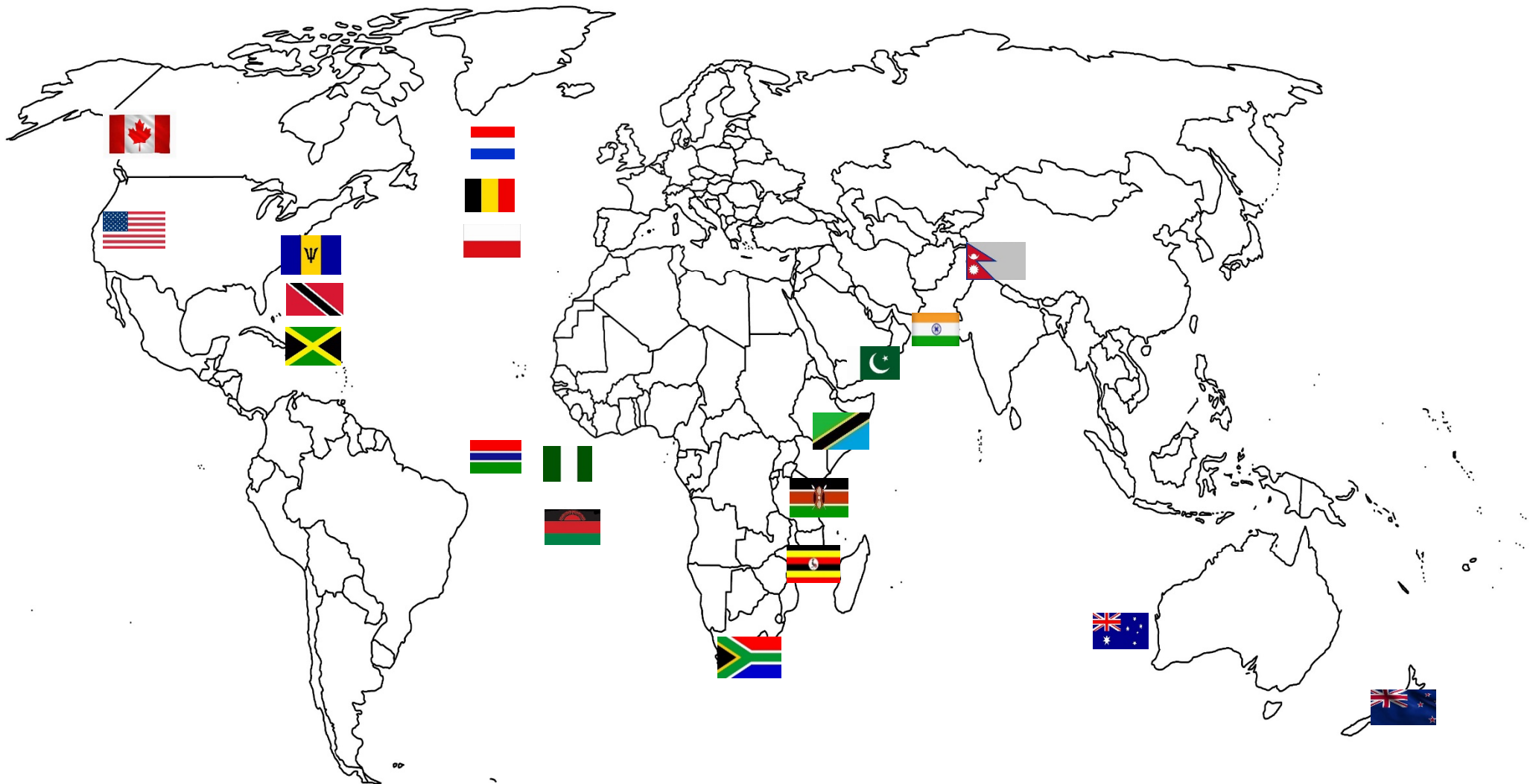


**JUNO beach 21 000 troops.**

In addition to these troops, the Americans used 16 000 paratroopers and the British 8 000 paratroopers.

## L1-2 Functional Maths – D Day Landings

Name \_\_\_\_\_ Date \_\_\_\_\_



Some of the countries involved in the Second World War fighting against the Germans.

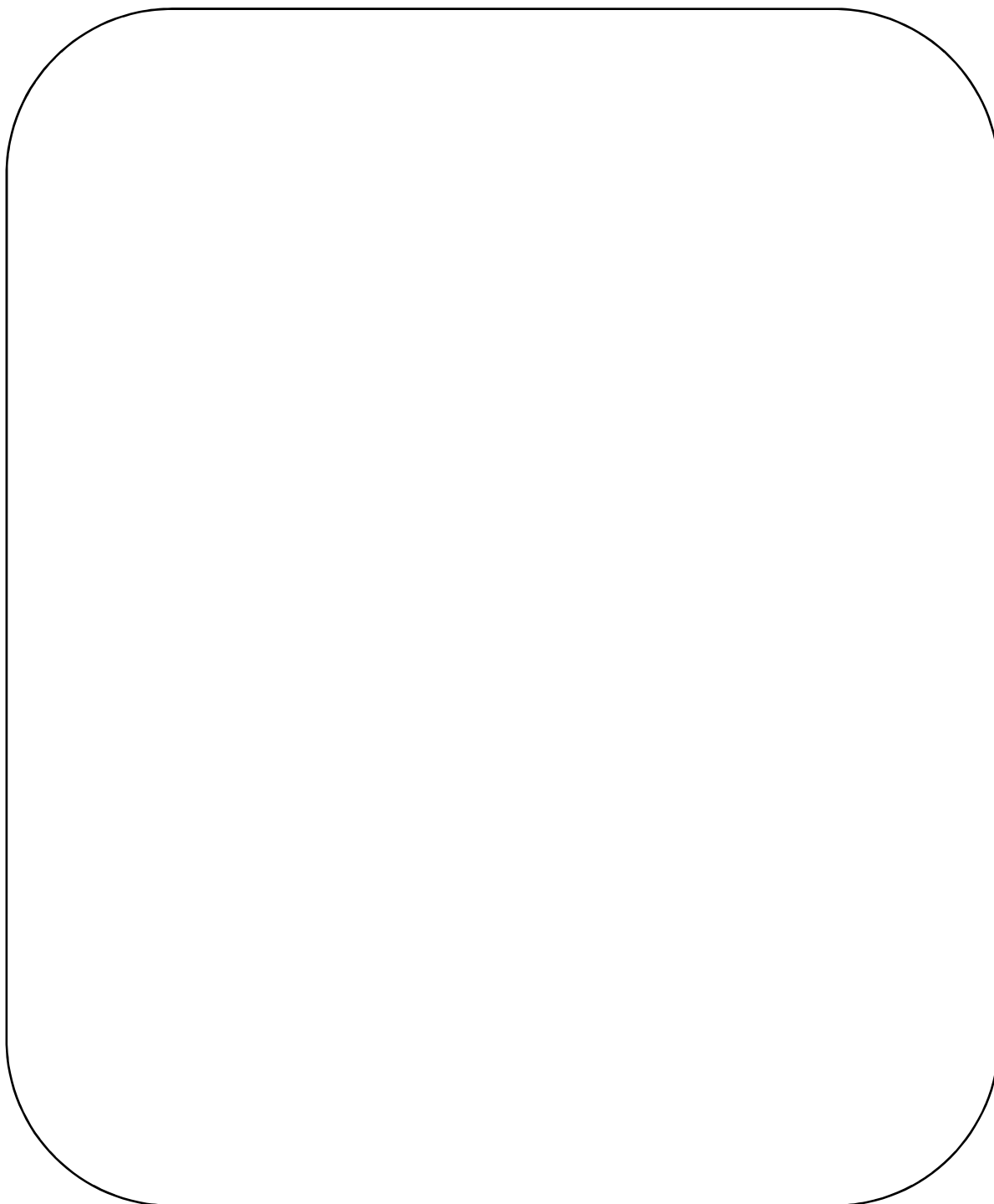
## L1-2 Functional Maths – D Day Landings

Name \_\_\_\_\_ Date \_\_\_\_\_

### Introduction

As you can see from the map of the world, there were many countries involved in the Second World War fighting against the Germans.

Look at the flags on the map of the world. **Identify the flags** and **label** as many countries as possible. You have 5 minutes to do so.

A large, empty rounded rectangle with a thin black border, intended for the student to write their answers or labels.

## D Day Landings – non calculator section

Name \_\_\_\_\_ Date \_\_\_\_\_

 **You must show your working out.**  **Do not use a calculator.**

1. How many British troops were used on the day in total?

**(2 marks)**

2. How many American troops were used on the day in total?

**(2 marks)**

3. Calculate  $7^2$

**(1 mark)**

## D Day Landings – non calculator section

Name \_\_\_\_\_ Date \_\_\_\_\_

 You must show your working out.  Do not use a calculator.

4. Work out  $-19 - 14$

(1 mark)

5. The picture shows troops leaving a small landing craft on the beaches of Normandy. Each landing craft is delivered to the navy in a cuboid wooden crate measuring 5m wide, 20m long and 5m high. What is the volume of the crate?



(2 marks)

6. Round 13.126 to 2 decimal places.

(1 mark)

## D Day Landings – non calculator section

Name \_\_\_\_\_ Date \_\_\_\_\_

 **You must show your working out.**  **Do not use a calculator.**

7. The army have a small, subsidised cinema for the soldiers at their base. The cinema is open 52 weeks a year.



Each ticket is the equivalent of £4.93 in today's money. In an average week ticket sales are 102.

The manager, Staff Sergeant Bernard Bresslaw, wants to **estimate** a whole year's income from ticket sales.

**Estimate** the value of the ticket sales for the year.

**(3 marks)**

## D Day Landings – non calculator section

Name \_\_\_\_\_ Date \_\_\_\_\_

 **You must show your working out.**  **Do not use a calculator.**

8. The table below displays approximate numbers of troops from around the world who fought for the allies against Germany.

a) Round the numbers to the nearest 10,000 and complete the table.

Global area	Number of men	Number of men (rounded to the nearest 10,000)
West Indies	20 000	
Nepal	112 000	
Australia	300 000	
New Zealand	104 000	
Africa	372 000	
Total		

(2 marks)

b) Use your **rounded figures** to calculate the total number of men.

(1 mark)

c) Using your **rounded figures**, write the number for each global area as a fraction of the total. **Simplify** each fraction.

(4 marks)

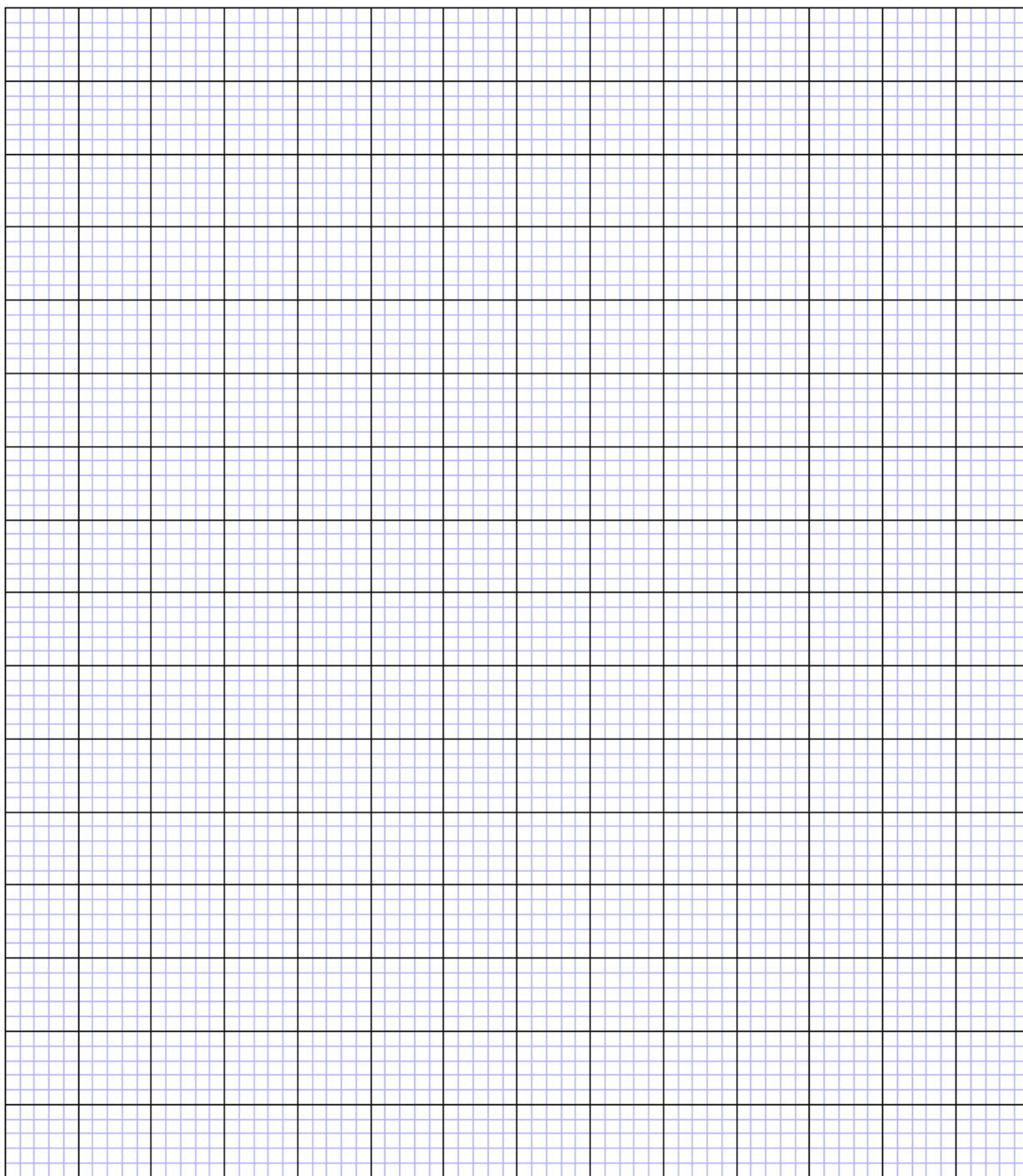


## D Day Landings – non calculator section

Name \_\_\_\_\_ Date \_\_\_\_\_

 **You must show your working out.**  **Do not use a calculator.**

8. d) Look back at your rounded totals and draw a bar chart to display this data.  
Remember to use all the bar chart conventions.

A large grid for drawing a bar chart. The grid is 20 units wide and 15 units high. Each unit is a square. The grid is divided into four quadrants by a vertical line at the 10-unit mark and a horizontal line at the 7.5-unit mark. The quadrants are: top-left (10x7.5), top-right (10x7.5), bottom-left (10x7.5), and bottom-right (10x7.5).

**(5 marks)**



## D Day Landings – calculator section

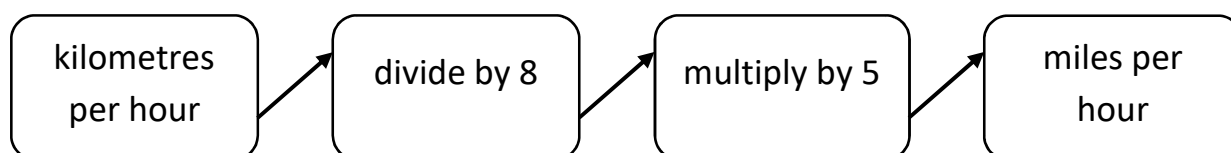
Name \_\_\_\_\_ Date \_\_\_\_\_

 **You must show your working out.**  **You may use a calculator.**

9. The British Cromwell tank had a top speed of 54 km/h (kilometres per hour).



Lieutenant Sidney James from the armoured division uses the following rule to convert kilometres per hour into miles per hour.



Lieutenant James thinks the top speed of the tank is 45mph. Is he correct?

A large, empty rounded rectangle with a black border, intended for the student to show their working out for the conversion problem.

**(3 marks)**

## D Day Landings – calculator section

Name \_\_\_\_\_ Date \_\_\_\_\_

 **You must show your working out.**



**You may use a calculator.**

10. To paint the outside of an amphibious landing craft you need 230 litres of treated paint to protect the craft from the sea salt.

The Ministry of Defence get a discount on the paint from the manufacturer.

Private Charles Hawtrey has 5 amphibious landing craft to paint. He has a budget of £5000 for the paint.

Does Private Hawtrey have enough money?



Treated paint

10 litre tin

Usual price £65

Ministry of Defence discount 35%

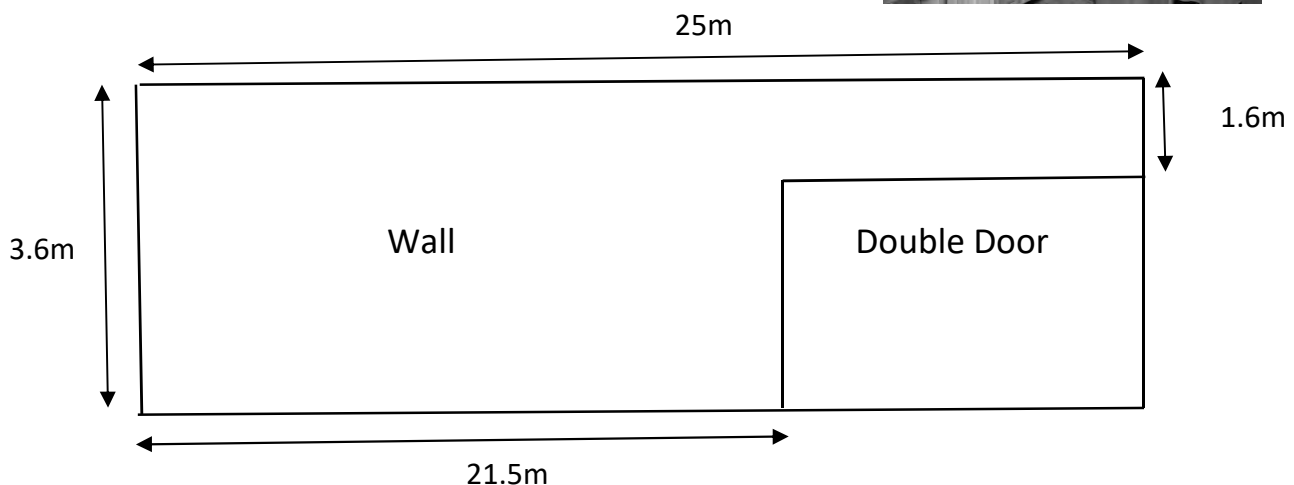
**(5 marks)**

## D Day Landings – calculator section

Name \_\_\_\_\_ Date \_\_\_\_\_

 **You must show your working out.**  **You may use a calculator.**

11. One of the walls in the soldiers' canteen has to be re-painted green. Here is a drawing of the wall.



The green paint is delivered in 2.5 litre tins. Each 1 litre will cover  $9\text{m}^2$  of wall.  
How many tins of paint will be required to paint the wall?

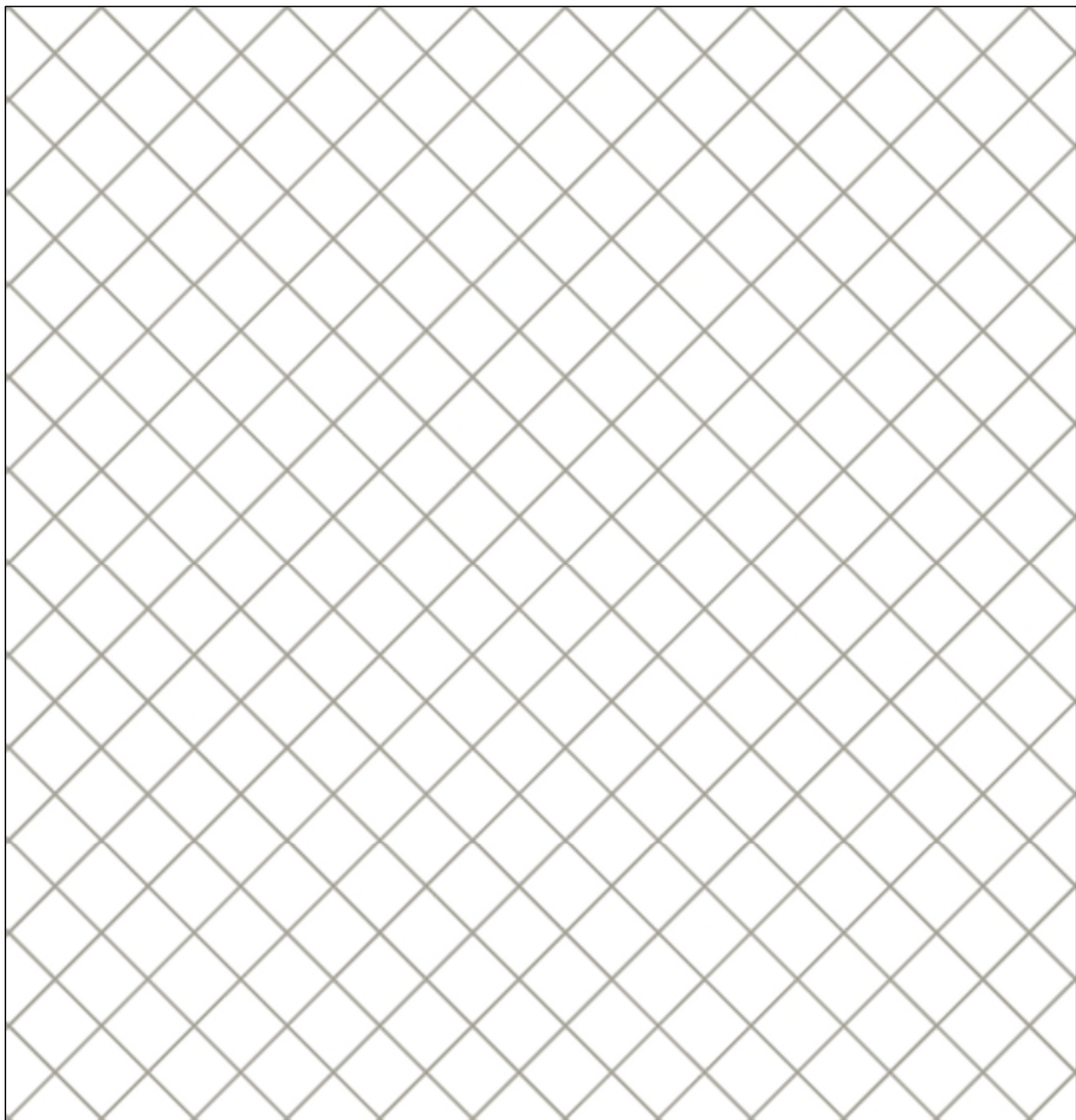


**(5 marks)**

 **You must show your working out.**  **You may use a calculator.**

12. In the army, soldiers' ranks are shown by the badges that they wear. A captain's shoulder badge is three 2cm squares (known as pips). Each square is rotated 45 degrees clockwise and then arranged in a vertical line with a small space between each pip. The resulting design has two lines of symmetry.

Draw the captain's shoulder badge.



Each square on the grid represents  $\frac{1}{2}$  cm x  $\frac{1}{2}$  cm.

**(4 marks)**

## D Day Landings – calculator section

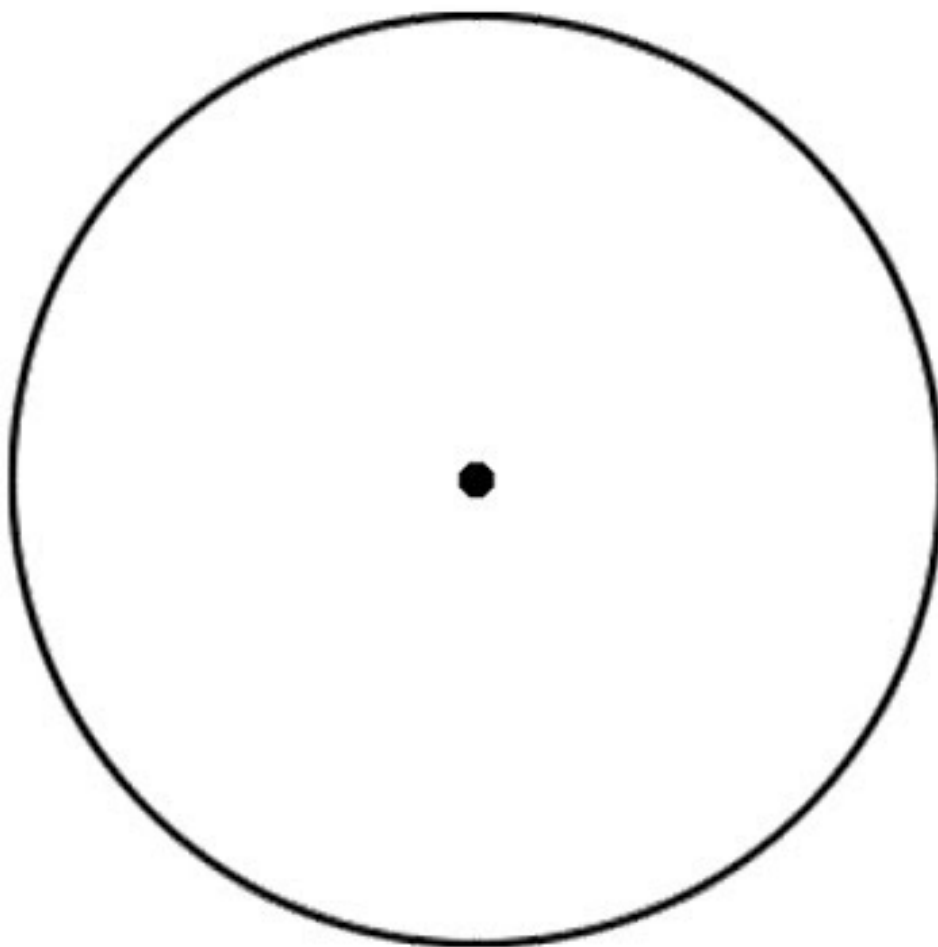
Name \_\_\_\_\_ Date \_\_\_\_\_

 **You must show your working out.**  **You may use a calculator.**

13. The D day landings mainly consisted of British, American and Canadian troops.  
In rounded figures these were:

Nationality of troops	Number of troops	Angle size
Canadian	21 000	63
British	52 000	
American	47 000	

Display this information in a pie chart.



**(4 marks)**



## D Day Landings – calculator section

Name \_\_\_\_\_ Date \_\_\_\_\_

 **You must show your working out.**  **You may use a calculator.**

14. The Allied advance from Normandy to Paris took approximately 2 months of bitter fighting and led to the liberation of France. What is the bearing of Paris **from** the Normandy beaches? These have been marked with crosses on the map.



**(3 marks)**

15. Today you can sail from Poole in Dorset to Cherbourg in France. This table shows data for the crossing. Complete the table.

	Time (minutes)
<b>Mean</b>	270
<b>Range</b>	45
<b>Longest time</b>	307
<b>Shortest time</b>	— — — —

**(2 marks)**

## D Day Landings – calculator section

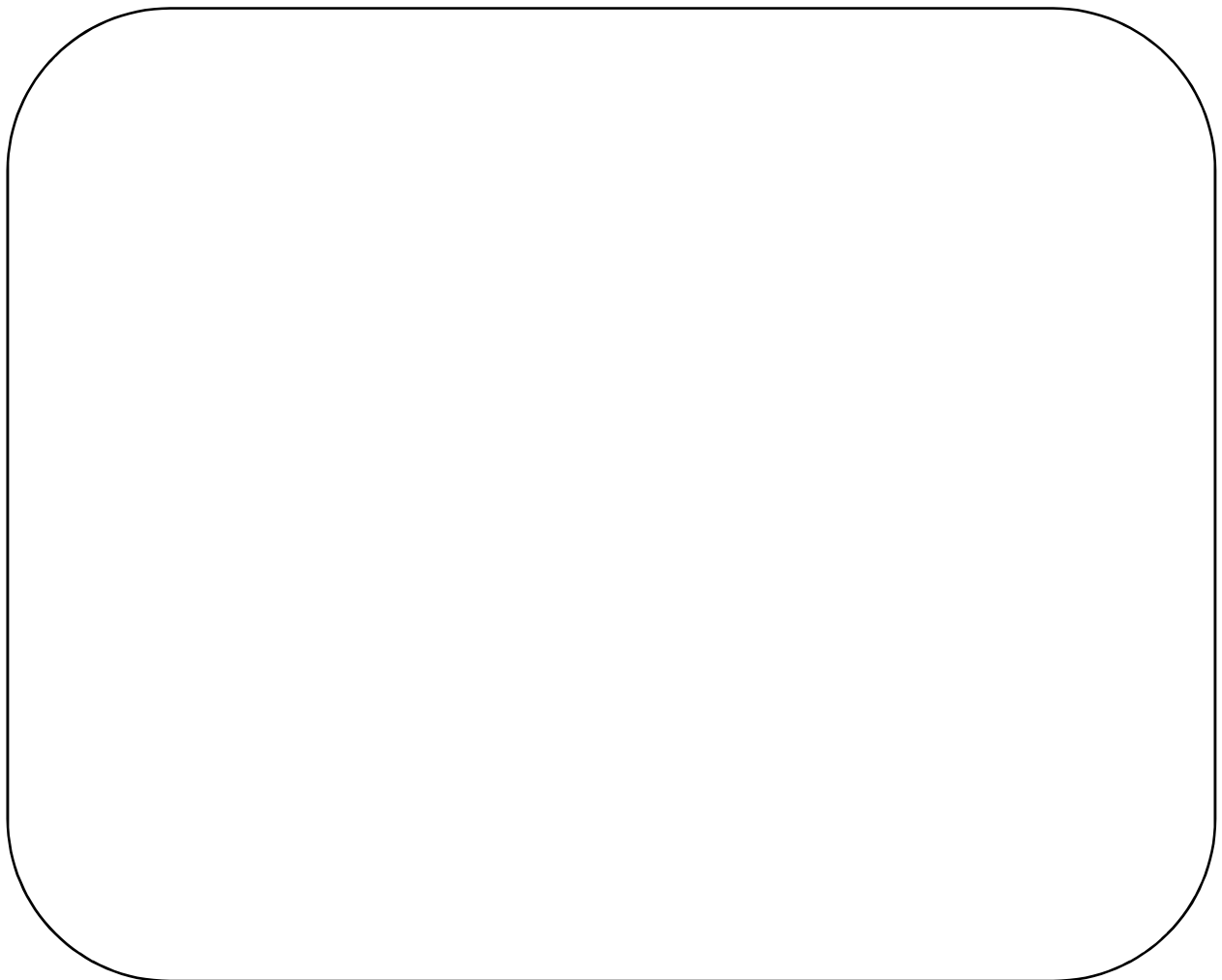
Name \_\_\_\_\_ Date \_\_\_\_\_

 **You must show your working out.**  **You may use a calculator.**

16. A WW2 veteran and his family travel to Normandy for a remembrance event that starts at 4.30pm (French time which is 1 hour ahead of UK time).

- The veteran and his family leave their home at 6.30am (UK time).
- It takes  $1\frac{1}{2}$  hours to drive to the ferry port from their house.
- The ferry leaves Bournemouth 8.30am (UK time).
- Crossing from Bournemouth to Normandy is  $4\frac{1}{2}$  hours.
- It takes  $1\frac{1}{4}$  hours to drive to the hotel.
- They stop for a 45 minute light lunch on the way to the hotel.
- They need 40 minutes to wash, change and have a cup of tea at the hotel.

**Will the veteran get to the reception on time?**



**(5 marks)**



## D Day Landings – calculator section

Name \_\_\_\_\_ Date \_\_\_\_\_

 **You must show your working out.**  **You may use a calculator.**

17. At the remembrance event dinner there are 280 guests and each person is allocated a seat number. 7 seat numbers are selected at random and the person sitting there will win a flight in a Spitfire.



What is the probability that a guest wins a Spitfire flight? (Simplify your answer.)

**(2 marks)**

18. This table shows the price of a tyre in five different garages.

Garage	Revitts	Slow Fitt	Tyred Out	Ray Coff	Cold Wheels
Tyre price	£90.00	£85.00	£110.00	£115.00	£75.00

Calculate the mean price of a tyre.

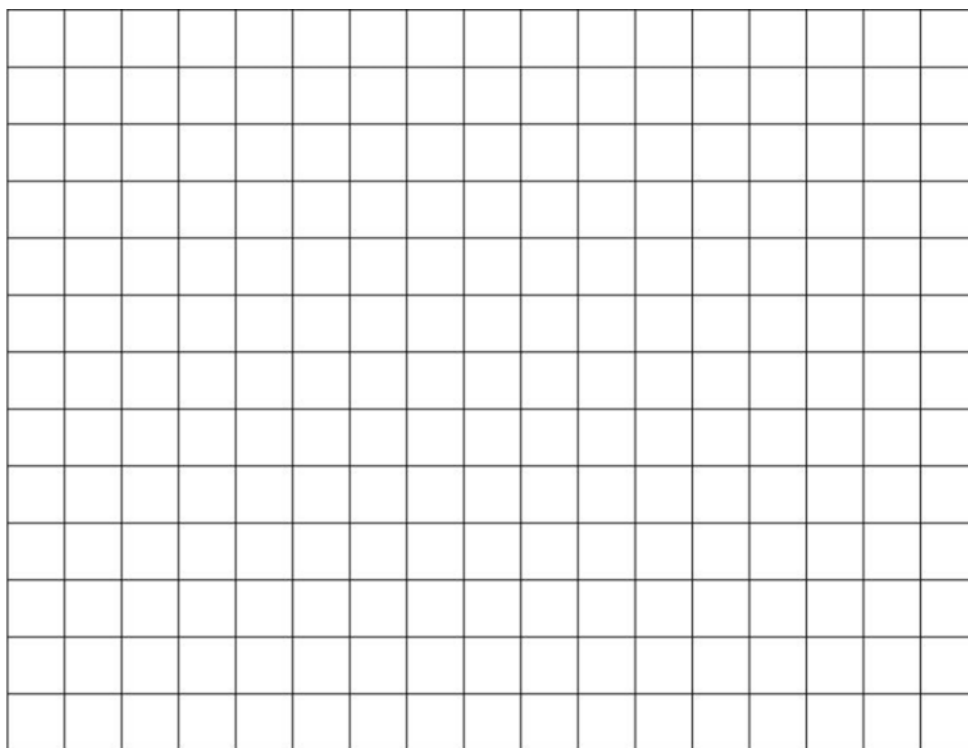
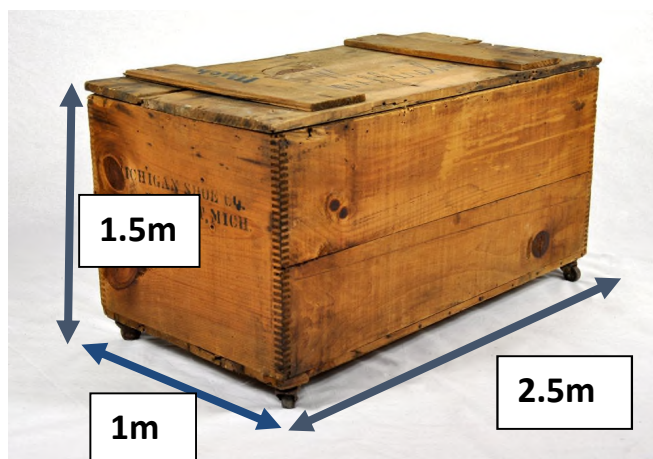
**(2 marks)**

## D Day Landings – calculator section

Name \_\_\_\_\_ Date \_\_\_\_\_

 **You must show your working out.**  **You may use a calculator.**

19. The garage uses this cuboid shipping crate when buying tyres.  
Use the grid below to draw a net of the cuboid.



**Each square represents 0.5m x 0.5m**

**(3 marks)**

## D Day Landings – calculator section

Name \_\_\_\_\_ Date \_\_\_\_\_

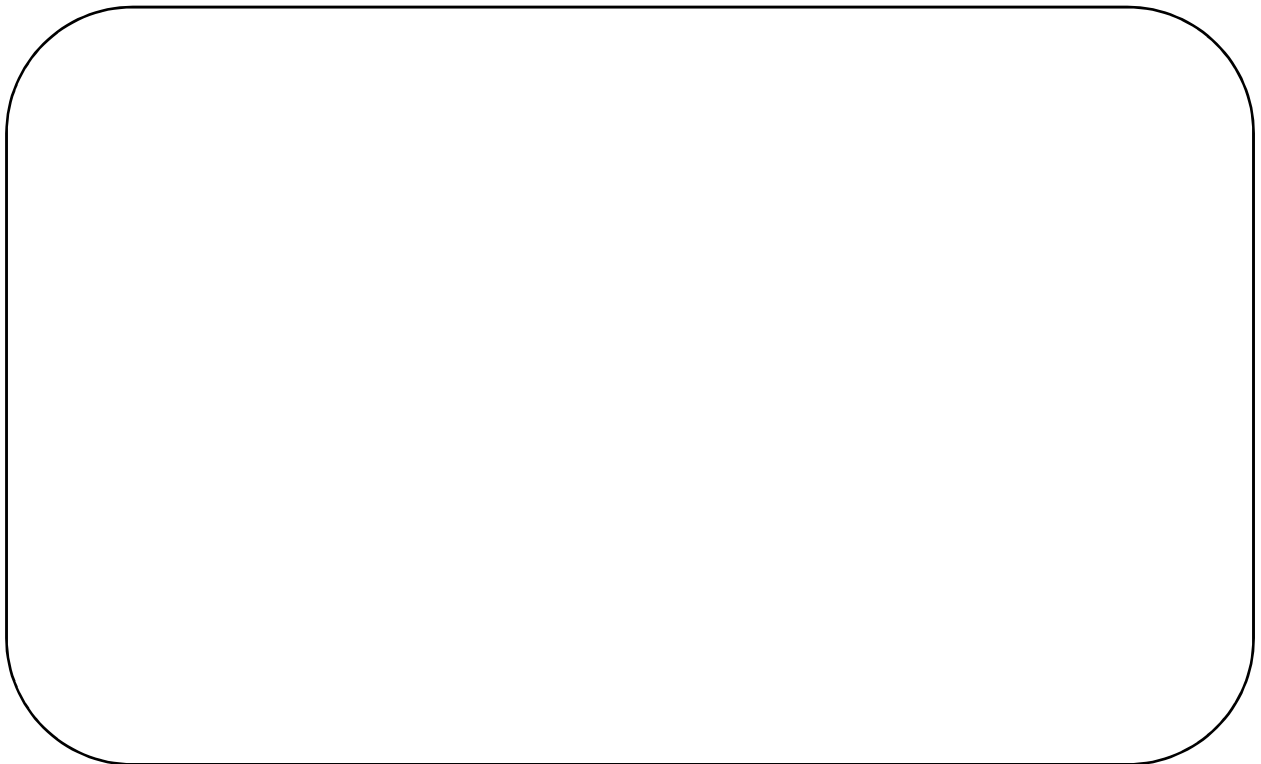
 **You must show your working out.**  **You may use a calculator.**

20. a) A local garage, Revitt and Sons, is offering a deal on car servicing, batteries and new tyres for war veterans. The costs are

- Car service £145.00
- New tyres £90.00 each
- New battery £110.00

All war veterans get a discount of 20% off everything. A war veteran books his car in and would like a service, 4 new tyres and a new battery.

Calculate his costs and his final bill.



**(3 marks)**

b) Check your answer using estimation.



**(1 mark)**

## Subject content – Reformed FUNCTIONAL SKILLS MATHEMATICS 2018

(takes effect from September 2019)

✓ indicates main **content** and **problem-solving skill(s)** covered in this resource, although these will vary with the student group and how the resource is used by the teacher. → or ← = not covered but included to show progression across levels (*content at each level subsumes and builds upon the content at lower levels*). Full content at: DfE (Feb 2018) <https://www.gov.uk/government/publications/functional-skills-subject-content-mathematics>

**1. Fundamental mathematical knowledge and skills** These must be demonstrated in their own right, **both with and without a calculator**, in addition to being used to solve problems or complete tasks.

### Entry Level 3

### Level 1

### Level 2

#### Using numbers and the number system (N)

E3.1 Count, read, write, order and compare numbers up to 1000 →  
E3.2 Add and subtract using three-digit whole numbers →  
E3.3 Divide three-digit whole numbers by single and double digit whole numbers and express remainders  
E3.4 Multiply two-digit whole numbers by single and double digit whole numbers  
E3.5 Approximate by rounding numbers less than 1000 to the nearest 10 or 100 and use this rounded answer to check results →  
E3.6 Recognise and continue linear sequences of numbers up to 100  
E3.7 Read, write and understand thirds, quarters, fifths and tenths including equivalent forms →  
E3.8 Read, write and use decimals up to two decimal places  
E3.9 Recognise and continue sequences that involve decimals

L1.1 Read, write, order and compare large numbers (up to one million) ✓ Q1 Q2 Q8  
L1.2 Recognise and use positive and negative numbers  
L1.3 Multiply and divide whole numbers and decimals by 10, 100, 1000  
L1.4 Use multiplication facts and make connections with division facts  
L1.5 Use simple formulae expressed in words for one or two-step operations ✓ Q9  
L1.6 Calculate the squares of one-digit and two-digit numbers ✓ Q3  
L1.7 Follow the order of precedence of operators  
L1.8 Read, write, order and compare common fractions and mixed numbers →  
L1.9 Find fractions of whole number quantities or measurements  
L1.10 Read, write, order and compare decimals up to three decimal places  
L1.11 Add, subtract, multiply and divide decimals up to 2 decimal places Q20a Q18  
L1.12 Approximate by rounding to a whole number or to one or two decimal places ✓ Q6  
L1.13 Read, write, order and compare percentages in whole numbers  
L1.14 Calculate percentages of quantities, including simple percentage increases / decreases by 5% and multiples thereof ✓ Q20a  
L1.15 Estimate answers to calculations using fractions and decimals ✓ Q7 Q20b  
L1.16 Recognise and calculate equivalences between common fractions, percentages and decimals  
L1.17 Work with simple ratio and direct proportions

L2.1 Read, write, order and compare positive and negative numbers of any size ✓ Q4  
L2.2 Carry out calculations with numbers up to one million including strategies to check answers including estimation and approximation ✓ Q1, Q2, Q4  
L2.3 Evaluate expressions and make substitutions in given formulae in words and symbols  
L2.4 Identify and know the equivalence between fractions, decimals and percentages  
L2.5 Work out percentages of amounts and express one amount as a percentage of another ←  
L2.6 Calculate percentage change (any size increase and decrease), and original value after percentage change ←  
L2.7 Order, add, subtract and compare amounts or quantities using proper and improper fractions and mixed numbers  
L2.8 Express one number as a fraction of another ✓ Q8c  
L2.9 Order, approximate and compare decimals  
L2.10 Add, subtract, multiply and divide decimals up to three decimal places  
L2.11 Understand and calculate using ratios, direct proportion and inverse proportion  
L2.12 Follow the order of precedence of operators, including indices ←

**1. Fundamental mathematical knowledge and skills** These must be demonstrated in their own right, **both with and without a calculator**, in addition to being used to solve problems or complete tasks.

Entry Level 3	Level 1	Level 2
<b>Using common measures, shape and space (MSS)</b>		
<p>E3.10 Calculate with money using decimal notation &amp; express money correctly in writing in pounds and pence →</p> <p>E3.11 Round amounts of money to the nearest £1 or 10p <b>Q7</b></p> <p>E3.12 Read, measure and record time using am and pm →</p> <p>E3.13 Read time from analogue and 24 hour digital clocks in hours and minutes</p> <p>E3.14 Use and compare measures of length, capacity, weight and temperature using metric or imperial units to the nearest labelled or unlabelled division</p> <p>E3.15 Compare metric measures of length including millimetres, centimetres, metres and kilometres</p> <p>E3.16 Compare measures of weight including grams and kilograms</p> <p>E3.17 Compare measures of capacity including millilitres and litres</p> <p>E3.18 Use a suitable instrument to measure mass and length</p> <p>E3.19 Sort 2-D and 3-D shapes using properties including lines of symmetry, length, right angles, angles including in rectangles and triangles →</p> <p>E3.20 Use appropriate positional vocabulary to describe position and direction inc. eight compass points and including full/half/quarter turns →</p>	<p>L1.18 Calculate simple interest in multiples of 5% on amounts of money ✓</p> <p>L1.19 Calculate discounts in multiples of 5% on amounts of money ✓ <b>Q10 Q20</b></p> <p>L1.20 Convert between units of length, weight, capacity, money and time, in the same system ✓ <b>Q16</b></p> <p>L1.21 Recognise and make use of simple scales on maps and drawings</p> <p>L1.22 Calculate area and perimeter of simple shapes including those that are made up of a combination of rectangles ✓ <b>Q11</b></p> <p>L1.23 Calculate the volumes of cubes and cuboids ✓ <b>Q5</b></p> <p>L1.24 Draw 2-D shapes and demonstrate an understanding of line symmetry &amp; knowledge of the relative size of angles ✓ <b>Q12</b></p> <p>L1.25 Interpret plans, elevations and nets of simple 3-D shapes ✓ <b>Q19</b></p> <p>L1.26 Use angles when describing position and direction, and measure angles in degrees ✓ <b>Q13 Q14</b></p>	<p>L2.13 Calculate amounts of money, compound interest, percentage increases, decreases and discounts including tax and simple budgeting</p> <p>L2.14 Convert between metric and imperial units of length, weight and capacity using a a) conversion factor and b) conversion graph</p> <p>L2.15 Calculate using compound measures including speed, density and rates of pay</p> <p>L2.16 Calculate perimeters and areas of 2-D shapes including triangles and circles and composite shapes including non-rectangular shapes (formulae given except for triangles and circles)</p> <p>L2.17 Use formulae to find volumes and surface areas of 3-D shapes including cylinders (formulae to be given for 3-D shapes other than cylinders)</p> <p>L2.18 Calculate actual dimensions from scale drawings and create a scale diagram given actual measurements ✓ <b>Q19</b></p> <p>L2.19 Use coordinates in 2-D, positive &amp; negative, to specify the positions of points</p> <p>L2.20 Understand and use common 2-D representations of 3-D objects</p> <p>L2.21 Draw 3-D shapes to include plans and elevations ✓ <b>Q19</b></p> <p>L2.22 Calculate values of angles and/or coordinates with 2-D and 3-D shapes</p>

**1. Fundamental mathematical knowledge and skills** These must be demonstrated in their own right, **both with and without a calculator**, in addition to being used to solve problems or complete tasks.

Entry Level 3	Level 1	Level 2
<b>Handling information and data (HD)</b>		
<p>E3.21 Extract information from lists, tables, diagrams and charts and create frequency tables ✓</p> <p>E3.22 Interpret information, to make comparisons and record changes, from different formats including bar charts and simple line graphs</p> <p>E3.23 Organise and represent information in appropriate ways including tables, diagrams, simple line graphs and bar charts →</p>	<p>L1.27 Represent discrete data in tables, diagrams and charts including pie charts, bar charts and line graphs ✓ <b>Q8d Q13</b></p> <p>L1.28 Group discrete data and represent grouped data graphically</p> <p>L1.29 Find the mean and range of a set of quantities ✓ <b>Q15 Q18</b></p> <p>L1.30 Understand probability on a scale from 0 (impossible) to 1 (certain) and use probabilities to compare the likelihood of events</p> <p>L1.31 Use equally likely outcomes to find the probabilities of simple events and express them as fractions ✓ <b>Q17</b></p>	<p>L2.23 Calculate the median and mode of a set of quantities</p> <p>L2.24 Estimate the mean of a grouped frequency distribution from discrete data</p> <p>L2.25 Use the mean, median, mode and range to compare two sets of data</p> <p>L2.26 Work out the probability of combined events including the use of diagrams and tables, including two-way tables</p> <p>L2.27 Express probabilities as fractions, decimals and percentages ✓</p> <p>L2.28 Draw and interpret scatter diagrams and recognise positive and negative correlation</p>

## 2. Mathematical problem solving (at all levels of Functional Mathematics)

Although underpinning knowledge is tested in its own right, problem solving is a core element of Functional Skills mathematics yet should not obscure or add additional mathematical complexity beyond the level of the qualification. Defining problem solving is a challenge but the attributes below may help. Not all (often just one) of the listed attributes must be present in a single task for it to be considered to be problem solving. ✓ indicates why all or parts of this resource can be considered to be problem solving.

**Source:** DfE (Feb 2018) <https://www.gov.uk/government/publications/functional-skills-subject-content-mathematics>.

**One or more of the following attributes may be present in a single task for it to be considered problem solving.**

<b>A</b> Tasks that have little or no scaffolding: there is little guidance given to the student beyond a start point and a finish point. Questions do not explicitly state the mathematical process(es) required for the solution. <b>Q1, Q2</b>	✓
<b>B</b> Tasks that provide for multiple representations, such as use of a sketch or a diagram as well as calculations. <b>Q8d, Q12, Q19</b>	✓
<b>C</b> The information is not given in mathematical form or in mathematical language; or there is a need for the results to be interpreted or methods evaluated, for example, in a real-world context. <b>Q7, Q10, Q11, Q12</b>	✓
<b>D</b> Tasks have a variety of techniques that could be used. <b>Q6, Q10, Q13, Q16, Q20</b>	✓
<b>E</b> The solution requires understanding of the processes involved rather than just application of the techniques. <b>Q7, Q14, Q15</b>	✓

KEY: MCA = appropriate mathematical content area(s). NS = Using numbers and the number system. MS = Using common measures, shape and space. HD = Handling information and data.

<sup>1</sup>A **simple mathematical problem** requires **working through one step or process**. At Entry Level it is expected that students will be able to address individual problems each of which draw upon knowledge and/or skills from **one** MCA (NS, MS or HD). **Context** should be familiar to all students and easily described.

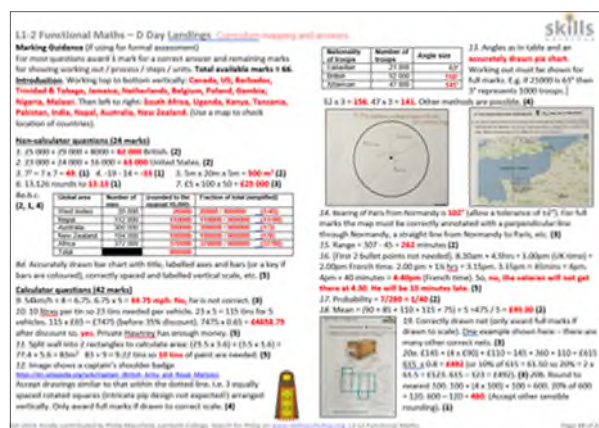
<sup>2</sup>A **straightforward problem** requires students to either work through one step or process **or to work through more than one connected step or process**. Individual problems are based on the knowledge and/or skills in the MCA (i.e. NS, MS or HD). At Level 1 it is expected that the student will be able to address individual problems, some of which **draw upon a combination of any two of the MCA** and require students to make connections between those content areas. **The context** of individual problems at L1 will require some comprehension in order for the student to be able independently to identify and carry out an appropriate mathematical approach.

<sup>3</sup>A **complex problem** requires a **multi-step process, typically requiring planning and working through at least two connected steps or processes**. Individual problems are based on a combination of the knowledge and/or skills from the MCA (NS, MS or HD). At Level 2 it is expected that the student will be able to address individual problems some of which draw upon a combination of **all three MCA** and require students to make connections between those content areas. **The context** of individual problems at L2 will require interpretation and analysis in order for the student to be able independently to identify and carry out an appropriate mathematical process or processes.



## Solving mathematical problems, carrying out tasks and decision making.

Entry 1 students are expected to be able to:	Entry 2 students are expected to be able to:	Entry 3 students are expected to be able to:	Level 1 students are expected to be able to:	Level 2 students are expected to be able to:
Use the content knowledge and skills to recognise a <b><sup>1</sup>simple problem</b> and obtain a solution			Use the content knowledge and skills to recognise and obtain a solution or solutions to a: <b><sup>2</sup>straightforward problem.</b> ✓	
E1a. Use given mathematical information and recognise and use simple mathematical terms appropriate to E1	E2a. E3a. Use given mathematical information including numbers, symbols, simple diagrams and charts		<b><sup>3</sup>complex problem.</b> L1a. L2a. Read, understand and use mathematical information and mathematical terms used at this level ✓	
	E2b. Recognise, understand and use simple mathematical terms appropriate to Entry Level 2	E3b. Recognise, understand and use simple mathematical terms appropriate to Entry Level 3	L1b. L2b. Address individual problems as described above ✓	
			L1c. L2c. Use knowledge and understanding to a required level of accuracy ✓	
E1b. E2c. E3c. Use the methods given above to produce, check and present results that make sense [E3 only: to an appropriate level of accuracy].				L2d. Identify suitable operations and calculations to generate results
E1c. Provide a simple explanation for those results.	E2d. Present appropriate explanations using numbers, measures, simple charts and symbols appropriate to Entry Level 2.	E3d. Present results with appropriate explanation using numbers, measures, simple diagrams, charts and symbols appropriate to Entry Level 3. ✓	L1d. L2e. Analyse and interpret answers in the context of the original problem ✓	
			L1e. L2f. Check the sense, and reasonableness, of answers ✓	
			L1f. Present results with appropriate explanation and interpretation demonstrating simple reasoning to support the process & show consistency with the evidence presented ✓	L2g. Present results and explain results clearly and accurately demonstrating reasoning to support the process and show consistency with the evidence presented



## Page 19 (answer sheet & marking guidance) is only available to resource contributors.

If you are a [skillsworkshop.org](https://www.skillsworkshop.org) contributor please use the site contact link to request your free copy.

If you wish to become a contributor please use the same link to request a free log-in and membership.