Hyndland Secondary School

Maths Support Booklet

Foreword

Dear Young People, Parents, and Carers,

Welcome to our Maths Support Booklet, thoughtfully designed to help our S1 pupils at Hyndland Secondary School strengthen their mathematical skills at home. As a department, our primary aim is to ensure that every young person feels supported and confident in their journey through mathematics. We understand that Maths can sometimes be challenging, and we want you to know that we are here to help every step of the way.

This booklet covers a range of topics that will help reinforce the basics, and we've included an answer section to make it easier for parents and carers to lend a hand when needed. We hope this resource serves as a valuable tool in creating a supportive environment for learning at home.

Please remember that your child is never alone in their studies. They can reach out to any of us via Microsoft Teams if they have questions or need clarification on any topic. Additionally, we encourage young people to speak with their teachers directly if they find themselves struggling with any aspect of Maths. Our doors are always open, and we are committed to providing the guidance and support needed to help every pupil succeed.

We believe that with the right support, every pupil can excel in Maths. Thank you for being an integral part of your child’s learning journey, and together, we can make a real difference.

We hope our new S1 enjoy their time studying Maths here at Hyndland Secondary School and they become the best version of themselves.

The Mathematics Department

Hyndland Secondary School

Contents

Learner's Section

N1 Number: Number and Place Value

N1.1 – Read, write, order and compare numbers up to 10 000 000 6
N1.2 – Use negative numbers in context 7
N1.3 – Solve number problems 9

N2 Number: Calculations

N2.1 – Long multiplication 11
N2.2 – Long division 12
N2.3 – Short division 14
N2.4 – Mental calculations 15
N2.5 – Common factors, multiples and prime numbers 16
N2.6 – BIDMAS 18
N2.7 – Addition and subtraction multi-step problems 19
N2.8 – Four rules problems 20
N2.9 – Use estimation to check answers 21

N3 Number: Fractions, Decimals and Percentages

N3.1 – Simplifying fractions 23
N3.2 – Add and subtract fractions 24
N3.3 – Multiply proper fractions 25
N3.4 – Divide fractions by whole numbers 26
N3.5 – Multiply numbers up to 2 decimal places 27
N3.6 – Written division methods up to 2 decimal places 28
N3.7 – Fraction, decimal and percentage equivalence 29

RP: Ratio and Proportion

RP1 – Relative Sizes 32
RP2 – Percentage Calculations 33
RP3 – Scale Factors 34
RP4 – Unequal Sharing 36

A: Algebra

A1 – Use Simple Formulae 38
A2 – Linear Sequences 40
A3 – Express Missing Number Problems Algebraically 42
A4 – Working with Two Variables 43

GM1 Geometry and Measures: Measurement

GM1.1 – Units of Measure 45
GM1.2 – Converting between Miles and Kilometres 47
GM1.3 – Area and Perimeter of Squares and Rectangles 49
GM1.4 – Area and Volume Formulae 51
GM1.5 – Area of Triangles and Parallelograms..... 53

GM2 Geometry and Measures: Properties of Shape

GM2.1 – 2D Shapes 55
GM2.2 – 3D Shapes 56
GM2.3 – Parts of the Circle 59
GM2.4 – Angles 61

GM3 Geometry and Measures: position and direction

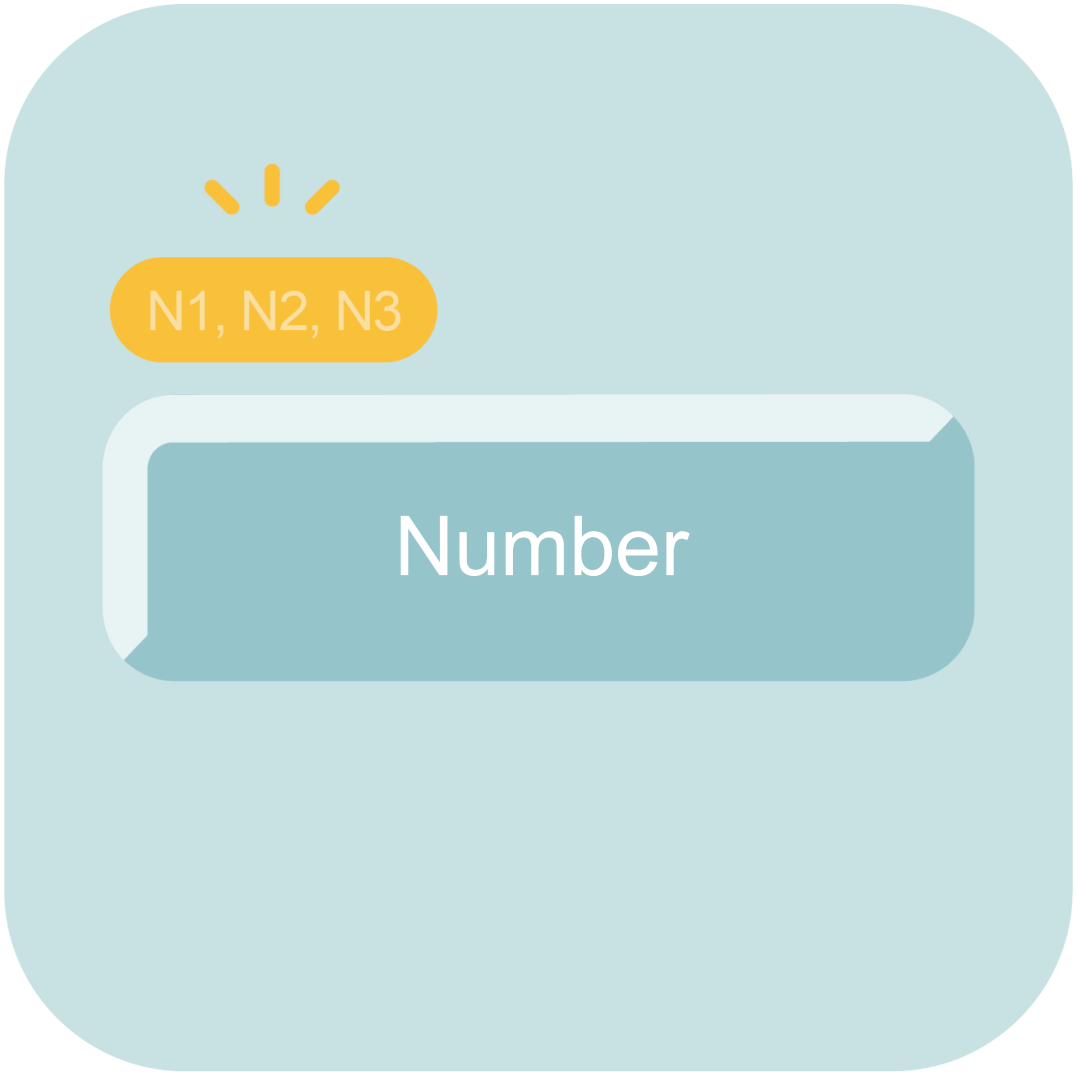
GM3.1 – Translation and Reflection in Four Quadrants 63

S statistics

S1 – Pie Charts and Line Graphs..... 65
S2 – The Mean 68

Parent & Carer Section with Answers

Teaching Notes 70
Tracking Sheet 71
N1 Number: Number and Place Value Answers 73
N2 Number: Calculation Answers 74
N3 Number: Fractions, Decimals and Percentages Answers 78
RP Ratio and Proportion Answers 82
A Algebra Answers 84
GM1 Geometry and Measures: Measurement Answers 86
GM2 Geometry and Measures: Properties of Shape Answers 89
GM3 Geometry and Measures: Position and Direction Answers 90
S Statistics Answers 92


N1, N2, N3
Number

In this task, you will:

- read, write, order and compare large numbers
- determine the value of each digit
- round any whole number to a required degree of accuracy.

Write in words:	
1.	1523
2.	8071
3.	17 080
4.	8 230 050

Write in figures:	
5.	Six thousand, seven hundred and two
6.	Twelve thousand, five hundred and eighty
7.	Half of a million
8.	Ten million, fifty thousand and one hundred

Write down the value of the digit 9:	
9.	1943
10.	90 500
11.	9 154 000
12.	94 × 100

Round the following numbers to the given accuracies:			
13.	8473	a. nearest 100	b. nearest 1000
14.	19 637	a. nearest 1000	b. nearest 10
15.	203 848	a. nearest 10	b. nearest 100

Challenge

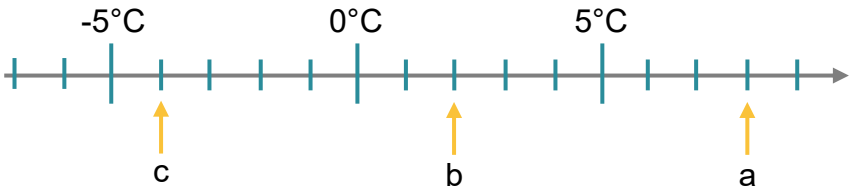
Using the following digit cards write down:

1. The largest possible five-digit number.
2. A three-digit number which has a tens digit that is double its hundreds digit.
3. A 5-digit number that rounds to sixty thousand, to the nearest ten thousand.
4. A 4-digit number that rounds to five thousand, to the nearest thousand.
5. A number that rounds to one hundred thousand.
6. All the numbers that round to ninety.
7. The smallest 3-digit number where its hundreds digit is treble its units digit.

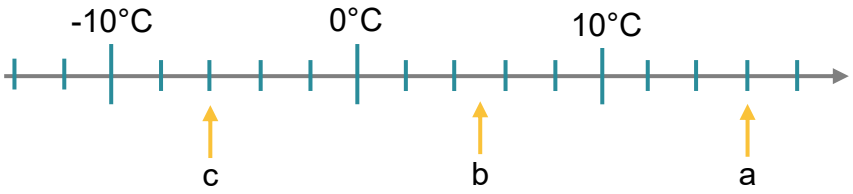
In this task, you will:

- use negative numbers in context.

1. Write down the temperature indicated by the arrows below.

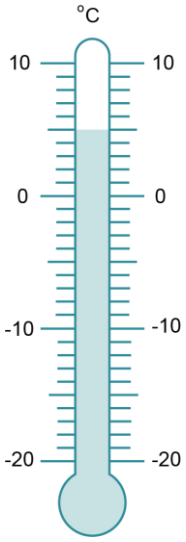


2. Write down the temperature indicated by the arrows below.

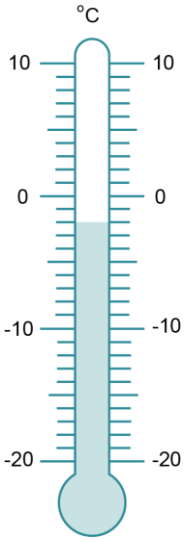


3. Write down the temperatures indicated on the thermometers below.

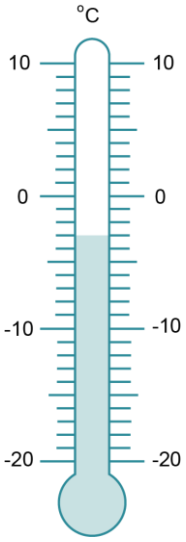
a.



b.



c.



4. Starting from negative three, what is:

a. 4 more b. 2 less a. 20 more b. 20 less

5. The temperature in Madrid overnight is -7°C. During the morning it rose by 15°C. What is the new temperature?

6. What temperature is 15 degrees lower than 8°C?

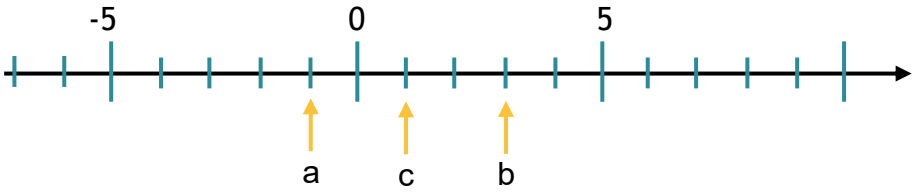
7. The temperature rises by 17 degrees from -9°C. What is the new temperature?

8. The temperature in New York at 8am is -2°C.
   a. By 2pm the temperature has risen by 14°C. What is the temperature at 2pm?
   b. Overnight the temperature drops to -6°C. How many degrees did it fall by?
   c. On another occasion, the lowest temperature was -8°C and the highest was 11°C. What is the difference between these temperatures?

9. Complete the following sequences:
   a. ☐ 1 ☐ 7 ☐
   b. ☐ ☐ 2 6 10
   c. ☐ ☐ 2 8 14

Challenge

1. On the diagram, we can see that **c** is ***halfway*** between points **a** and **b**. It is worth **1.**



Find the number that is **halfway** between the following pairs of numbers:

a. -2 and 6 b. -6 and 2 c. -3 and 9 d. -10 and -4

e. Find the number halfway between -24 and 36 and explain how you found it.

In this task, you will:

- solve problems that involve integers, decimals, rounding and negative numbers.

1. Round the following numbers to the nearest whole number.

   a. 7.632 b. 17.3 c. 405.99

2. Using each of these digits once in each number:

   3 9 6

   a. write down the largest even number and the smallest odd number.
   b. make a 3-digit number that rounds to one thousand.

3. Copy and complete the table. There is more than one possible answer.

Integer	47		961		
Rounded to the nearest 10		50		90	200

4. Using each of these digits once in each number, write:

   3 6 4 9

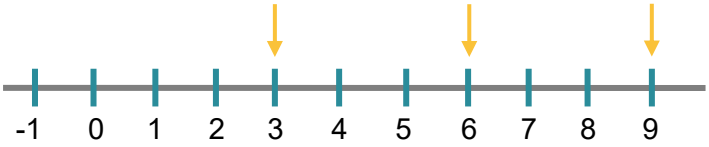
   a. the smallest 2-digit odd number that can be made
   b. the largest 3-digit number that can be made
   c. a 3-digit number that rounds to five hundred
   d. the value of the ones digit in the largest 2-digit number that can be made
   e. the value of the hundreds digit in the answer when the largest 2-digit odd number is multiplied by 10

5. The temperature in Leeds was -5°C at midnight.
   By midday, the temperature had risen by 12°C.

   a. What was the temperature at midday?
   b. By 10 o'clock that evening, the temperature had fallen to -1°C. By how much did the temperature fall?

6. What number is five hundred less than one million?

7. The diagram below shows that 6 is **halfway** between the numbers three and nine. What number is **halfway** between -1 and 5?



8. Alice has £732 in her bank account. Jim has -£127 in his bank account.
   a. Round the amount of money in Alice's account to the nearest £10.
   b. Round the amount of money in Jim's account to the nearest £100.
   c. How much more money does Alice have than Jim?

Challenge

1. What number is halfway between:
   a. -4 and 6? b. -7 and 5?

2. The number **eight** is halfway between **two** and another number. What is the other number?

3. Write down a 4-digit number that obeys the following instructions:
   - It rounds to 3000.
   - The thousands digit is half the units digit.
   - The tens digit is the sum of the thousands and units digits.

In this task, you will:

- multiply numbers using the formal written method of long multiplication.

1. Copy and complete the following long multiplications:

a.

			3	2
	×		2	3
	+			0

b.

			1	4
	×		2	1
	+			0

c.

			3	1
	×		2	4
	+			0

2. Copy and complete the following long multiplications:

a.

	1	3	2
×		3	1

b.

	2	4	3
×		2	1

c.

	5	2	3
×		3	2

3. Find the products of the following multiplications:

a. 483 × 53 b. 821 × 37 c. 2461 × 67 d. 4118 × 28

4. Find the following products:

a. 2743 × 54 b. 4095 × 63 c. 1986 × 85

Challenge

Copy and fill in the missing gaps in the following multiplications:

1.

			6	
	×		4	7
			3	4
+	2	4		0
	2	9		4

1 (carry)

2.

	3		7	4
×			2	
2		5	9	2
+ 6	1	5 (carry)	3 (carry)	0
	1 (carry)			
	6		7	2

1 (carry) 1 (carry)

3. 7 ☐ × ☐ 6 = 3 3 5 8

In this task, you will:

- divide by a two-digit whole number using long division, and interpret remainders as whole number remainders, fractions or rounded decimals.

Top tip: Write a list of multiples of the divisor before you start.

1. Copy and complete the following division calculations:

a. 704 ÷ 16

						×16
						16
1	6	7	0	4		32
	-					48
						64
						80
						96
						112

b. 903 ÷ 43

						×43
						43
4	3	9	0	3		86
	-					129
						172
						215
						258
						301

2. Copy and complete the following division calculations:

a. 3806 ÷ 22

2	2	3	8	0	6
	-				

b. 5148 ÷ 36

3	6	5	1	4	8
	-				

3. Copy and complete the following division calculations and express the remainder as a fraction:

a. 940 ÷ 29

2	9	9	4	0

b. 4560 ÷ 32

3	2	4	5	6	0

4. Complete the following division calculations

a. 8924 ÷ 23 b. 9558 ÷ 54

5. Complete the following division calculations and express the remainder as a fraction.

a. 1976 ÷ 83 b. 2226 ÷ 47

Challenge

1. Marker pens cost 69p each. Shola has £5 to spend on buying as many as she can get.
   a. How many can she buy?
   b. How much change does she receive?

2. One shelf holds 28 books. Alisa has 183 books. How many shelves does she need to hold **all** her books?

3. Write down **one** digit from each list below to complete the following divisions.

   a.

			÷			=		
8	3		÷	3		=		6

1	2	3

   b.

				÷			=		
2		0	1	÷		3	=	3	

5	6	7

In this task, you will:

- divide numbers of up to 4 digits by a two-digit number using short division.
- interpreting remainders according to the context.

Top tip: Write a list of multiples of the divisor before you start.

1. Copy and complete these division calculations:

   a. 621 ÷ 27

2	7	6	2	1

   b. 884 ÷ 34

3	4	8	8	4

   c. 1394 ÷ 41

4	1	1	3	9	4

   d. 1323 ÷ 63

6	3	1	3	2	3

2. Complete the following division calculations and write a whole number remainder:

   a. 403 ÷ 24 b. 1216 ÷ 52

3. Complete the division calculations and express the remainder as a decimal:

   a. 456 ÷ 32 b. 804 ÷ 48

4. Margo stacks 420 bricks into piles containing 15 bricks each. How many piles does she make?
5. Carlos buys 34 pairs of trainers for £986. How much did each pair cost?
6. A group of 58 people spent £1972 on tickets for a music festival. How much does one ticket cost?
7. A courier delivers a class set of 29 books weighing 2407 kg to a local school. How much does each book weigh?
8. The organisers of a school fete sell 3888 cartons of drink on their stall. The drinks come in packs of 36. How many packs did they sell?
9. A charity raises £3852 from doing a sponsored run. Each runner paid £18 to enter. How many runners entered the race?

Challenge

1. Birthday cards cost 79p each. Freddy has £5. He buys as many cards as he can. Work out the amount of change Freddy should get from £5. Give your answer in pence.
2. 600 students in a secondary school are travelling to their annual sports day. They take buses that carry 53 people when full. How many buses are needed? How many spare seats will there be?

In this task, you will:

- perform mental calculations, including with mixed operations and large numbers.

1. Using **BIDMAS**, find the answers to the following calculations:

   a. $10 - 4 \times 2$ b. $10 - (4 + 2)$

   c. $10 \div 5 + 4 \times 2$ d. $(10 + 2) \div 6$

2. Insert the following symbols, > (greater than), < (less than) or = (equal to) to make each statement correct.

a.	$(8 - 2) - 2 \times 3$		$0 \times 1 \times 2 \times 3 \times 4 \times 5$
b.	$100 - 5 \times 10$		$2 \times 5 \times 5$
c.	$4 + 5 \times 6 + 7$		6×7
d.	$(1 + 3)^2$		$1 + 2 + 3 + 4 + 5$

3. Find the answer to the following calculations:

   a. $700\,000 + 60\,000 + 500 + 40 + 3$ b. $1\,000\,000 + 20\,000 + 300 + 4$

4. If $78 \times 34 = 2652$, find the answer to the following calculations:

   a. 780×3400 b. $2\,652\,000 \div 780$

5. How much bigger is 60 435 than 14 503?

6. At a rugby ground, the four weeks in February had these attendances:

Week 1	Week 2	Week 3	Week 4
40 346	15 496	30 946	37 083

   What was the total attendance for the whole of February?

Challenge

1. Using up to four 4s, make calculations with the following answers. An example is done for you.

Question	Working	Answer
Example	$44 \div 4 - 4 = 11 - 4 = 7$	7
a.		5
b.		9
c.		20
d.		80

In this task, you will:

- identify common factors, common multiples and prime numbers.

1. Write down all the factors of:

   a. 10 b. 18 c. 36

2. Write down the first five multiples of:

   a. 8 b. 9 c. 12

   d. Write down any number that is a multiple of both **9** and **12**.

3. Here is a list of numbers

   3 13 16 29 36 48

   Choose any number from this list that is:

   a. a prime number b. a multiple of 9 c. a factor of 52

   d. a common multiple of two other numbers in the list.

4. Copy and write one number in each section of the Carroll diagram.

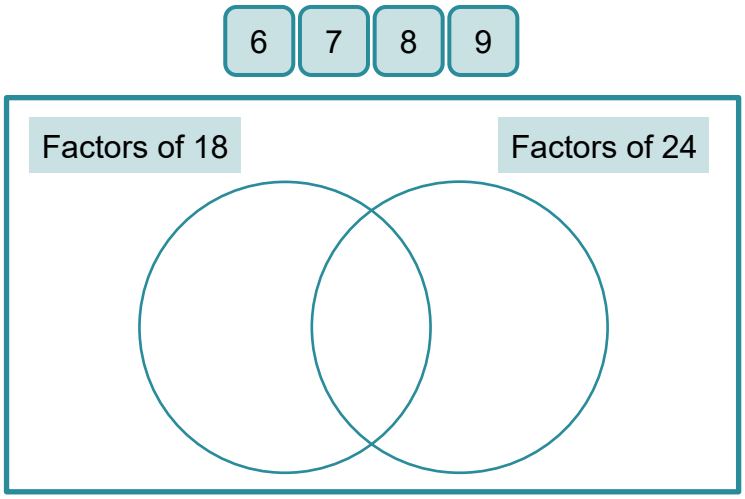
	100 or less	More than 100
Multiple of 30		
Multiple of 20		

5. Write down two factors of 24 that are not factors of 12.

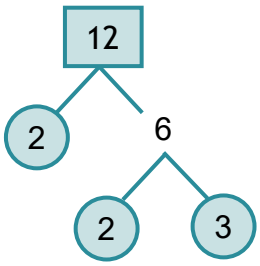
6. Write down all the common multiples of 6 and 9 that are between 50 and 100.

7. 376 is a multiple of 4 but not a multiple of 7.
   406 is a multiple of 7 but not a multiple of 4.
   Find a number that is **between** 376 and 402 that is a multiple of **both 4** and **7**.

8. Copy the Venn diagram and write these numbers in the correct regions.



Challenge



12 can be split into its two factors as 2 × 6.

6 can be split again into its two factors as 2 × 3.

We can't split any further because 2 and 3 are prime numbers.

So we can write 12 = 2 × 2 × 3.

These are called the ***prime factors*** of 12 as they are all prime numbers.

1. Find the **prime factors** of the following numbers.
   a. 18 b. 50 c. 90 d. 126

In this task, you will:

- use your knowledge of the order of operations to carry out calculations involving the four operations.

When calculations have got different operations in them, we have to solve them in the correct order. We use a method called B I D M A S.

B	=	Brackets	Do the calculations in this order
I	=	Order (powers, roots)	
D M	=	Divide and multiply (left-to-right)	
A S	=	Add and subtract (left-to-right)	

Find the answers to the following:

1. $7 - 5 + 4$	2. $5 - 7 + 4$	3. $7 \times 3 - 2$	4. $2 \times 6 + 3$
5. $8 \div 2 + 5$	6. $12 \div 2 - 3$	7. $7 + 3 \times 4$	8. $9 - 3 \times 2$
9. $18 - 5 \times 3$	10. $7 + 15 \div 5$	11. $(8 - 5) \times 4$	12. $(2 + 7) \div 3$

Challenge

1. Insert **brackets** to make the following calculations correct.

Example: $7 \times 3 + 1 = 28$

$7 \times (3 + 1) = 28$

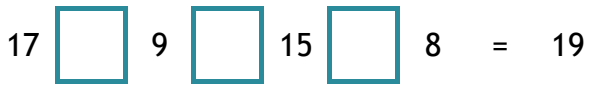
a. $8 \times 4 - 2 = 16$	b. $12 \div 1 + 5 = 2$
c. $3 + 4 \times 5 = 35$	d. $4 + 2 \times 5 - 3 = 12$
e. $9 - 3 \times 2 \times 5 = 15$	

2. Using any of the numbers: 2, 5, 6 and 8, find at least **three** ways to make a sum with the answer 30.

In this task, you will:

- solve addition and subtraction multi-step problems in contexts, deciding which methods to use and why.

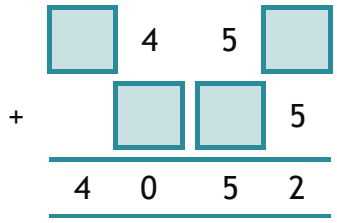
1. A salesman has to travel 348 miles. In the first two hours he travelled 63 miles. In the next three hours he travelled a further 94 miles. How much further does he have to travel?
2. Use the operations + and - to make this calculation correct.



3. A baker has 1043 loaves of bread at the start of the day. In the morning, 593 loaves are sold and a further 396 loaves are sold in the afternoon.
   How many loaves of bread are there left at the end of the day?
4. In a garden centre, a rose plant costs £6.48, lily seeds cost £1.95 and daffodil bulbs cost 65p each. Mavis buys a rose plant and five daffodil bulbs.
   How much change does she get from a £10 note?
5. Circle the three numbers that total 100.

   48 39 26 47 14 19

6. Write the missing digits to make this addition sum correct.



7. Keith bought a writing pad and a pen. He paid **£1.40**. Katy bought a writing pad and 2 pens. She paid **£1.95.**

   Calculate the cost of a writing pad.

8. Use all four digits to complete each of the following calculations:

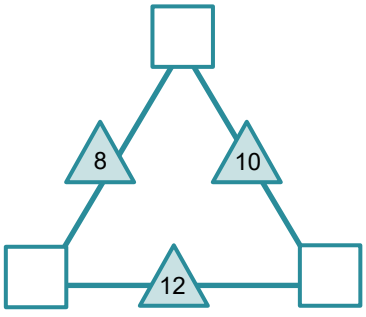
   a. **9**, **2**, **6** and **4**

   b. **3**, **8**, **5** and **4**

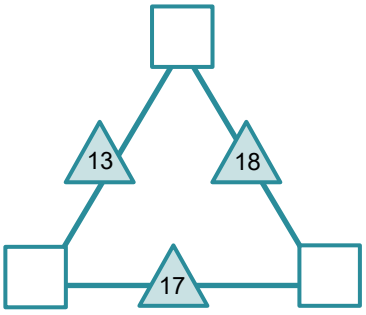
Challenge

The number in each triangle is equal to the sum of the numbers in the squares on either side. Find the missing numbers.

a.



b.



In this task, you will:

- solve problems involving addition, subtraction, multiplication and division.

Answer each question, showing all your working.

1. A waiter and a waitress earned tips during a day while working in a restaurant. The waiter received £28 and the waitress received £37. They agree to share the tips.

   How much will they both get?

2. I bought 3 pears at 49p each and 2 drinks at £1.14 each.
   How much did I spend altogether?

   What change would I get by paying for the items with a £5 note?

3. A farmer had 370 eggs. 18 smashed so he put the rest into boxes of 15. How many boxes did he use?

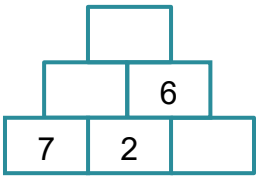
4. Rose bushes cost £12.95 each. There is a special offer whereif you buy three rose bushes, you pay £30. How much money do you save through this offer?

5. Jules has read 197 pages of a 648 page book. How many pages must he read until he reaches the middle of the book?

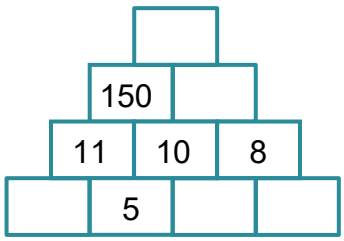
6. In the following grids, each number is the product of the two numbers which lie directly beneath it.

   Copy and complete each grid.

   a.



   b.



7. At a primary school there are 238 students. One cold day in January, 17 students were absent and 13 students decided to go home for lunch. The remainder stayed for school lunch. Of these staying students, three times as many had a hot meal than had a packed lunch.

   How many students had a hot meal for lunch?

8. Erica thinks of a number.
   She doubles this number and then adds thirteen.
   She divides this result by five and is left with the number seven.

   What number did Erica start with?

Challenge

1. Michael has twice as much money as Trisha. When Michael spends £75 and Trisha has spent £20, they both have the same amount left. How much money did Michael have at first?

In this task, you will:

- use estimation to check answers to calculations and determine an appropriate degree of accuracy
- identify the value of each digit and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.

1. 34 boxes contain 18 apples each.
   Circle the best estimate that shows the total number of apples.

   a. 400 b. 500 c. 600 d. 800

2. There are 342 children going to the theatre. The theatre can seat up to 22 children in each row. Circle the best estimate to show how many rows will be filled.

   a. 10 b. 15 c. 20 d. 25

3. Suzie buys 54 chews at 16 pence each. Roughly, how much does she spend?

4. Carol has 42 boxes of toys with a total weight of 197 kg. What is the approximate weight of each box?

5. Copy and complete the following table. The first row has been done for you.

	Question	Rounding	Estimate	Actual
e.g.	19 × 241	20 × 200	4000	4579
a.	15 463 + 8946			
b.	7631 – 2814			
c.	78 × 437			
d.	5632 ÷ 32			

6. Copy and complete the following table:

× 1000	× 100	Number	÷ 10	÷ 100
		42		
		6.75		
	2300			
			6	
				0.45

7. Every week, 2392 new patients are admitted to a hospital. Estimate how many patients visited the hospital during 2018.

8. Using any of the digits **3**, **6**, **7** and **8** at most once in each number, write:
   a. The number that is closest to 500.
   b. the value of the **hundreds** digit in the answer when the largest 3-digit **odd** number is multiplied by 10.
   c. the value of digit **6** in the smallest 4-digit number when it is divided by 1000.

Challenge

Two **integers** are each **rounded** to the **nearest 10**.
The sum of the rounded numbers is 80.

Work out the **maximum** possible sum of the original two numbers.

$\square + \square = 80$

In this task, you will:

- use common factors to simplify fractions
- use common multiples to express fractions with the same denominator
- compare and order fractions, including improper fractions and mixed numbers.

1. Write **four** equivalent fractions to each one given below.

   a. $\frac{2}{5}$ b. $\frac{3}{8}$ c. $\frac{5}{6}$

2. Write an equivalent fraction for each of the following:

   a. $\frac{3}{4}$ b. $\frac{2}{3}$ c. $\frac{5}{6}$ d. $\frac{2}{7}$

3. Which is the larger fraction.

   a. $\frac{2}{3}$ or $\frac{3}{4}$ b. $\frac{5}{6}$ or $\frac{7}{9}$

4. Write these fractions in order of size starting with the smallest.

   $\frac{7}{12}$ $\frac{3}{4}$ $\frac{5}{6}$ $\frac{1}{2}$ $\frac{2}{3}$

5. Write each statement out and fill in the missing values.

   a. $\frac{2}{3} = \frac{\quad}{18} = \frac{10}{\quad}$ b. $\frac{\quad}{8} = \frac{9}{24} = \frac{6}{\quad}$

6. Write out each pair of fractions and insert one of the following symbols: >, < or =.

   a. $\frac{7}{2}$ ☐ $3\frac{1}{2}$ b. $\frac{9}{10}$ ☐ $\frac{4}{5}$ c. $1\frac{1}{3}$ ☐ $1\frac{1}{6}$

7. Use each of the following numbers once to make each pair of fractions equivalent:

18	15	5	20	6	3

   a. $\frac{\quad}{8} = \frac{\quad}{40}$ b. $\frac{\quad}{6} = \frac{\quad}{24}$ c. $\frac{\quad}{7} = \frac{\quad}{21}$

Challenge

Copy and complete the following equivalent fraction equations:

1. a. $\frac{\quad}{12} = \frac{20}{48} = \frac{10}{\quad}$ b. $\frac{10}{\quad} = \frac{\quad}{24} = \frac{5}{4}$

In this task, you will:

- add and subtract fractions with different denominators, and mixed numbers, using the concept of equivalent fractions.

1. Find the common denominator to solve these addition calculations.

   a. $\frac{1}{4} + \frac{3}{8}$ b. $\frac{1}{3} + \frac{4}{9}$

2. Find the common denominator to solve these subtraction calculations.

   a. $\frac{5}{6} - \frac{1}{3}$ b. $\frac{7}{12} - \frac{1}{4}$

3. Complete the following fraction calculations.

   a. $\frac{3}{4} + \frac{1}{6}$ b. $\frac{3}{8} + \frac{5}{12}$ c. $\frac{4}{9} - \frac{1}{6}$ d. $\frac{11}{12} - \frac{5}{8}$

4. Jack and Sarah share a pizza. Jack has $\frac{5}{8}$ and Sarah has $\frac{1}{8}$ of the pizza.
   a. What fraction of the pizza have they eaten altogether?
   b. What fraction is left over?

5. Find the common denominator to solve these subtraction calculations.

   a. $\frac{1}{8} + \frac{5}{12}$ b. $\frac{5}{9} + \frac{1}{6}$ c. $\frac{7}{9} - \frac{5}{12}$ d. $\frac{11}{12} - \frac{7}{8}$

6. Paula, Freda and Judith share a large bar of chocolate.
   Paula has $\frac{5}{12}$ and Freda has $\frac{1}{4}$.
   What fraction of the chocolate is left for Judith?

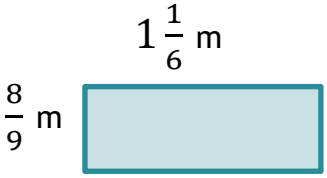
7. Stevie swam $\frac{7}{12}$ of a mile on a Tuesday and $\frac{3}{8}$ of a mile on a Thursday.
   What fraction of a mile further did he swim on the Tuesday than on the Thursday?

Challenge

1. Complete the following mixed number calculations.

   a. $3\frac{4}{9} + 2\frac{5}{12} =$ b. $7\frac{11}{12} - 3\frac{7}{8}$

2. Julie wants to wrap string around this large box.
   She has 5 metres of ribbon. How much string is left over?
   Give your answer as a fraction.



In this task, you will:

- multiply proper fractions, writing the answer in its simplest form.

1. Work out these multiplication calculations.

   a. $\frac{3}{4} \times \frac{1}{2}$ b. $\frac{5}{8} \times \frac{3}{4}$ c. $\frac{1}{5} \times \frac{4}{5}$

2. Complete these multiplication calculations, simplifying your answers.

   a. $\frac{5}{8} \times \frac{2}{3}$ b. $\frac{5}{6} \times \frac{3}{4} =$ c. $\frac{1}{4} \times \frac{8}{9}$

3. Calculate the following:

   a. $\frac{3}{4}$ of £16 b. $\frac{3}{5}$ of £25 c. $\frac{1}{5}$ of £48

4. Match up these calculations to their correct answer.

$\frac{11}{12} \times \frac{4}{5}$	$\frac{1}{4}$
$\frac{7}{8} \times \frac{2}{3}$	$\frac{11}{15}$
$\frac{3}{10} \times \frac{5}{6}$	$\frac{7}{12}$
$\frac{1}{2} \times \frac{3}{4}$	$\frac{3}{8}$

5. Complete these multiplication calculations, simplifying your answers.

   a. $\frac{5}{8} \times \frac{6}{7}$ b. $\frac{5}{9} \times \frac{6}{7}$ c. $\frac{5}{8} \times \frac{4}{15}$

6. $\frac{2}{5}$ of my friends go to the cinema every weekend. Half of them are boys.
   What fraction of my friends are boys?

7. There was $\frac{7}{12}$ of a pie left in the fridge. Jade ate $\frac{3}{4}$ of the leftover pie.
   What fraction of the pie did she eat?

8. Complete these multiplication calculations, simplifying your answers.

   a. $\frac{5}{8}$ of £44 b. $\frac{3}{4}$ of £54 c. $\frac{7}{12}$ of £3

Challenge

1. Complete these multiplication calculations simplifying your answers.

   a. $\frac{5}{8} \times \frac{2}{13}$ b. $\frac{7}{9} \times \frac{3}{4}$ c. $\frac{3}{4} \times \frac{11}{18}$

2. Complete the following mixed number calculations.

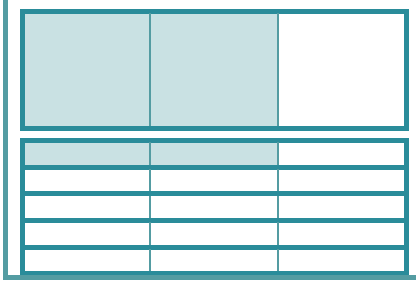
   a. $\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5}$ b. $1\frac{1}{4} - 1\frac{1}{5}$

In this task, you will:

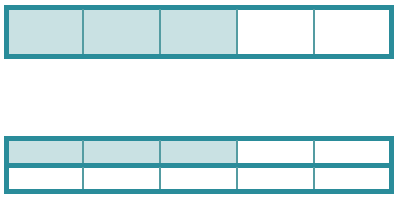
- divide proper fractions by whole numbers
- associate a fraction with division and calculate decimal equivalents

1. Work out the following divisions. You can use the grids to help you.

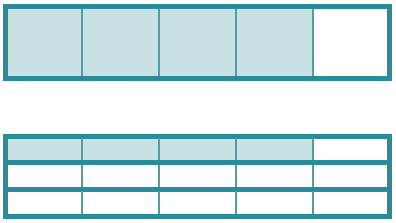
a. $\frac{2}{3} \div 5$



b. $\frac{3}{5} \div 2$



c. $\frac{4}{5} \div 3$



2. Complete these divisions. You can draw grids to help you.

a. $\frac{3}{4} \div 2$ b. $\frac{1}{2} \div 3$ c. $\frac{5}{6} \div 3$

3. Change the following fractions to decimals by dividing numerator by denominator.

a. $\frac{3}{4}$ b. $\frac{4}{5}$ c. $\frac{5}{8}$

4. Match each of the four fractions to its equivalent decimal number.

$\frac{1}{4}$	$\frac{3}{10}$
$\frac{1}{2}$	$\frac{2}{5}$

0.5	0.25
0.4	0.3

5. Write these in order of size, starting with the smallest.

$\frac{2}{5}$ 0.3 $\frac{1}{3}$ 0.28 $\frac{3}{8}$

6. Complete these divisions. Write your answers as fractions in their simplest forms.

a. $\frac{4}{5} \div 2$ b. $\frac{5}{6} \div 10$ c. $\frac{9}{10} \div 6$

7. Write the following as decimals.

a. $\frac{7}{8}$ b. $\frac{1}{6}$ c. $1\frac{1}{4}$

8. Kevin has £5 in his pocket and wants to share it equally between himself and six of his friends. He says that they will get 83 pence each as £5 ÷ 6 = £0.83
Using division, can you show that he is correct?

Challenge

1. Josie has $\frac{3}{4}$ of a metre of string. She wants to cut it into six equal lengths.
How long will each length be? Write your answer in centimetres.

In this task, you will:

- multiply numbers with up to 2 decimal places by one-digit integers.

1. Copy and complete the following multiplications. You can use the grids to help you.

   a. 26.4 × 7

		2	6	.	4
×					7
				.	

   b. 73.1 × 4

		7	3	.	1
×					4
				.	

   c. 7.86 × 5

		7	.	8	6
×					5
			.		

   d. 14.67 × 6

			.		
×					
			.		

2. Complete the following multiplications.

   a. 37.82 × 8

   b. 184.5 × 9

3. Answer the following questions.

   a. Dane buys seven tickets costing £2.85 each. How much did he pay altogether?
   b. Paula travels 9.73 miles every day. How far does she travel over four days?

4. A football shirt costs £32.69. If a five-a-side team need to buy some new shirts, how much will it cost them?

5. Find the missing numbers to make these calculations correct:

   a. $\square \times 4 = 1.2$

   b. $\square \times 9 = 10.8$

6. Complete the following multiplications. You can use grids to help you.

   a. 437.8 × 8

   b. 384.75 × 9

7. Stuart saves £283.57 every year. How much money does Stuart save over four years?

8. Karen bought seven cans of dog food for £1.99 each and four tins of cat food for £1.38 each. What was the total amount she spent?

Challenge

1. Copy each calculation and fill in the gaps:

   a. $0.08 \times \square = 0.48$

   b. $\square \times 5 = 4.3$

In this task, you will:

- use written division methods where the answer has up to 2 decimal places
- answer problems to specified degrees of accuracy.

1. Calculate the following, giving answers rounded up to 2 decimal places if needed:

a. 25 ÷ 4 =

4	2	5	0	0

b. 53 ÷ 4 =

4	5	1	0	0

c. 40 ÷ 3 =

3	4	0	0	0	

2. Calculate the following, giving answers rounded up to 2 decimal places if needed:

a. 43 ÷ 6 =

6	4	3	0	0	0

b. 53 ÷ 8 =

4	5	3	0	0	0

c. 61 ÷ 7 =

7	6	1	0	0	0

3. Calculate the following, giving answers up to 2 decimal places.

a. 79 ÷ 5 b. 79 ÷ 8

4. Julian is training for a race. He needs to reach 100 miles over 7 weeks.
How much does he have to run each week to complete this?
Write your answer to the nearest mile.

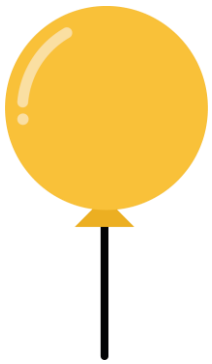
5. Complete the following division calculations.

a. 140 ÷ 8 b. 215 ÷ 9 c. 341 ÷ 7

6. Six friends go out to share a meal at a restaurant. The bill comes to £54.42. They share the cost equally. How much do they each pay?

7. Erica wants to complete a 16-mile training run in three hours.

a. To the nearest mile, how far should she run each hour?
b. Erica decides to round up. Explain why she might have done that.



8. Three shops sell packets of balloons in different sizes as shown.

Billy's	Judy's	Smith's
3 packets for £4	7 packets for £9	9 packets for £11.75

Which shop give the best value?

Challenge

1. A highland bike race consists of 6 laps. The total distance of the race is 39½ miles.
How far is one lap (to the nearest hundredth of a mile)?

2. A Complete the following division calculation in **two** different ways.

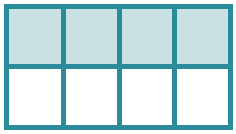
☐ ÷ ☐ = 13.5 ☐ ÷ ☐ = 13.5

In this task, you will:

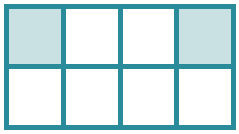
- recall and use equivalences between simple fractions, decimals and percentages in different contexts.

1. Look at the diagrams below. Write down the percentage the shading represents in each diagram.

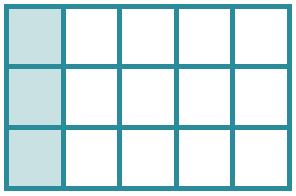
a.



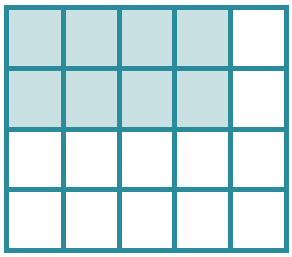
b.



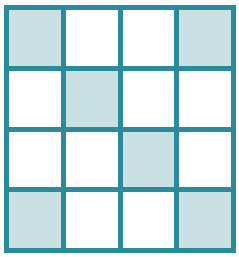
c.



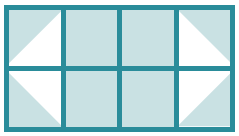
d.



e.



f.



2. Copy and complete the following table:

Diagram	Fraction	Decimal	Percentage
	$\frac{1}{4}$		
			
		0.3	
			45%

3. Arrange these quantities in order of size starting with the smallest.

$\frac{1}{2}$ $\frac{1}{4}$ 0.21 $\frac{2}{3}$ 30%

4. Which is the larger value?

a. $\frac{3}{4}$ or 0.34

b. 0.055 or 7%

c. $\frac{7}{8}$ = or 81%

5. Find the matching pairs. The first one is done for you.

50% of 8	30%
	0.7
$\frac{3}{10}$	$\frac{1}{4}$ of 16
$\frac{1}{5}$ of 15	$\frac{18}{25}$
72%	60%
$\frac{3}{5}$	0.5
$\frac{3}{5}+\frac{1}{10}$	3

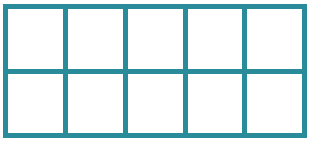
6. Write the following amounts in ascending order, starting with the smallest.

$\frac{3}{5}$ 0.37 36% 0.057 $\frac{4}{7}$ 29.5%

Challenge

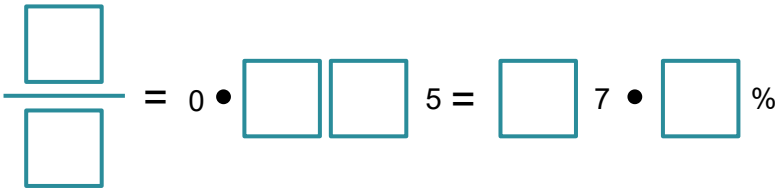
1. Jean has 70 fizzy drinks to sell one weekend. She wants to sell 60% of the bottles by Saturday night.

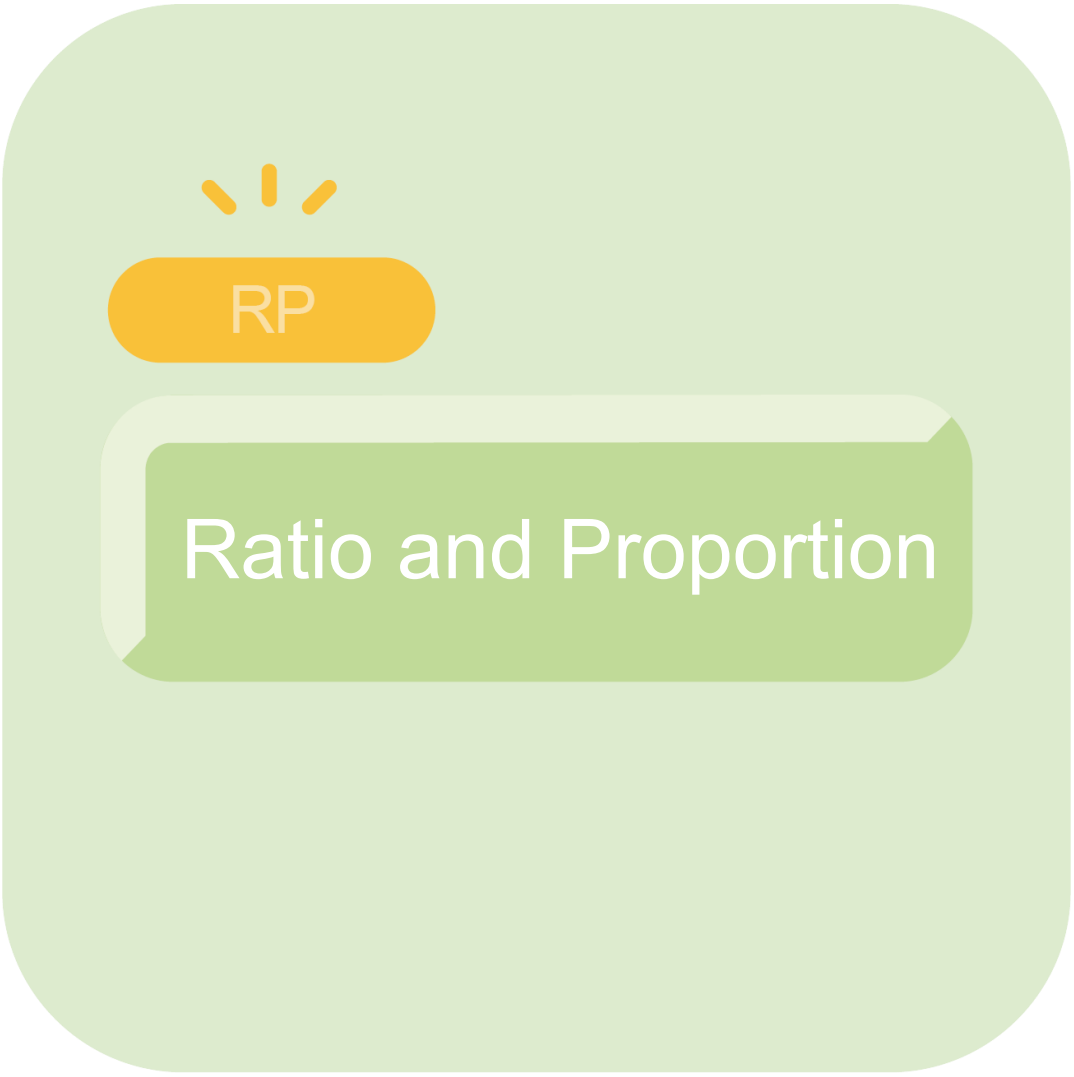
   a. Shade in a copy of this grid to represent this sale of 60%.



   b. Use the grid to help you find how many bottles she has left to sell on Sunday.

2. Using the digits 1 to 9 fill in the gaps.
   Each number can be used more than once or not at all.




RP
Ratio and Proportion

In this task, you will:

- solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.

1. Share the following quantities into the given ratio. You can use bar models to help.

   a. £25 into 2:3 [:] b. 30 into 1:4 [:] c. 40 into 3:5 [:]

2. Share the following quantities into the given ratio. You can use bar models to help.

   a. £56 into 2:5 [:] b. £66 into 6:5 [:]

3. A box of chocolates contains 7 milk chocolates and 4 dark chocolates. Judy buys three boxes. How many milk chocolates will she have altogether?

4. Builder Joe made up a cement mixture by mixing 3 bags of sand for every bag of cement. To build a wall, he needs 12 bags of sand. How many bags of cement will he need?

5. To make 5 cheese scones, it takes 2 cups of cheese for every 3 cups of butter.

   a. How many cups of butter will be needed for 35 scones?

   b. Ashton makes similar scones. He has 27 cups of butter available. How many cups of cheese will he need?

6. A necklace is made by linking yellow and green beads. Suzanne makes a necklace like the one below.

   a. She decides to make 7 for her friends. How many yellow beads will she need?

   b. For Christmas, Suzanne buys 45 yellow beads. How many green beads will she need, and how many necklaces will she be able to make?

7. Two small pizzas cost £11. Find the cost of 9 small pizzas.

8. Six tickets for a children's play pool cost £27. Calculate the cost of four tickets.

Challenge

1. Every 100 g of 'toasty' white bread contains 4.5 grams of fibre. In a large loaf weighing 800 grams, there are 18 slices of bread.
   How much fibre is there in three slices of bread?

In this task, you will:

- solve problems involving the calculation of percentages and the use of percentages for comparison.

1. Write the following fractions as percentages:

   a. $\frac{9}{20}$ b. $\frac{9}{30}$ c. $\frac{9}{60}$

2. There are 13 black and 7 white disks in a bag. What percentage are black disks?

3. Jamie had £40. He spent £12 on a DVD. What percentage of his money did he spend on the DVD?

4. Work out the following calculations:

   a. 20% of £30 b. 15% of £8 c. 35% of £40

5. If 10% of a number is 7, what is the number?

6. If 9 is 20% of a number, what is the number?

7. A jacket costing £60 is reduced by 20% in a sale.
   a. How much was the jacket reduced in the sale?
   b. How much was the final sale price?

8. Orange squash is made with one part cordial and four parts water.
   a. What fraction of the squash is cordial?
   b. What percentage of the squash is water?

9. If 15% of a number is 30, what is 100%?

10. Find the missing values.

    a. 60% of 24 = 20% of ☐ b. 12% of 36 = ☐ % of 6

11. Darren sees a crazy offer in an advert, which offer should he go for?

Offer A	**Offer B**
Eat 60% of 3 pizzas for £1! 	Eat 25% of 7 pizzas for £1! 

Challenge

1. A golf club has 400 members. 65% of the members are male. 25% of the female members are children.
   a. How many male members are in the golf club?
   b. How many female children are in the club?

In this task, you will:

- solve problems involving similar shapes where the scale factor is known or can be found.

1. A pen and a pencil cost 60 pence. If the pen cost twice as much as the pencil, find the cost of the pen.

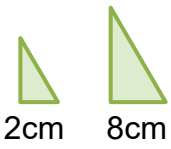
2. If 2 pens cost 80 pence, what do 3 pens cost?

3. Larry made a scale drawing of a flat. The scale of the drawing is 1 cm : 2 m. The kitchen is 3 cm long in the drawing. How long is the actual kitchen?

4. Lola makes a scale drawing of a bungalow. The side of the bungalow is 12 m wide in real life and is 3 cm wide in the drawing. What is the scale of the drawing?

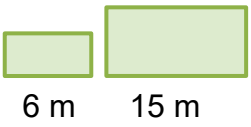
5. Write down the scale factor for each of the following enlargements.

a.



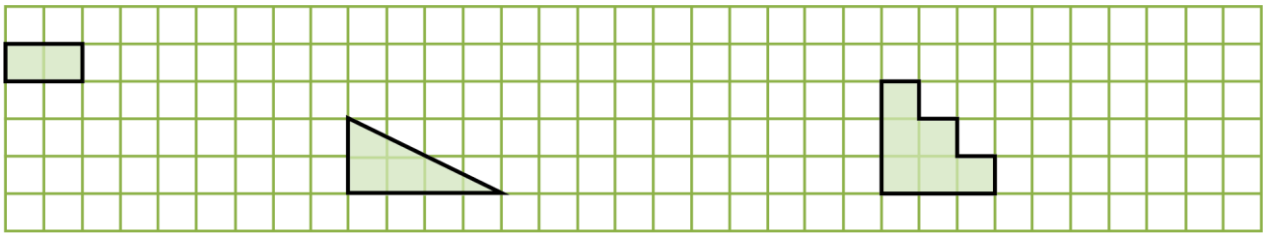
b.

c.



6. Complete these enlargements using the given scale factor.

a. Scale factor = 3 b. Scale factor = 2 c. Scale factor = 2



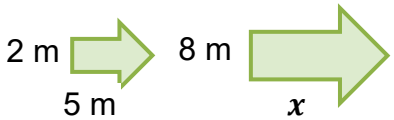
7. The distance from A to B is three times as far as from B to C. The distance from A to C is 80 kilometres. Calculate the distance from A to B.

8. An apple and blackberry pie requires three times as much apple as blackberry. The total weight of apples and blackberries in the pie is 220 grams. How much apple is there in the pie?

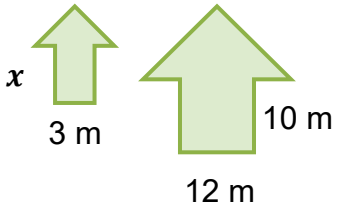
9. A scale drawing is made of a local park. 1 cm on the drawing represents 20 metres on the ground. One path is 7cm long on the drawing. What is the actual length?

10. Find the lengths of the side marked x in these similar shapes.

a.



b.

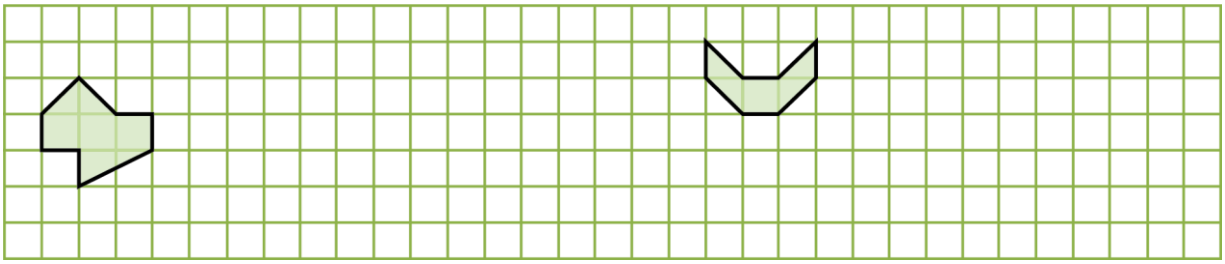


Challenge

1. Complete the following enlargements on squared paper.

   a. Scale factor = 2

   b. Scale factor = 3



In this task, you will:

- solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

1. Erica and Joseph have some marbles. Erica has 8 more marbles than Joseph. If they have 34 marbles together, how many marbles does Erica have?

2. A 16 metre length of string is cut into two pieces. One piece is 6 metres longer than the other, what is the length of the smaller piece of string?

3. There are 33 oranges in a box. Beth and Clive share them out. For every two that Beth gets, Clive gets one. How many oranges do they each get?

4. A bag contains red and blue balls. Three-quarters of the balls are blue and there are five red balls. How many balls are there altogether?

5. Here is a recipe to make 10 pancakes.

120 g flour
150 ml milk
2 eggs

   a. Julie has 60 grams of flour. How many pancakes can she make?
   b. Ben has 100 ml of milk. How much flour will he need?

6. Alex and Keith are playing Top Trumps. There are 32 cards in a pack. At the end of a game, Alex wins with 6 more cards than Keith. How many cards did Alex end up with?

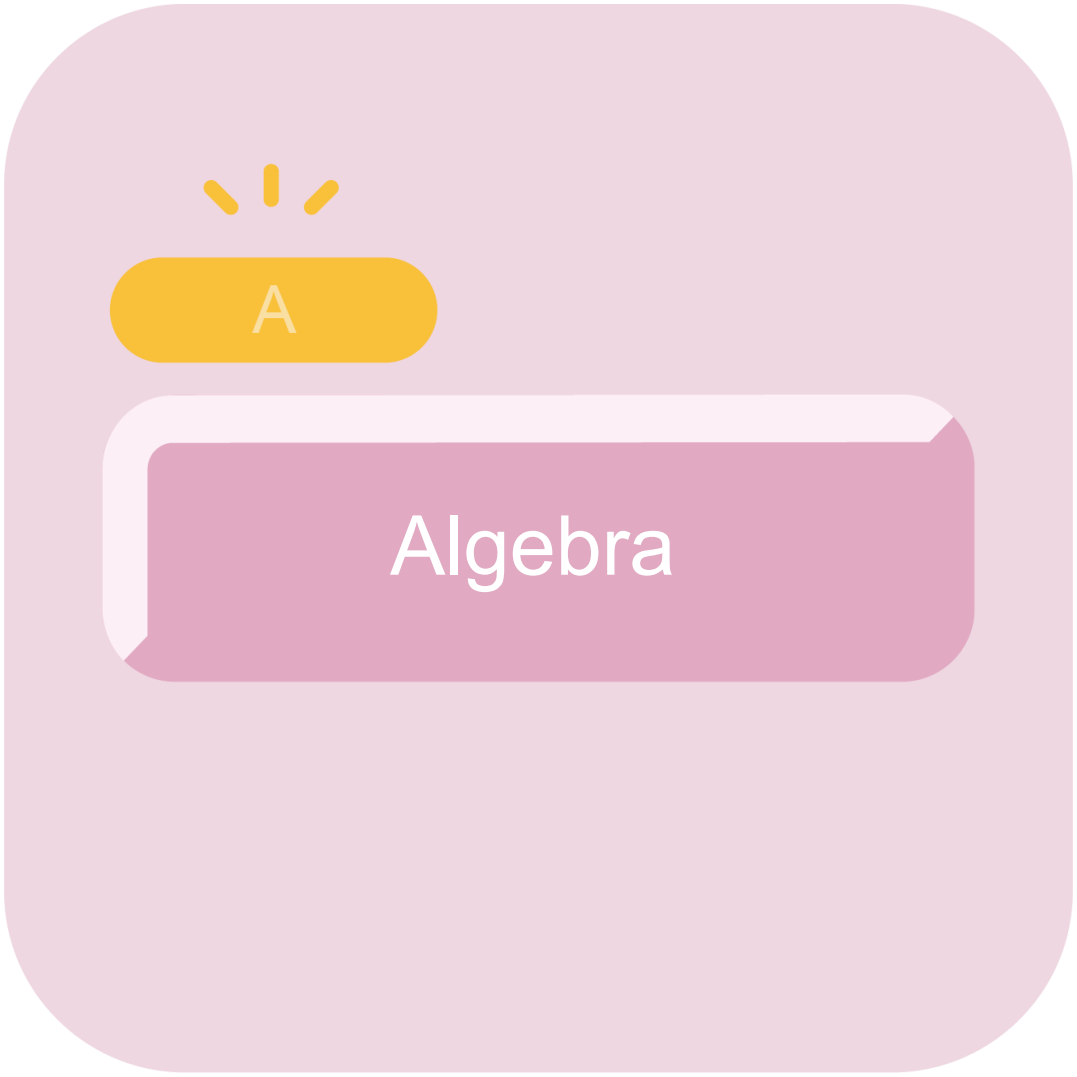
7. Thomas has a bag of sweets. He gives 5 sweets to his friend and eats one third of the remainder himself. If he has 16 sweets left, how many sweets were there in the bag at the start?

8. A teaching assistant is checking the quality of coloured pencils. She finds that $\frac{4}{5}$ of the pencils are good but throws away the other 42 pencils. How many pencils did she check?

9. Hens can lay eggs in three sizes: small, medium and large. $\frac{2}{3}$ of the eggs laid are medium and the remaining eggs are equally small or large. If 8 of the eggs laid during one week are small, how many eggs were laid altogether?

Challenge

1. A DIY shop stocks three popular colours of paint: blue, red and white. The owner likes to keep between 175 and 185 tins of paint. $\frac{2}{9}$ of the paint is blue. For every two tins of blue there are three tins of red. How many tins of each colour will he have in stock?


A
Algebra

In this task, you will:

- write and use simple formulae.

1. If ***p*** has the value of 7, find the value of the following expressions:

   a. $3p$ b. $11 - p$ c. $2p + 5$ d. $20 - 2p$

2. The formula for working out the perimeter of a parallelogram is $p = 2l + 2h$. Work out the perimeter when:

   a. $l = 5$ and $h = 4$ b. $l = 9$ and $h = 3$ c. $l = 1.5$ and $h = 2.5$

3. The cost of producing a box of rulers is worked out as follows:

   Cost = 11 pence × number of rulers + 15 pence for the box.

   Use this formula to work out the cost for a box of 8 rulers.

4. Crisps cost 25 pence a bag. Write down the formula for the total cost, **C**, of buying any number of bags. Use your formula to calculate the cost of six bags.

5. A plumber charges £30 an hour plus a £40 call-out fee.

   a. Write a formula for the total cost of calling a plumber out. Use **T** to stand for the total cost in pounds and **H** for each hour worked.

   b. Work out the charge for 4 hours' work.

6. If ***a*** has the value of 3 and ***b*** has the value of 4, find the following:

   a. $3a + 2b$ b. $3a - 2b$ c. $5a - 3b$ d. ab

7. The formula to work out the charges, in pence, a taxi driver makes is T = 80 + 50M. M is the number of miles driven.

   What would the taxi driver charge if a passenger travelled 7 miles?

8. A chicken requires 45 minutes cooking time per kg, plus an extra 30 minutes.

   a. Write a formula for the cooking time.

   b. How long would a large 4 kg chicken take to cook? Give your answer in hours and minutes?

   c. A medium chicken took 2 hours (120 minutes) to cook. What was the weight of the chicken in kilograms?

Challenge

1. Two pizza shops advertise the following payments for deliveries.

Peppa's	**Salty's**
£2 for each pizza delivered	Charge = 5 + 0.5N (N is number of pizzas)

   a. Mrs Jacques wants to order three pizzas. Which shop should she choose?

   b. Mr Jones paid £9 for the delivery of several pizzas for his son's party from Salty's shop. How much would it have cost if he had bought the same number of pizzas from Peppa's?

In this task, you will:

- generate and describe linear sequences.

1. Copy the following sequences and fill in the missing numbers.

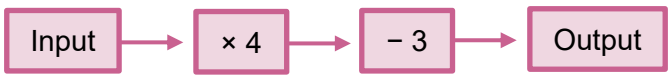
   a. 1, 4, ☐, 10, ☐, ☐, …

   b. 4, 10, ☐, ☐, 28, ☐, …

   c. 2, ☐, 14, 20, ☐, ☐, …

   d. 30, ☐, 22, ☐ ☐, , …

2. The rule for a sequence is given by:



   Write down the first four terms.

3. Copy and write in the missing numbers to complete the following sequences.

   a.

In	Function	Out
2	× 5 − 2	
5		
		18
		33

   b.

In	Function	Out
4	÷ 2 + 3	
8		
		8
		18

4. Work out the rule for this sequence and find the 20th term.

Position of number	1	2	3	4	20
Number sequence	7	10	13	16	

5. Copy and write in the missing numbers to complete the inputs and outputs.

Rule		**× 7**	**then**	**- 5**	
In	4	6		9	
Out			9		51

6. Write in the missing numbers to complete the following linear sequences.

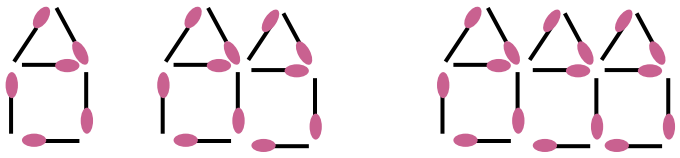
   a. 7, ☐, ☐, 25,…

   b. 10, ☐, ☐, 46…

   3, ☐, ☐, ☐, 27…

7. Look at this matchstick sequence.

   a. Draw the next pattern in the sequence.

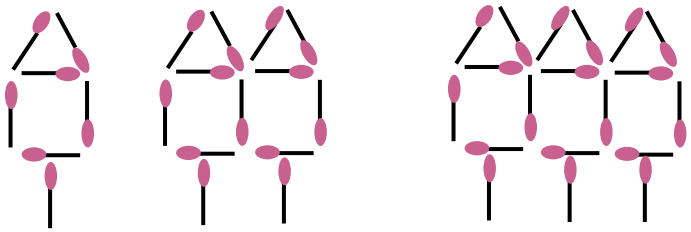


   b. Copy and complete the table to show the number of matchsticks in each pattern:

Number of houses	1	2	3	4
Number of matchsticks	6			
Formula				

Challenge

1. Look at this matchstick sequence.
   a. Write down the formula for the sequence.Use M for matchsticks and N for the term number.



   b. Louise has 50 matchsticks. Will she be able to use all of these to make a pattern of complete houses in the above pattern or will she have any spare? Explain your reasoning.

In this task, you will:

- express missing number problems algebraically.

1. Find the missing numbers:

   a. $\square - 11 = 23$ b. $25 - \square = 13$ c. $3 \times \square + 5 = 14$

2. Find the value of the letters in the following equations:

   a. $p + 17 = 30$ b. $5q - 7 = 13$ c. $2r + 3 = 35$

3. A taxi driver charges a £3 pick-up fee and then £2 per mile. Circle the formula that he uses to calculate the cost of a journey.

   $3m + 2$ $2m - 3$ $3m - 2$ $2m + 3$

4. The letter ***f*** is 7 less than the letter ***g***.
   Write two equations that show the relationship between ***f*** and ***g***.

5. By solving this multiplication table, find the values of ***a***, ***b***, ***c*** and ***d***.

×	***a***	***b***
4	28	36
c	***d***	27

6. Robert thinks of a number. He multiplies it by 7 and subtracts 5. He ends up with 23. What number did he start with?

7. Five cauliflowers cost £2. If three cauliflowers and one broccoli cost £1.50, find the cost of two broccoli.

8. a. If **t** = 15, find the value of 3**t** − 20.

   b. Find the value of **d** when 20 − 3**d** = 8

9. Solve these equations by finding the value of ***x***:

   a. $2x + 5 = 23$ b. $7x - 12 = 30$

10. Eric thinks of a number. He doubles it, adds 7 and multiplies that result by 5. He ends up with 75. What number did Eric first think of?

11. Joe and Ted think of the same number. Joe adds 15 to the number. Ted multiplies the number by 4. They both get the same answer. What was the original number?

Challenge

1. Here are two equations:

   $z = 3y + 5$ $x = 30 - z$

   If the value of ***y*** is 6, find the value of ***x***.

In this task, you will:

- find pairs of numbers that satisfy an equation with two unknowns.
- enumerate combinations of two variables.

1. Two positive integers add to give 12. Write down all the possible pairs of integers.

2. Find all the possible integer solutions to the following equations:

   a. $x + y = 10$ b. $x - y = 5$ (both integers positive and less than 10)

3. Copy and fill in the gaps for each of these equations:

   a. $x + y = 12$ b. $4x + y = 20$

   i. $x = 5$, $y =$ ☐ ii. $x = 3$, $y =$ ☐

   iii. $x =$ ☐, $y = 9$ iv. $x =$ ☐, $y = 12$

4. In the equation, $4p = q$, both p and q are integers less than 30.
   Write down all the possible solutions for the equation. This table may help.

q	1	2					
p	4				20		

5. If $3g - 2h = 7$, find the value of:

   a. g when $h = 4$ b. h when $g = 7$

6. Write down 2 possible integer solutions to the following:

   a. $4x + 3y = 30$ b. $4x - 3y = 12$

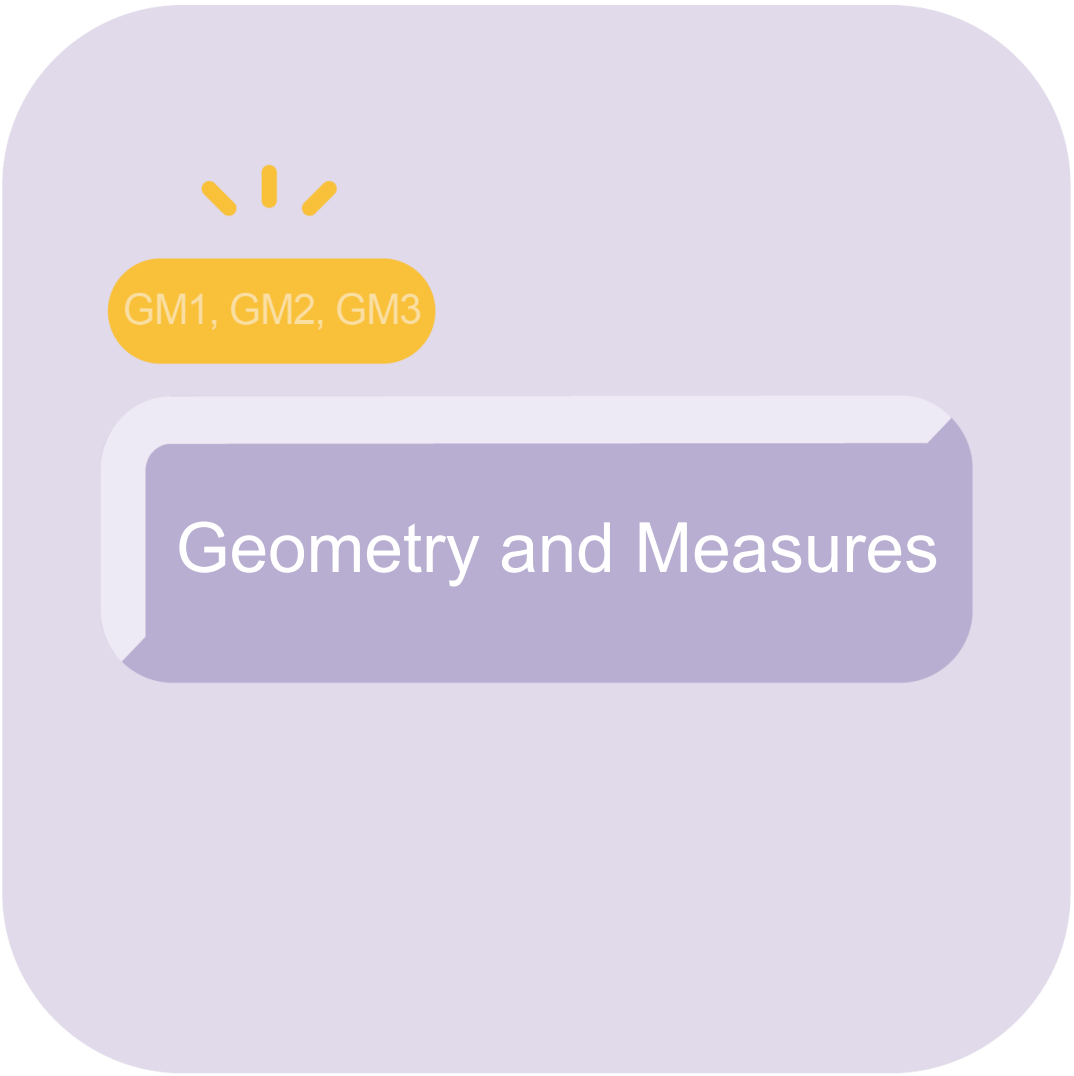
7. Write down four possible pairs of integers that satisfy the equation $3s - 5 = t$.

8. In the equation, $3e - 2f = 4$, both e and f are integers less than 12.
   Find all the possible pairs of e and f that satisfy this equation:

Challenge

1. Find **one** solution that is true for the pairs of equations.

   a. $r + s = 16$, $r - s = 6$ b. $v + w = 7$, $3v + 2w = 16$


GM1, GM2, GM3
Geometry and Measures

In this task, you will:

- solve problems involving the calculation and conversion of units of measure
- use, read, write and convert between standard units, converting measurements of length, mass, volume and time
- use decimals of up to three decimal places.

1. Convert the following metric units:

   a. 4.5 km to m b. 3.6 m to cm c. 3.45 kg to g d. 0.85 cm to mm

   e. 1.375 l to ml f. 3250 g to kg g. 65 cm to m h. 875 m to km

2. Isa walks 273 m to school five days a week. She returns home the same way. How far does she walk altogether in one week of school? Give your answer in kilometres.

3. Julie fills cups with juice for a party. Each cup can hold 295 ml of juice. If she fills 20 cups, how much juice does she need in litres?

4. A small parcel weighs 145 grams. How much do nine parcels weigh in kilograms?

5. If I swim 200 metres each day. How many days will it take me to swim the equivalent of 3 kilometres?

6. How many weeks and days is 53 days equal to?

7. A film at the cinema lasts for 1 hour and 40 minutes. If the film starts at a quarter to two in the afternoon, at what time did it finish?

8. A pencil weighs 11 g and a box for 12 pencils weighs 15 g. Calculate the weight of 10 boxes of 12 pencils. Give your answer in kilograms.

9. Mandy has a 1 litre carton of orange juice. She fills five glasses with it. She puts 160ml of juice in each glass.

   How much juice does she have left?

10. Paula walks 4.62 km during a week, Kate walks 4¾ km and Alex walks 4560 m.

    a. Who walks the furthest?
    b. How far do they walk in total?

11. There are 24 screws in a small pack. Each screw weighs 7 g.

    a. How much do 30 packs weigh in kilograms?

    b. How many packs would Tim need to buy if he wanted $\frac{1}{2}$ kg of screws?

Challenge

1. A shop sells cartons of juice using the following offers:

Offer A

One litre costs 79 pence

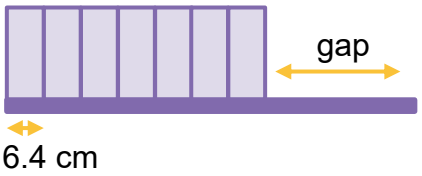
Offer B

A pack of eight 300ml cartons for £2

Thelma wants to buy 9 litres of juice for a party. Which offer should she use to buy her juice?

2. Seven identical books are placed on a shelf which is half a metre long. If each book is 6.4 cm in width, what is the gap left on the end?

   Give your answer in millimetres.



In this task, you will:

- convert between miles and kilometres.

1. Use **1 mile ≈ 1.6 km** to convert the following distances into kilometres:
   a. 10 miles b. 25 miles c. 3 miles

2. Use **1 mile ≈ 1.6 km** to convert the following distances into miles:
   a. 24 km b. 56 km c. 10 km

3. Copy and complete the following table:

Distance in miles	Distance in km
15 miles	
	32 km
	200 km
18 miles	
100 miles	
	3.6 km

4. Copy and complete the following:
   a. 1 mile = km b. 9 miles = km c. 27 miles = km
   d. 8 km = miles e. 20 km = miles f. 52 km = miles

5. In the UK, the maximum speed limit on motorways is 70 mph. In Spain, the maximum speed limit is 130 km/h. Which country has the higher speed limit?

6. David ran 4.5 miles. Jenny ran 7 km. Who ran further and by how much?

7. Michael wants to complete 100 miles over three days. On day one, he cycles 50 km. On day two, he cycles 10 miles less than he did on day one. How far does he have to cycle on the third day

Challenge

1. Two runners look at how fast they can run. Alisa can run at 7 miles per hour. Jasmine can run at 3 metres per second. Who runs faster?

   You may need to know: **1 hour = 3600 seconds**.

2. Mr Rushton wants to compare the hire costs of two cars in two different countries. He needs to travel **360 miles**. Which country represents the better value?

   The table shows you the individual costs. You will need to know: **1 gallon ≈ 4.5 litres**

England	Germany
40 miles to the gallon £1.20 per litre of petrol	16 kilometres to the litre £6 per gallon of petrol

In this task, you will:

- recognise that shapes with the same areas can have different perimeters and vice versa.

Remember:

Area of a rectangle = length × width
A = lw

Perimeter = 2 × length + 2 × width
P = 2l + 2w

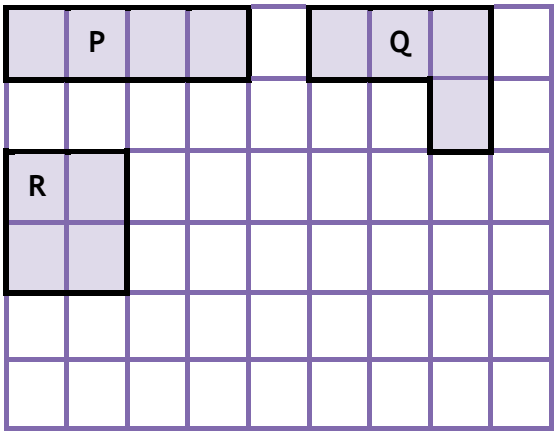
1. Write down the area and perimeter of the following rectangles.

a.

b.

c.

2. Look at the shapes in the grid below.



a. Which two shapes have the same perimeter?

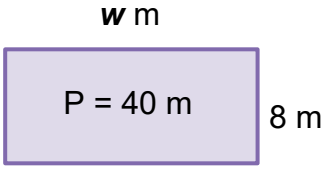
b. Draw a shape with a perimeter of 6 cm. Find the area.

c. Draw a shape with an area of 6 cm^2. Find the perimeter.

3. Use the formula to find:

a. The perimeter of the following rectangle:

b. Find the length, *w*, if the perimeter = 40 m



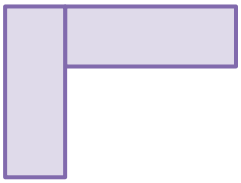
4. Draw two shapes with a perimeter of 10 cm but with different areas.

5. Draw two shapes where the perimeter of each shape is twice its area.

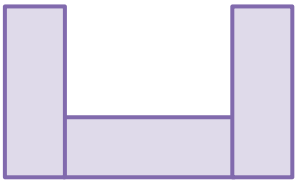
6. The following shapes are made by using rectangles measuring 6 cm by 3 cm.

   Work out their areas and perimeters.

a.



b.

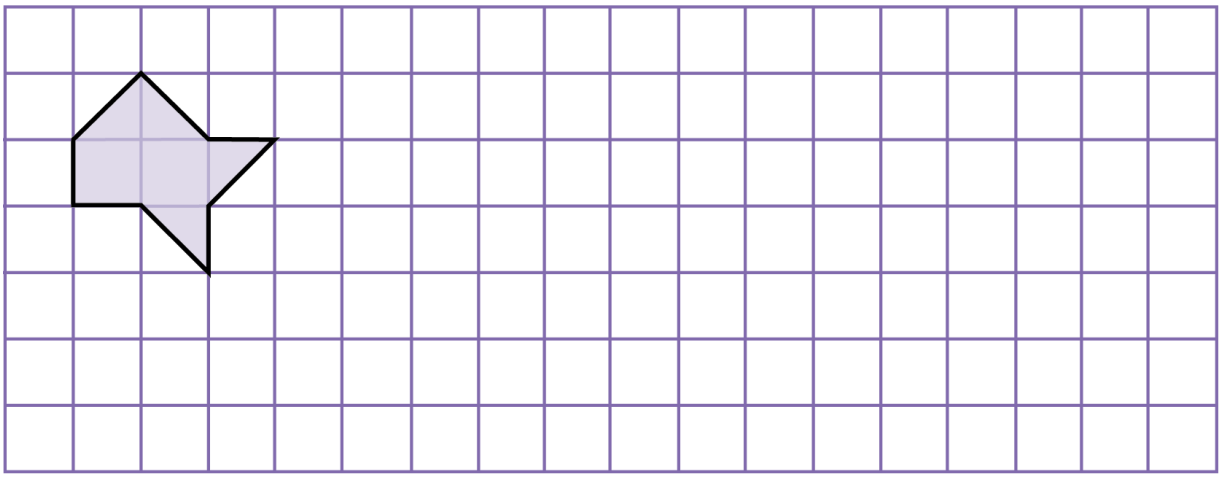


Challenge

1. Copy the shape onto squared paper.

   Draw at least **three** shapes that have the same area and perimeter as shape P.

   Draw **two** shapes which have a **smaller area** than **P** but **the same perimeter**.



In this task, you will:

- recognise when to use formulae for area and volume of shapes
- calculate, estimate and compare volume of cubes and cuboids.

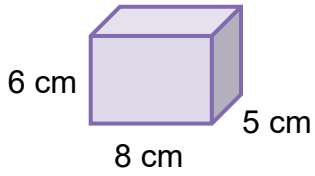
Remember:

Area of a rectangle = length × width
A = lw

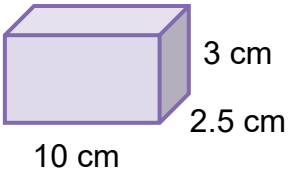
Volume of a cuboid = length × width × height
V = lwh

1. Find the volume of the following cuboids:

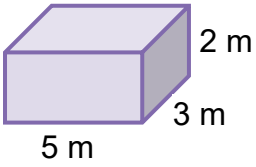
a.



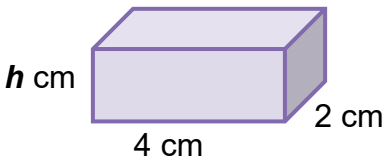
b.



c.

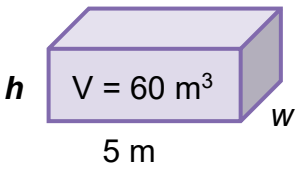


2. The volume of this cuboid is 24 cm^3 . Calculate its height.

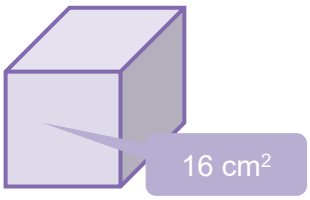


3. Find three different cuboids with a volume of 30 cm^3 and integer lengths in cm.

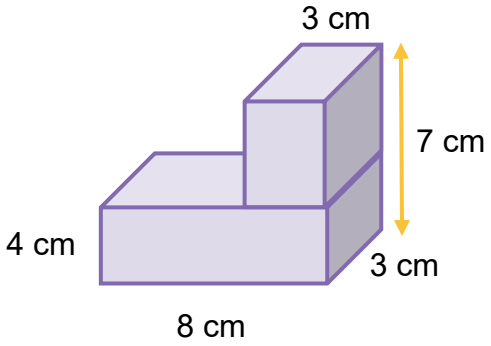
4. A cuboid has a volume of 60 m^3 . All its measurements are integers.
If the length of the cuboid is 5 metres, what could its width and height be?



5. One face of a cube has an area of 16 cm^2.
What is the volume of the cube?



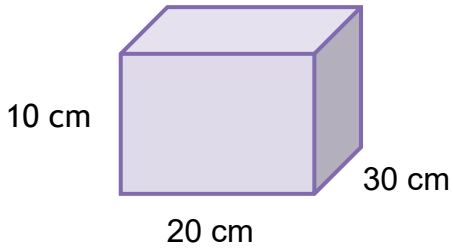
6. Find the volume of this shape. All dimensions are in centimetres.



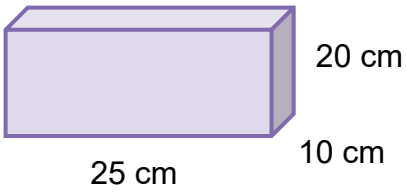
Challenge

1. Calculate the volume of the following two boxes:

Box A



Box B



b. The two boxes are filled with water. Which box will hold the most water?

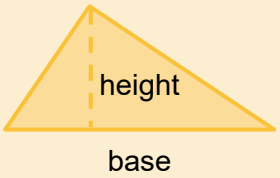
In this task, you will:

- calculate the area of parallelograms and triangles.

Remember:

Area of a parallelogram = base x height

$\mathbf{A = bh}$

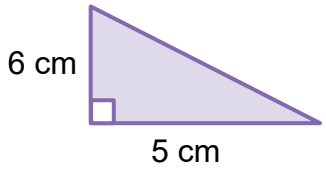


Area of a triangle = base x height ÷ 2

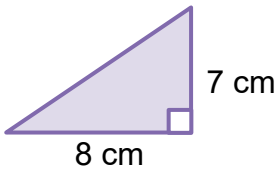
$\mathbf{A = \frac{bh}{2}}$

1. Find the areas of these triangles.

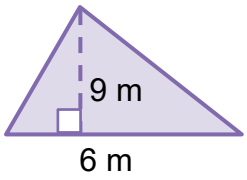
a.



b.

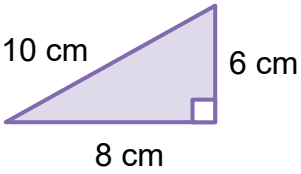


c.

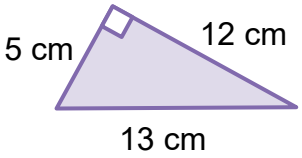


2. Which triangle has a greater area?

a.

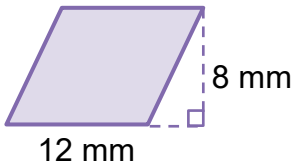


b.

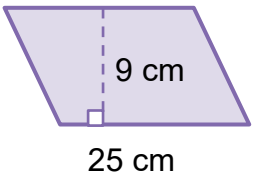


3. Find the areas of these parallelograms.

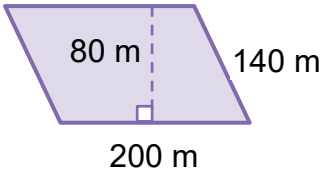
a.



b.

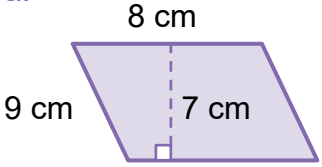


c.

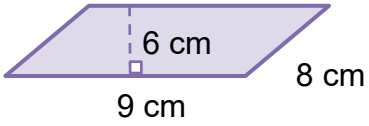


4. Which parallelogram has the smaller area?

a.

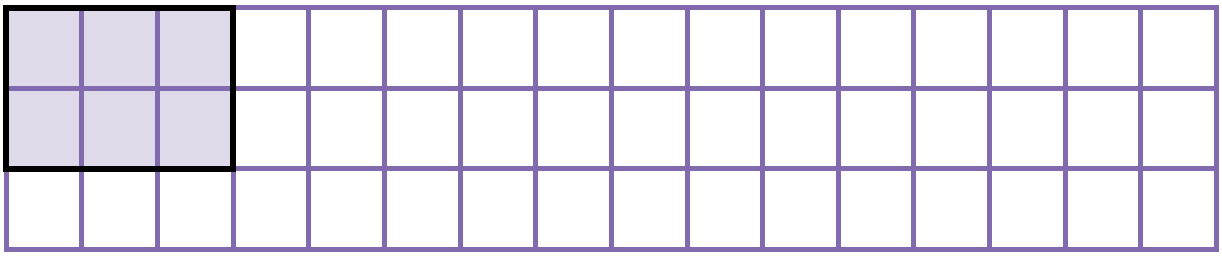


b.



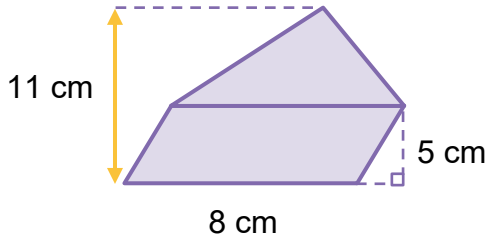
5. Draw a triangle and a parallelogram each with an area of 4 square units.

6. Draw two different triangles which have same area as the rectangle below:

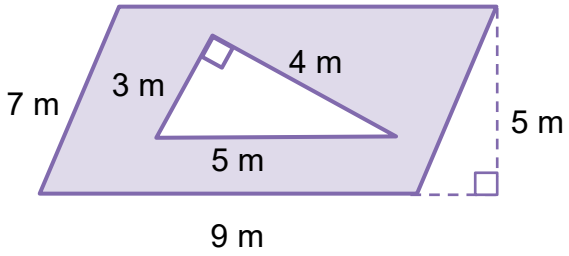


7. Draw a parallelogram with an area of 16 cm^2.

8. Find the area of the following shape:

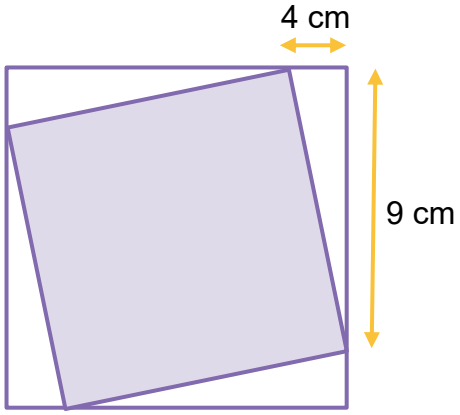


9. Work out the shaded area.



Challenge

1. A larger square has a smaller (shaded) square drawn inside it, as in the diagram. Calculate the area of the shaded square.



In this task, you will:

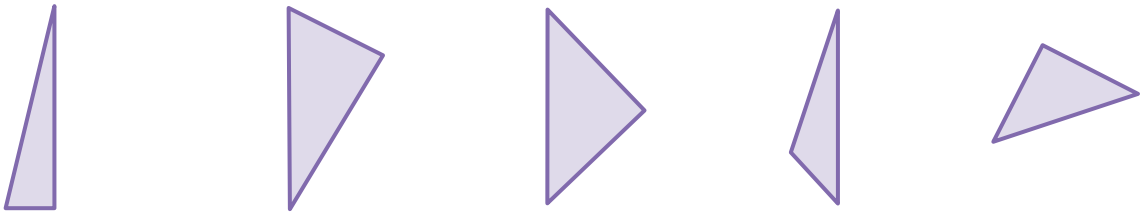
- recall and use the properties of 2D shapes, including their angles
- accurately draw 2D shapes using a ruler and protractor.

1. One angle in a parallelogram is 72°. Find the size of the other angle, as shown.

2. One angle in an **isosceles** triangle is 50°. Find the size of the other angles. There are two possible answers, can you find them both?

3. Here are five triangles. Write down the letter of each triangle that has a right angle.

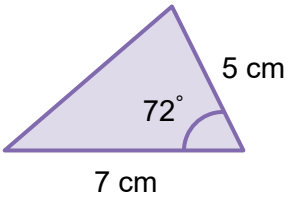
a. b. c. d. e.



4. Draw three different hexagons that contain at least **one** right angle.

5. Using a ruler and a protractor or set square, draw a 8 cm × 3 cm rectangle.

6. Here is a sketch of a triangle. It is not drawn to scale.
Using a pencil, ruler and a protractor, draw an accurate drawing of the triangle.



7. Copy each parallelogram then add **one** line to form a:

a. rhombus

b. trapezium.

8. A kite has a perimeter of 20 cm. One of its sides measures 4 cm.
Find the lengths of the other sides.
Draw an accurate diagram of your kite.

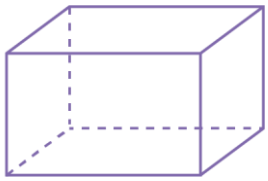
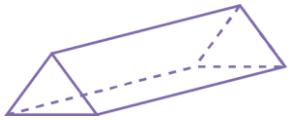
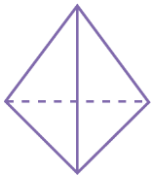
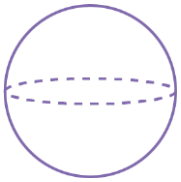
Challenge

1. **Draw** an accurate **rhombus** with side lengths of 6 cm and one of the angles equal to 60°. Use a pencil, ruler and protractor.

In this task, you will:

- Recognise and describe the properties of 3D shapes, including their nets.

1. Link each shape to its correct name.

Shape A	Shape B	Shape C	Shape D
			
Name 1	Name 2	Name 3	Name 4
Sphere	Triangular prism	Cuboid	Tetrahedron

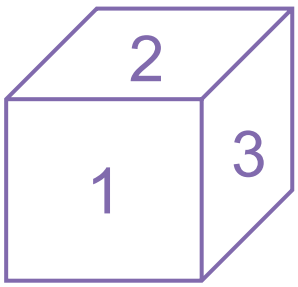
2. Name as many shapes as you can with six faces.

3. Copy the table and write the names of theses shapes in the correct places.

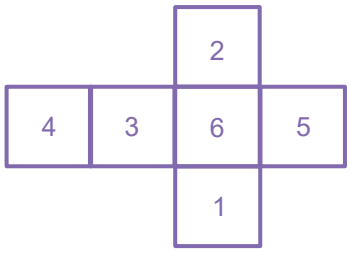
Cube	Triangular prism	Cylinder
Hexagonal prism	Cone	Sphere
Cuboid	Square-based pyramid	Tetrahedron

	At least one square face	No square faces
One or more curved faces		
No curved face		

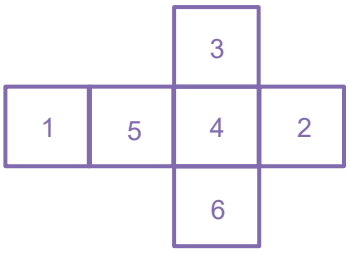
4. Which is the correct net of the cube shown?
(Ignore the orientation of the numbers - they're just labels)



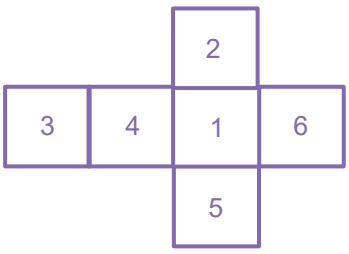
a.



b.



c.



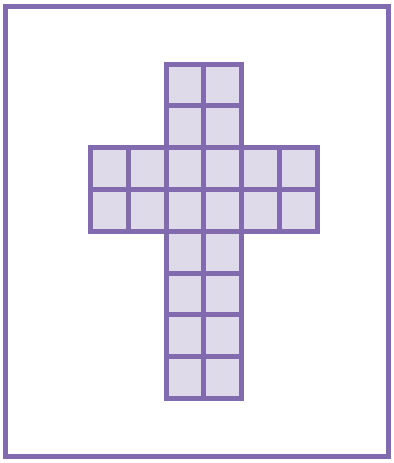
5. Copy and complete the table below.

	Number of faces	Number of vertices	Number of edges
Cuboid			
Cylinder			
Tetrahedron			
Hexagonal prism			
Cube			

6. Name each shape from its properties.

Shape properties
a. 6 rectangular faces, 12 edges and 8 vertices
b. 1 curved face, 1 flat face, 1 vertex and 1 edge
c. 7 flat faces, 15 edges and 10 vertices
d. 1 curved face, no edges and no vertices

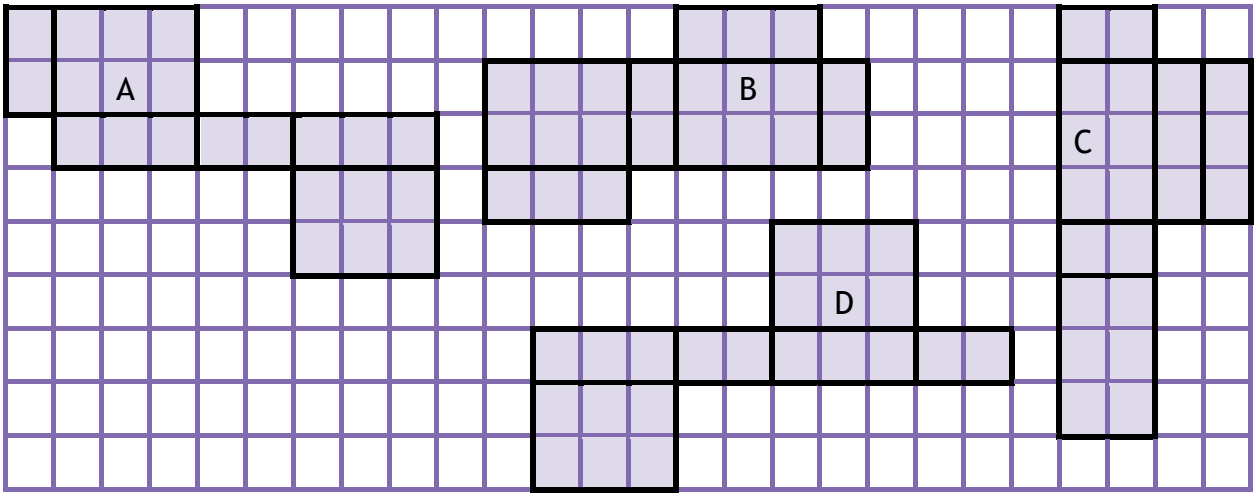
7. Draw the 3D shape the net below makes.



Challenge

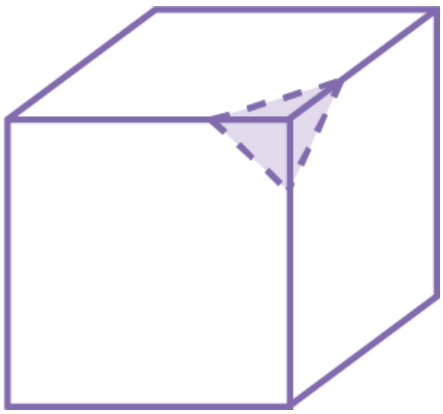
1. a. Which net does not fold to make a cuboid?

   b. Draw at least two more nets to make a cuboid.



2. A **truncated cube** is made by cutting off each of the eight corners.
   The **first one** is shown. Visualise the shape and complete the table below

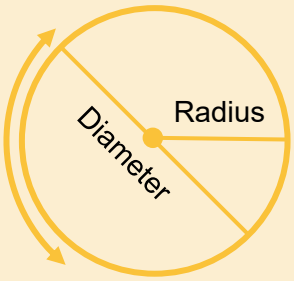
Triangular faces	Octagonal faces	Edges	Vertices



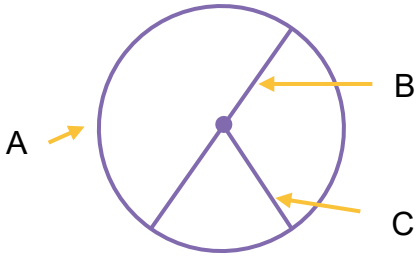
In this task, you will:

- Recognise and describe parts of a circle.

Remember: Here are the parts of a circle



1. The radius of a circle is 12 cm. What is its diameter?
2. The diameter of a circle is 7 m. What is its radius?
3. Draw the diagram and label the parts of the circle.



4.
   a. Jenny measures the radius of her dinner plate as 9 cm What is the diameter of her dinner plate?
   b. The diameter of her teacup is 10 cm. What is its radius?
   c. Jenny decorates some Easter eggs by gluing ribbon around the circumference of each egg. She knows that the circumference of each egg is 36 cm. How much ribbon will she need to decorate five eggs?

5. Dale measures the **radius** of a 10p coin as 12 millimetres.
He lines up as many as he can until he reaches 1 metre.

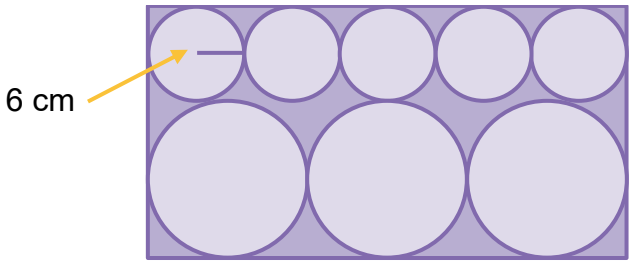
   a. How many 10p coins will he have altogether?

   b. What is the total value of this?

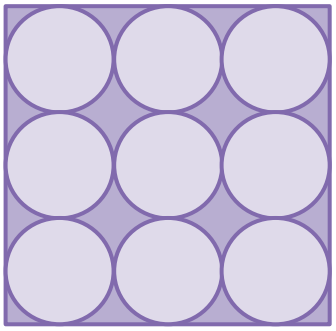
6. Danni stacks 2p coins to make a tower.
She finds that a stack of 14 coins is the same height as that of a single two pence coin standing on its end. If the radius of the coin is 14 mm, what is the thickness of one 2p coin?

Challenge

1. Three large circles and five small circles fit exactly inside this rectangle.
The radius of the small circle is 6 centimetres. Find the diameter of the larger circle.



2. Nine circles are enclosed in a square, as shown in the diagram below. If the radius of one of the circles is 2cm long, what is the **area** of the square?

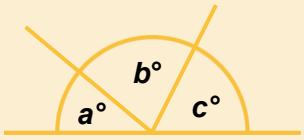


In this task, you will:

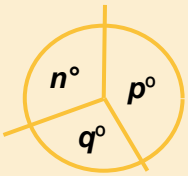
- recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

Remember:

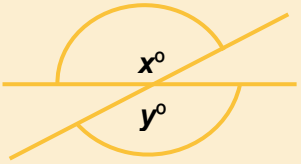
Angles that meet at a point on a straight line add up to 180°



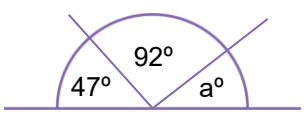
Angles that make a full turn at a point add up to 360°

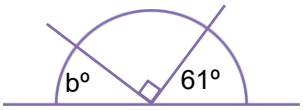


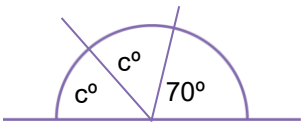
When two straight lines cross, the vertically opposite angles are equal.



1. Find the missing angle in each of the following diagrams.



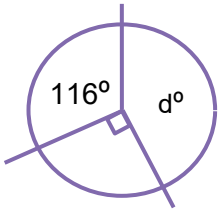


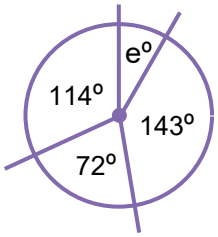


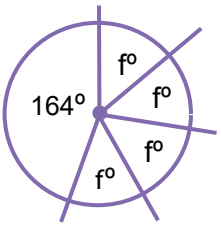
Not drawn to scale

2. Meza says she can draw three angles together and make a perfect straight line. She uses the angles 49°, 74° and 67°. Is she correct? Show your working out.

3. Find the missing angle in the following diagrams:

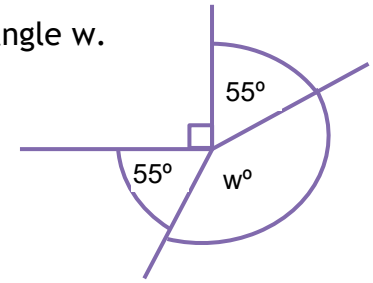




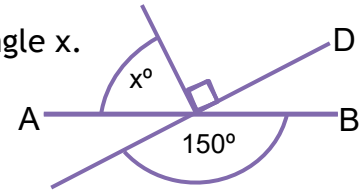


Not drawn to scale

4. Calculate the size of angle w.

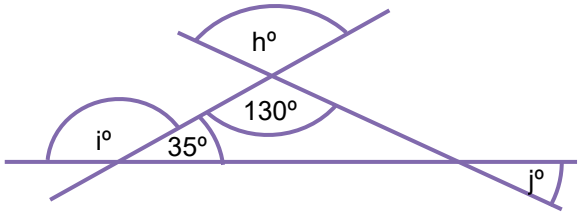


5. AB and CD are straight lines. Find the size of angle x.

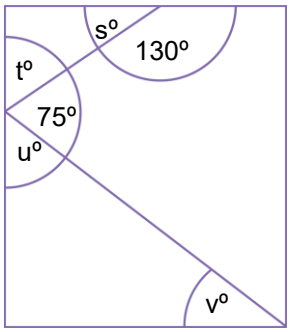


6. Three angles meet at a point. One angle is twice the size of the other and the third angle is 60°. Find the size of the two missing angles.

7. Find the size of the angles outside the triangle.

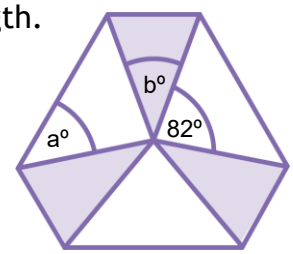


8. Find the size of the unknown angles inside this rectangle.



Challenge

1. The shape below has three identical white tiles and three identical grey tiles.
   The sides of the tiles which touch are all the same length.
   Opposite sides of each tile are parallel.
   One of the angles is 82°.



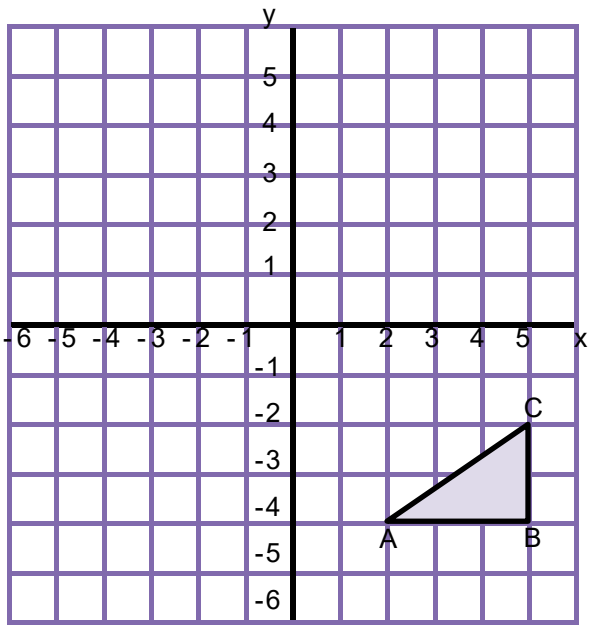
   a. Calculate the size of angle a°.

   b. Calculate the size of angle b°.

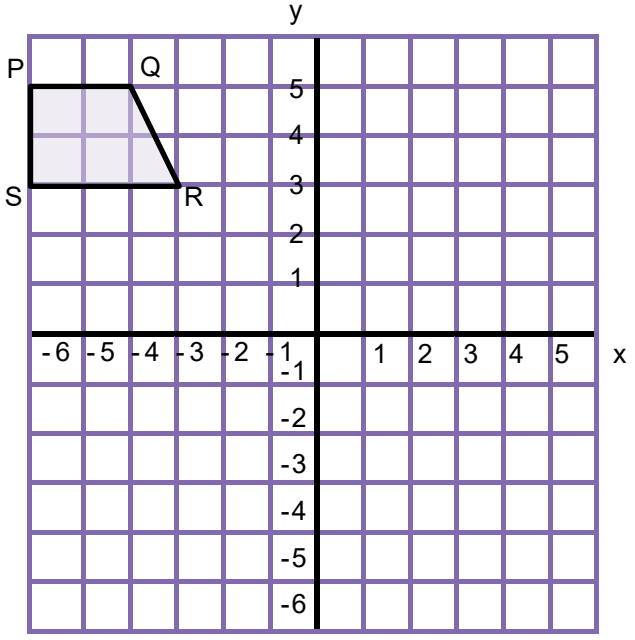
In this task, you will:

- describe positions on the four-quadrant coordinate grid
- draw and translate simple shapes on the coordinate plane
- reflect simple shapes in the axes.

1. Copy the grid opposite and triangle ABC.
   a. Write down the coordinates of **A**.
   b. Plot the point **D** (-1, 5).
   c. Translate the triangle ABC 2 units to the left and 5 up. Label it **T.**
   d. Reflect triangle ABC in the y-axis. Label it.

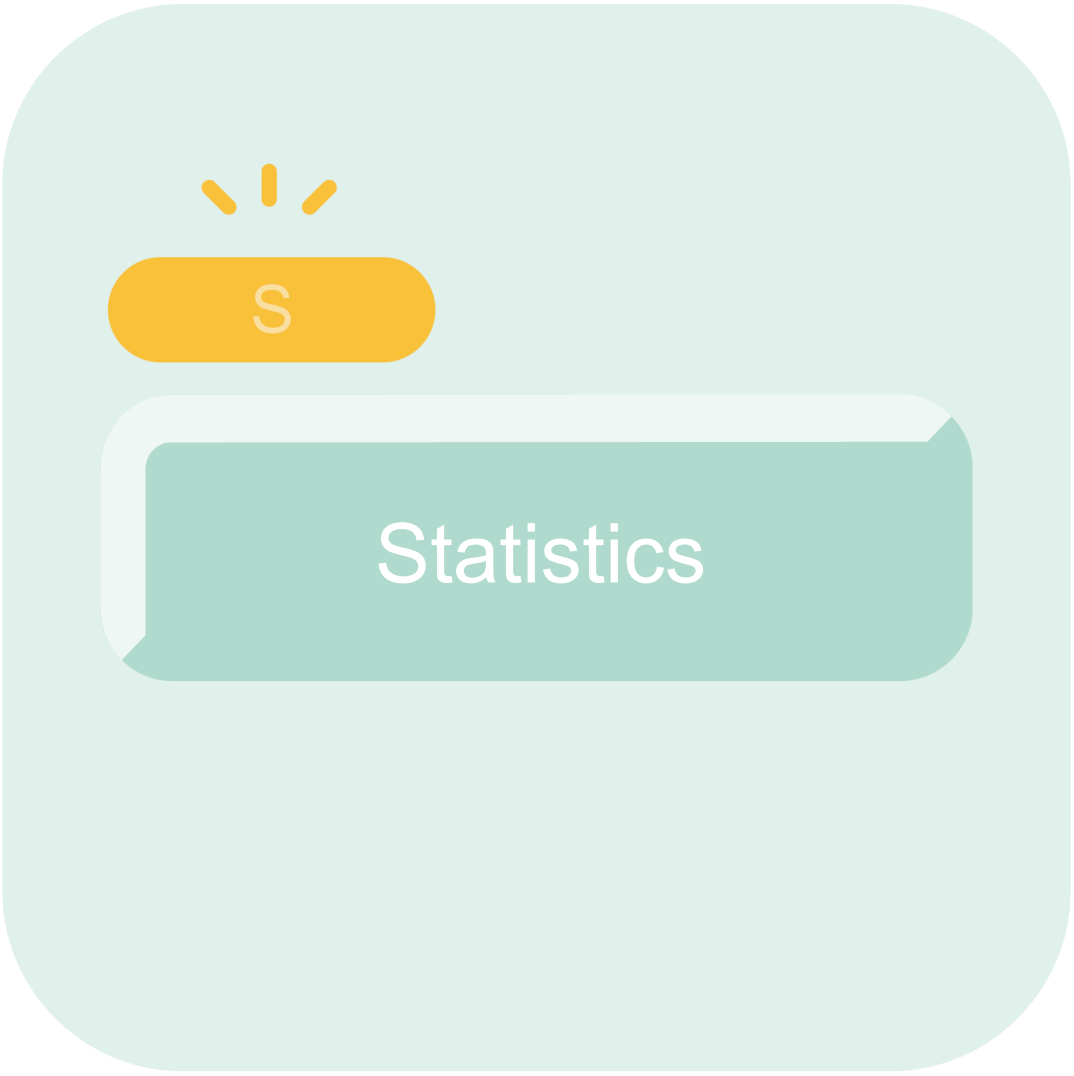


2. Copy the grid opposite and draw shape PQRS.
   a. Write down the coordinates of P.
   b. Plot the point V (0, -6).
   c. Translate the quadrilateral PQRS 5 units to the right. Label it A.
   d. Reflect PQRS in the x-axis. Label it B.



Challenge

1. Draw a coordinate grid like the ones above. Write the new coordinates when:
   a. (2, 5) is translated 3 units to the left.
   b. (0,-2) is translated 2 units up.
   c. (-4,1) reflected:
      i. in the x-axis
      ii. in the y-axis

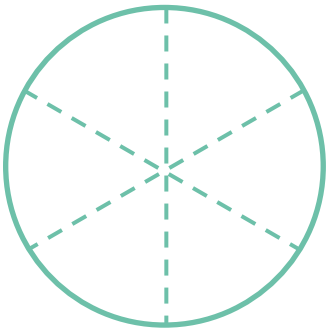

S
Statistics

In this task, you will:

- draw and interpret pie charts and simple line graphs.

1. The table below shows the votes for three competitors in a competition.
   Copy and complete the pie chart to illustrate the information.

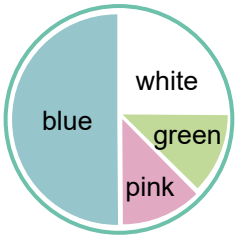
A	B	C
3	9	6



2. The following pie charts show favourite colours.
   Match each statement to the correct pie chart.

a.

b.



c.

d.

e. If four people chose pink then eight people chose blue.

f. One quarter of the people chose pink.

g. The same number of people chose pink and green.

h. About 20% of the people chose white.

3. The distance-time graph shows an outing taken by Joe last Saturday.
   Read the graph carefully and answer the questions.

   a. At what time did Joe first stop?

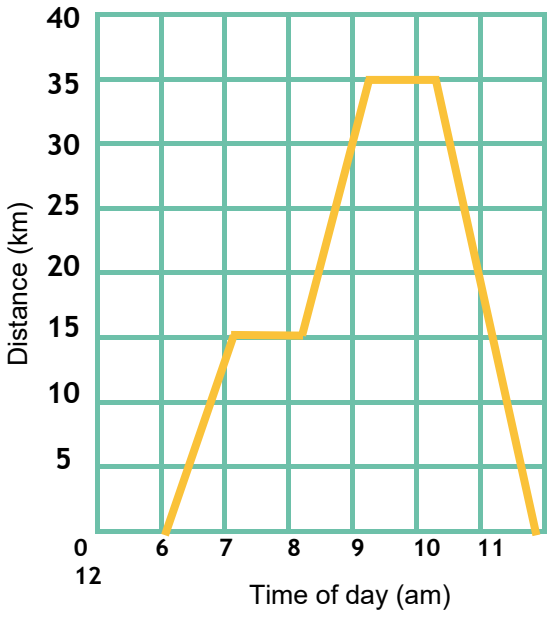
   b. How far did he travel in the first hour?

   c. How far had he travelled by 9am?

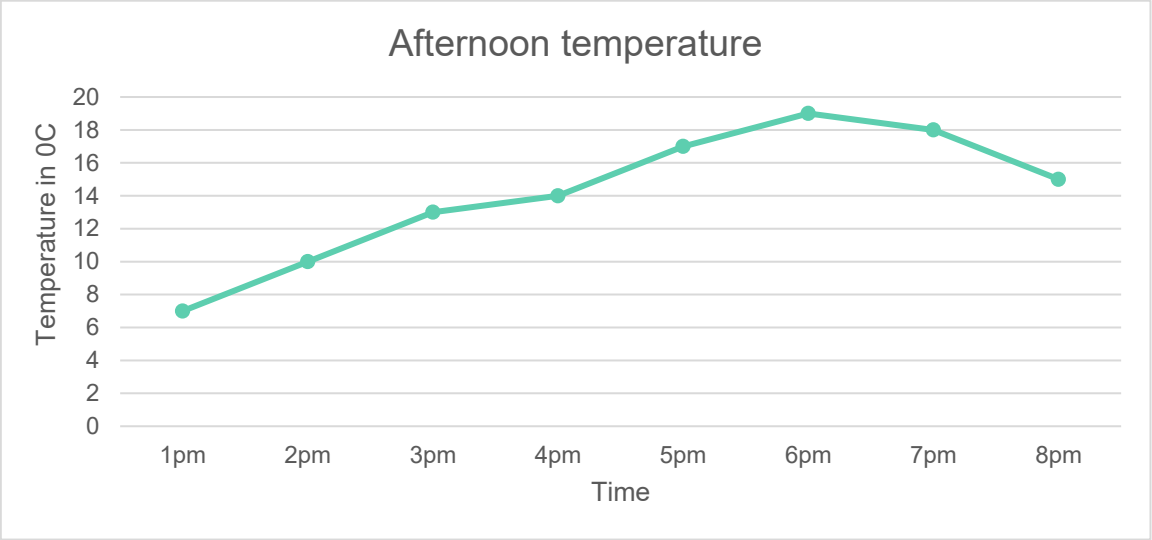
   d. How long did he shop for?

   e. How long did his journey home take?

   f. How long was his whole outing?



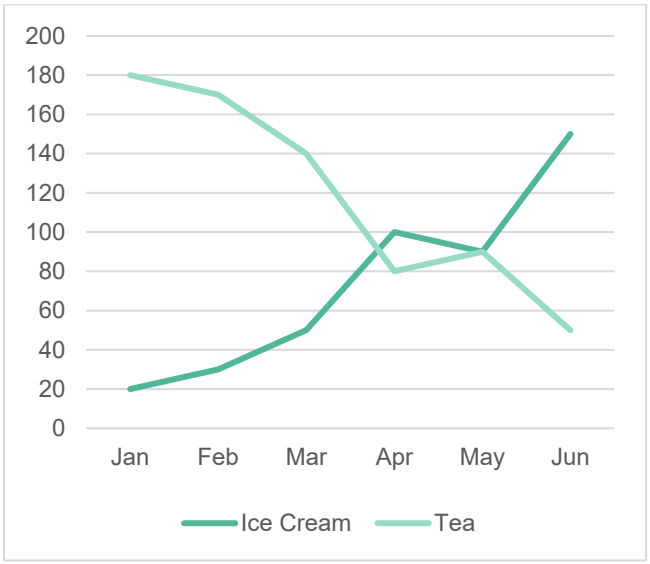
4. The graph shows the temperature recorded each hour during an afternoon.



   a. What was the highest temperature?
   b. How many hours had a temperature **below** 14°C?
   c. At what time was the temperature double that at 1pm?
   d. Between which two times did the temperature drop the fastest?

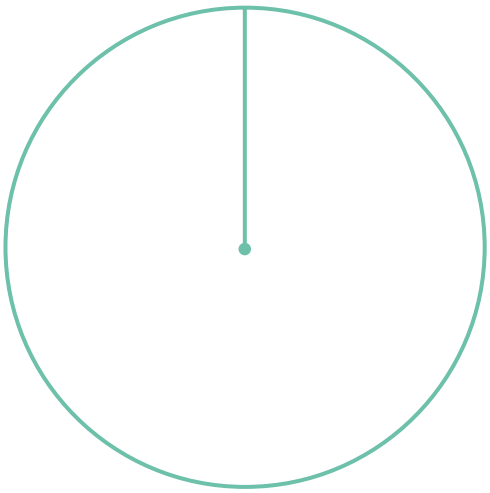
5. The line graph shows the sales of ice-creams and cups of tea at a small cafe.

   a. How many ice-creams were sold in March?
   b. How many more ice-creams than cups of tea were sold in June?
   c. How many cups of tea might you expect to sell in July?



6. Forty students were asked what their favourite type of crisps were.
Copy and complete the pie chart to illustrate the information.

Flavour	Frequency	Angle
Beef	14	
Chicken	10	
Cheese and onion	5	
Plain	11	
Total	**40**	

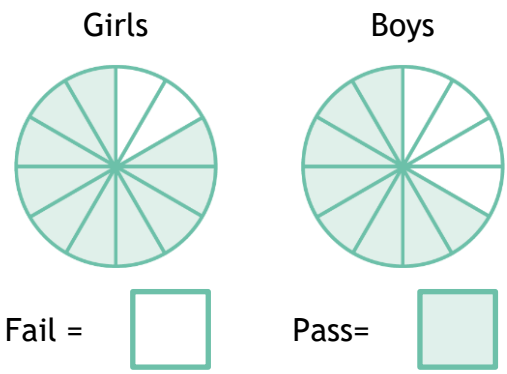


Challenge

1. The pie charts show the results of a reading test.

   a. Eight girls fail the test.
   How many girls pass the test?

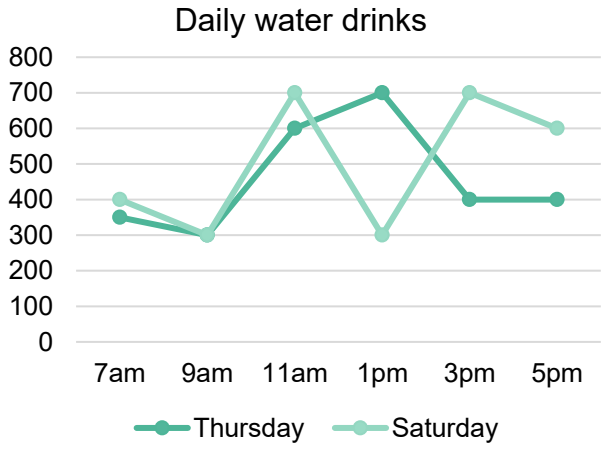
   b. The same number of boys took the test.
   How many boys failed the test?



2. The graph shows how much water is drunk during two days.

   a. On which day was most water drunk?

   b. Which day do you think was warmer and why?



In this task, you will:

- calculate and interpret the mean as an average.

Remember:

To find the mean of a set of data:

Find the total of the data (*add up the numbers*)
Divide by the total frequency (*the number of numbers*)

1. Find the mean of the following sets of numbers:
   a. 4, 6, 3, 7
   b. 3, 8, 8, 4, 7
   c. 1, 0, 9, 6, 4, 10

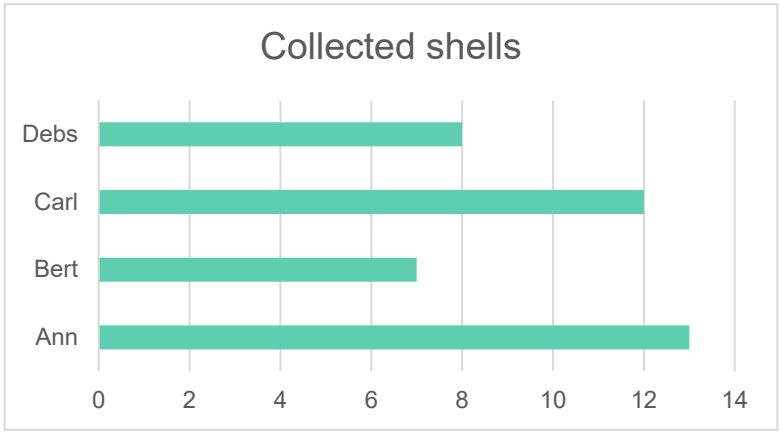
2. The midday temperatures were recorded in the table for the last six months of 2018. Find the mean temperature.

July	August	September	October	November	December
18°C	20°C	17°C	15°C	14°C	12°C

3. The mean of two numbers is 8. If one of the numbers is 5, what is the other number?

4. The mean of two numbers is 3. What could the two numbers be?:
   Give three possible pairs of answers.

5. Four friends are collecting shells on a beach. Find the mean number of shells collected.



6. The mean of three numbers is 7. If two of the numbers are both 4, what is the third number?

7. During a game of basketball, Mike scored 14, 9 and 11 points in the first three quarters. How many points does he need to score in the fourth quarter in order to score a mean of 12 points per quarter for the whole game?

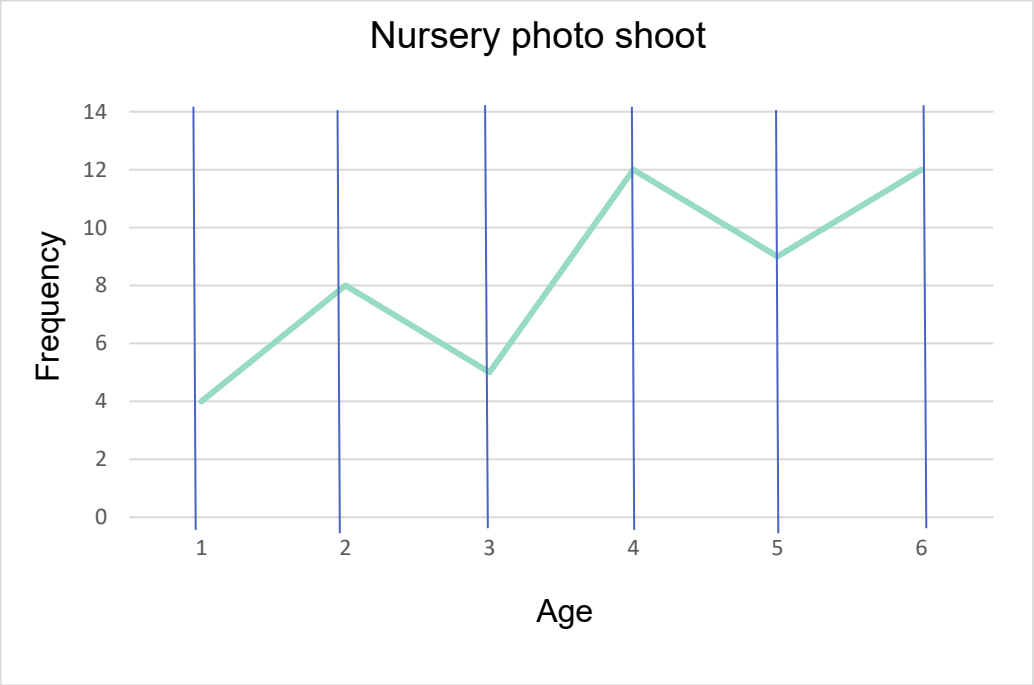
8. Find the missing number 4, **?**, 7, 3, when the mean is 6.

9. The mean of five numbers is 11. The mean of two of the numbers is 14. What is the mean of the other three numbers?
10. The mean of seven numbers is 3. The mean of another five numbers is 15. What is the mean of all twelve numbers put together?

Challenge

1. The line graph shows the number of toddlers of different ages who attended a photo shoot.

   Calculate their mean age in years.



Teaching Notes

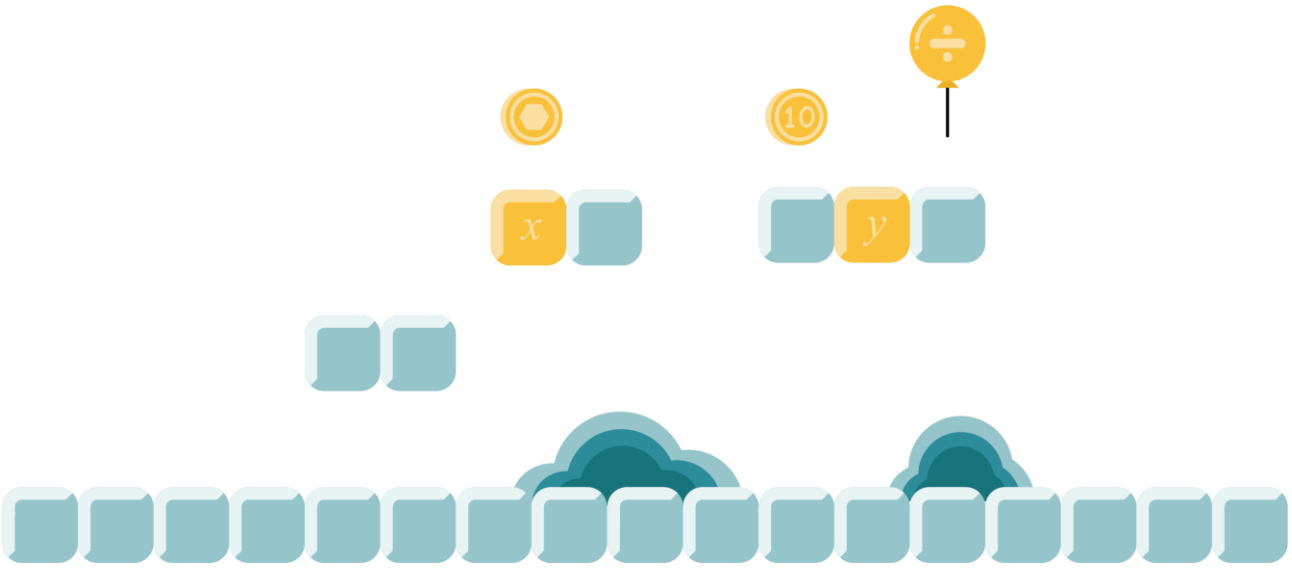
This resource aims to provide parents and carers of young people at Hyndland Secondary School with resources to help develop numeracy with students who need extra support.

This resource can be used for P7 upwards, but we use this to help support our learners in case they need additional support with topics in the BGE.

The resource is divided into two sections – a teacher's section (including teaching notes, answers and a tick list to enable teachers to track which tasks students have completed) and a students's section which contains work for number, ratio and proportion, algebra, geometry and measures and statistics.

Each unit comprises a set of photocopiable tasks. Each task is mapped to one or more of the requirements of the Benchmarks and is intended to consolidate learning that students have covered during their time at school but are not yet secure with. There are 39 tasks in total, which could then be used once a week across the school year.

We hope you enjoy using this resource. If you have any questions, please get in touch: email gw12ryanchristopher@glow.sch.uk via your child's Glow account.



Name:

Keep track of which tasks learners have completed.

N1 number: number and place value	Date completed and notes
N1.1 - Read, write, order and compare numbers up to 10 000 000	
N1.2 - use negative numbers in context	
N1.3 - Solve number problems	

N2 number: calculation	Date completed and notes
N2.1 - Long multiplication	
N2.2 - Long division	
N2.3 - Short division	
N2.4 - Mental calculations	
N2.5 - Common factors, multiples and prime numbers	
N2.6 - BIDMAS	
N2.7 - Addition and subtraction multi-step problems	
N2.8 - Four rules problems	
N2.9 - Use estimation to check answers	

N3 number: fractions, decimals and percentages	Date completed and notes
N3.1 - Simplifying fractions	
N3.2 - Add and subtract fractions	
N3.3 - Multiply proper fractions	
N3.4 - Divide fractions by whole numbers	
N3.5 - Multiply numbers up to 2 decimal places	
N3.6 - Written division methods up to 2 decimal places	
N3.7 - Fraction, decimal and percentage equivalence	

RP ratio and proportion	Date completed and notes
RP1 – Relative sizes	
RP2 – Percentage calculations	
RP3 – Scale factors	
RP4 – Unequal sharing	

A algebra	Date completed and notes
A1 – Use simple formulae	
A2 – Linear sequences	
A3 – Express missing number problems algebraically	
A4 – Working with two variables	

GM1 geometry and measures: measurement	Date completed and notes
GM1.1 – Units of measure	
GM1.2 – Convert between miles and kilometres	
GM1.3 – Area and perimeter of squares and rectangles	
GM1.4 – Area and volume formulae	
GM1.5 – Area of triangles and parallelograms	

GM2 geometry and measures : properties of shape	Date completed and notes
GM2.1 – 2D shapes	
GM2.2 – 3D shapes	
GM2.3 – Parts of the circle	
GM2.4 – Angles	

GM3 geometry and measures: position and direction	Date completed and notes
GM3.1 – Translation and reflection in four quadrants	

S statistics	Date completed and notes
S1 – Pie charts and line graphs	
S2 – The mean	

N1 Number: number and place value answers

N1.1 – Read, write, order and compare numbers up to 10 000 000 answers

	Answers		
1.	One thousand five hundred and twenty three	12.	Nine thousands or 9000
2.	Eight thousand and seventy one	13.	8500 (nearest 100) 8000 (nearest 1000)
3.	Seventeen thousand and eighty	14.	20 000 (nearest 1000) 19 640 (nearest 10)
4.	Eight million, two hundred and thirty thousand and fifty	15.	203 850 (nearest 10) 203 800 (nearest 100)
5.	6702	Challenge answers	
6.	12 580	1.	98 653
7.	500 000	2.	365, 368, 369
8.	10 050 100	3.	Any five-digit number that starts with 56 000 58 000, 59 000 or 63 000
9.	Nine hundreds or 900	4.	5368; 5369; 5386; 5389; 5396; 5398
10.	Ninety thousands or 90 000	5.	Any five-digit number that starts with 96 000, 95 000 or 98 000
11.	Nine millions or 9 000 000	6.	85, 86, 89 and 93
		7.	953

N1.2 – Use negative numbers in context answers

	Answers						
1.	a. 8°C	b. 2°C	c. -4°C	7.	8°C		
2.	a. 16°C	b. 5°C	c. -6°C	8.	a. 12°C	b. 18°C	c. 19°C
3.	a. 5°C	b. -2°C	c. -3°C	9 a.	-2, 1, 4, 7, 10		
4.	a. 1	b. -5	c. 17	d. - 23	b.	-6, -2, 2, 6, 10	
5.	8°C				c.	-10, -4, 2, 8, 14	
6.	-7°C						
	Challenge answers						
1.	a. 2	b. -2	c. 3	d. -7	e. 6		

N1.3 – Solve number problems answers

	Answers				
1.	a. 8	b. 17	c. 406		
2.	a. 936, 369	b. 963			
3.	a. 50	b. 45 ≤ x ≤ 54	c. 960	d. 85 ≤ x ≤ 94	e. 195 ≤ x ≤ 204
4.	a. 43	b. 964	c. 49_ or 46_	d. 6	e. 9
5.	a. 7°C	b. 13°C			
6.	999,500				
7.	2				
8.	a. £730	b. -£100	c. £859		
	Challenge answers				
1.	a. 1	b. -1			
2.	14				
3.	2564, 2664, 2764, 2864, 2964 or 3096, 3196, 3296, 3396, 3496				

N2 Number: calculation answers

N2.1 – Long multiplication answers

	Answers			
1.	a. 736	b. 294	c. 744	
2.	a. 4092	b. 5103	c. 16 736	
3.	a. 25 599	b. 30 377	c. 164 887	d. 115 304
4.	a. 148 122	b. 257 985	c. 168 810	
	Challenge answers			
1.	Top to bottom, the missing numbers are: 2, 4, 8 and 1			
2.	Top to bottom, the missing numbers are: 0, 8, 4, 8, 8 and 0			
3.	73 × 46 = 3358			

N2.2 – Long division answers

	Answers	
1.	a. 44	b. 21
2.	a. 173	b. 143
3.	a. $32\frac{12}{29}$	b. $142\frac{1}{2}$
4.	a. 388	b. 177
5.	a. $23\frac{67}{83}$	b. $47\frac{17}{47}$
	Challenge answers	
1.	a. 7 pens	b. 17p change
2.	7 shelves	
3.	a. Missing digit is 2	b. Missing digit is 7

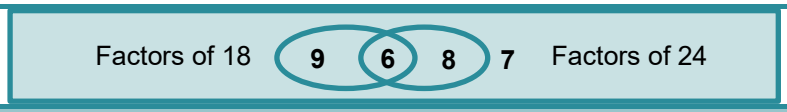
N2.3 – Short division answers

	Answers			
1.	a. 23	b. 26	c. 34	d. 21
2.	a. 16 r 19	b. 23 r 20		
3.	a. 14.25	b. 16.75		
4.	28 piles			
5.	29 trainers			
6.	Each ticket costs £34			
7.	Each parcel weighs 83 kg			
8.	108 packs			
9.	£214			
	Challenge answers			
1.	Freddy buys 6 cards with 26p change			
2.	12 buses are needed with 36 spare seats			

N2.4 – Mental calculations answers

	Answers			
1.	a. 2	b. 4	c. 10	d. 2
2.	a. 0 = 0	b. 50 = 50	c. 41 < 42	d. 16 > 15
3.	a. 760 543	b. 1 020 304		
4.	a. 2 652 000	b. 3400		
5.	45 932			
6.	123 871			
	Challenge answers			
1.	a. 4 ÷ 4 + 4 = 5 or (4 × 4 + 4) ÷ 4 = 5	b. 4 ÷ 4 + 4 + 4 = 9		
	c. 4 × 4 + 4 = 20 or (4 ÷ 4 + 4) × 4 = 20	d. (4 × 4 + 4) × 4 = 80		

N2.5 – Common factors, multiples and prime numbers answers

	Answers			
1.	a. 1, 2, 5, 10	b. 1, 2, 3, 6, 9, 18	c. 1, 2, 3, 4, 6, 9, 12, 18, 36	
2.	a. 8, 16, 24, 32, 40	b. 9, 18, 27, 36, 45	c. 12, 24, 36, 48, 60	d. 36, 72, 108, …
3.	a. 3, 13 or 29	b. 36	c. 13	d. 48
4.				
5.	8 and 24			
6.	54, 72 and 90			
7.	392			
8.				
	Challenge answers			
	a. 2 × 3 × 3	b. 2 × 5 × 5	c. 2 × 3 × 3 × 5	d. 2 × 3 × 3 × 7

	100 or less	More than 100
Multiple of 30	30, 60 or 90	120, 150, … 300, …
Multiple of 20	20, 40, 60, 80 or 100	120, 140, … 200, …

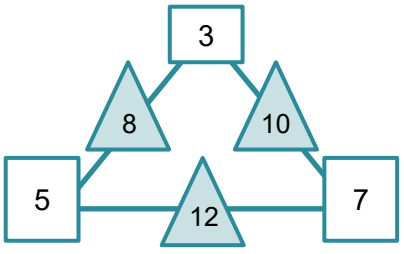
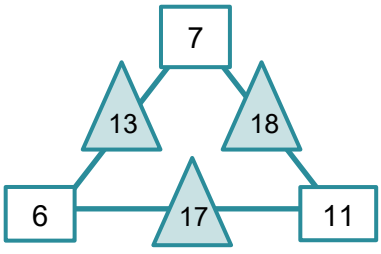
N2.6 – BODMAS answers

	Answers		
1.	$7 - 5 + 4 = 11 - 5 = 6$	7.	$7 + 3 \times 4 = 7 + 12 = 19$
2.	$5 - 7 + 4 = 9 - 7 = 2$	8.	$9 - 3 \times 2 = 9 - 6 = 3$
3.	$7 \times 3 - 2 = 21 - 2 = 19$	9.	$18 - 5 \times 3 = 18 - 15 = 3$
4.	$2 \times 6 + 3 = 12 + 3 = 15$	10.	$7 + 15 \div 5 = 7 + 3 = 10$
5.	$8 \div 2 + 5 = 4 + 5 = 9$	11.	$(8 - 5) \times 4 = 3 \times 4 = 12$
6.	$12 \div 2 - 3 = 6 - 3 = 3$	12.	$(2 + 7) \div 3 = 9 \div 3 = 3$

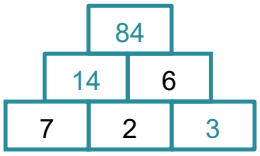
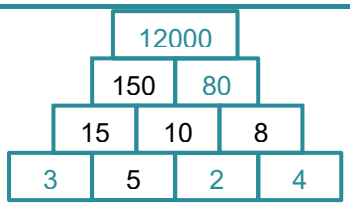
	Challenge answers		
1.	a. $8 \times (4 - 2) = 16$	2.	Examples: $5 \times 6 = 30$
	b. $12 \div (1 + 5) = 2$		$5 \times (8 - 2) = 5 \times 6 = 30$
	c. $(3 + 4) \times 5 = 35$		$8 \times (5 - 2) + 6 = 8 \times 3 + 6 = 24 + 6 = 30$
	d. $(4 + 2) \times (5 - 3) = 2$		$(5 + 6) \times 2 + 8 = 11 \times 2 + 8 = 22 + 8 = 30$
	e. $(9 - 3 \times 2) \times 5 = 15$		$2^5 + 6 - 8 = 32 + 6 - 8 = 30$

N2.7 – Addition and subtraction multi-step problems answers

	Answers
1.	191 miles
2.	17 + 9 − 15 + 8 = 19
3.	54 loaves
4.	27p
5.	39 + 47 + 14 = 100
6.	3 4 5 7 + 5 9 5 4 0 5 2
7.	85p
8.	a. 69 − 42 = 27 b. 85 − 34 = 49

	Challenge answers
	a.  b. 

N2.8 – Four rules problems answers

	Answers
1.	£32.50
2.	Cost £3.75, change £1.25
3.	24 boxes
4.	£8.85 saving
5.	127 pages
6.	a.  b. 
7.	156 students
8.	Starts with 11
	Challenge answers
1.	£110

N2.9 – Use estimation to check answers

	Answers
1.	c. 600
2.	b. 15
3.	£10
4.	5 kg
5.	
6.	
7.	100 000
8.	a. 387 b. 700 c. 6 tenths
	Challenge answers
1.	88

	Question	Rounding	Estimate	Actual
a.	15 463 + 8946	15 000 + 9000	24 000	24 409
b.	7631 – 2814	8000 – 3000	5000	4817
c.	78 × 437	80 × 400	32 000	38 903
d.	5632 ÷ 32	6000 ÷ 30	200	176

x 1000	× 100	Number	÷ 10	÷ 100
42000	4200	42	4.2	0.42
6750	675	6.75	0.675	0.0675
23 000	2300	23	2.3	0.23
60 000	6000	60	6	0.6
45 000	4500	45	4.5	0.45

N3 Number: fractions, decimals and percentages answers

N3.1 – Simplifying fractions answers

	Answers							
1. a.	$\frac{2}{5} = \frac{4}{10} = \frac{6}{15} = \frac{8}{20} = \frac{10}{25}$	b.	$\frac{3}{8} = \frac{6}{16} = \frac{9}{24} = \frac{12}{32} = \frac{15}{40}$	c.	$\frac{5}{6} = \frac{10}{12} = \frac{15}{18} = \frac{20}{24} = \frac{25}{30}$			
2. a.	$\frac{3}{4} = \frac{9}{12}$ o.e.	b.	$\frac{2}{3} = \frac{8}{12}$ o.e.	c.	$\frac{5}{6} = \frac{20}{24}$ o.e.	d.	$\frac{2}{7} = \frac{10}{35}$ o.e.	
3. a.	$\frac{3}{4}$	b.	$\frac{5}{6}$					
4.	Smallest: $\frac{1}{2}$; $\frac{7}{12}$; $\frac{2}{3}$; $\frac{3}{4}$; $\frac{5}{6}$ largest							
5. a.	$\frac{2}{3} = \frac{12}{18} = \frac{10}{15}$	b.	$\frac{3}{8} = \frac{9}{24} = \frac{6}{16}$					
6. a.	=	b.	>	c.	>			
7. a.	$\frac{3}{8} = \frac{15}{40}$	b.	$\frac{5}{6} = \frac{20}{24}$	c.	$\frac{6}{7} = \frac{18}{21}$			
	Challenge answers							
1. a.	$\frac{5}{12} = \frac{20}{48} = \frac{10}{24}$	b.	$\frac{10}{8} = \frac{30}{24} = \frac{5}{4}$					

N3.2 – Add and subtract fractions answers

	Answers							
1. a.	$\frac{5}{8}$	b.	$\frac{7}{9}$					
2. a.	$\frac{3}{6} = \frac{1}{2}$	b.	$\frac{4}{12} = \frac{1}{3}$					
3. a.	$\frac{11}{12}$	b.	$\frac{19}{24}$	c.	$\frac{5}{18}$	d.	$\frac{7}{24}$	
4. a.	$\frac{6}{8} = \frac{3}{4}$	b.	$\frac{2}{8} = \frac{1}{4}$					
5. a	$\frac{13}{24}$	b.	$\frac{13}{18}$	c .	$\frac{13}{36}$	d.	$\frac{1}{24}$	
6.	$\frac{4}{12} = \frac{1}{3}$							
7.	$\frac{5}{24}$							
	Challenge answers							
1. a.	$5\frac{31}{36}$	b.	$4\frac{1}{24}$					
2.	$\frac{8}{9}$ m left over							

N3.3 – Multiply proper fractions answers

Answers

1.	a.	$\frac{3}{8}$	b.	$\frac{15}{32}$	c.	$\frac{4}{25}$
2.	a.	$\frac{5}{12}$	b.	$\frac{5}{8}$	c.	$\frac{2}{9}$
3.	a.	£12	b.	£15	c.	£9.60
4.		$\frac{11}{12} \times \frac{4}{5}$		$\frac{1}{4}$		
		$\frac{7}{8} \times \frac{2}{3}$		$\frac{11}{15}$		
		$\frac{3}{10} \times \frac{5}{6}$		$\frac{7}{12}$		
		$\frac{1}{2} \times \frac{3}{4}$		$\frac{3}{8}$		
5.	a.	$\frac{15}{28}$	b.	$\frac{10}{21}$	c.	$\frac{1}{6}$
6.		$\frac{1}{5}$				
7.		$\frac{7}{16}$				
8.	a.	£27.50	b.	£40.50	c.	£1.75

Challenge answers

1.	a.	$\frac{10}{104} = \frac{5}{52}$	b.	$\frac{21}{36} = \frac{7}{12}$	c.	$\frac{33}{72} = \frac{11}{24}$
2.	a.	$\frac{24}{120} = \frac{1}{5}$	b.	$\frac{1}{20}$		

N3.4 – Divide fractions by whole numbers answers

Answers

1.	a.	$\frac{2}{15}$	b.	$\frac{3}{10}$	c.	$\frac{4}{15}$
2.	a.	$\frac{3}{8}$	b.	$\frac{1}{6}$	c.	$\frac{5}{18}$
3.	a.	0.75	b.	0.8	c.	0.625
4.		$\frac{1}{4}$		0.5		
		$\frac{1}{2}$		0.25		
		$\frac{2}{5}$		0.3		
		$\frac{3}{10}$		0.4		
5.		Smallest: 0.28 0.3 $\frac{1}{3}$ $\frac{3}{8}$ $\frac{2}{5}$ Largest				
6.	a.	$\frac{2}{5}$	b.	$\frac{1}{12}$	c.	$\frac{3}{20}$
7.	a.	0.875	b.	0.1666...	c.	1.25
8.		0.833…rounds to 0.83. Yes, 83p each, with 2p left over.				

Challenge answers

1.	12.5 cm

N3.5 – Multiply numbers up to 2 decimal places answers

	Answers			
1.	a. 184.8	b. 292.4	c. 39.3(0)	d. 88.02
2.	a. 302.56	b. 1660.5		
3.	a. £19.95	b. 38.92 miles		
4.	£163.45			
5.	a. 0.3	b. 1.2		
6.	a. 3502.4	b. 3462.75		
7.	£1134.28			
8.	Total = 13.93 + 5.52 = £19.45			
	Challenge answers			
1.	a. 6	b. 0.86		

N3.6 – Written division methods up to 2 decimal places answers

	Answers		
1.	a. 6.25	b. 13.25	c. 13.33
2.	a. 7.17	b. 6.63	c. 8.71
3.	a. 15.8	b. 9.88	
4.	14 miles		
5.	a. 17.5	b. 23.89 (2dp)	c. 48.71 (2dp)
6.	£9.07		
7.	a. 5 mph	b. 16 ÷3 = 5.33… She would round up to 6 miles so that she could be sure to cover the 16 miles.	
8.	Billy's = £1.33	Judy's = £1.29 (cheapest)	Smith's = £1.31
	Challenge answers		
1.	6.58 miles		
2.	Example answers: 27 ÷ 2, 40.5 ÷ 3		

N3.7 – Fraction, decimal and percentage equivalence answers

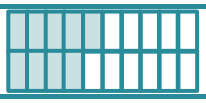
Answers

1.

a. $\frac{4}{8} = 50\%$ b. $\frac{2}{8} = 25\%$ c. $\frac{3}{15} = \frac{1}{5} = 20\%$

d. $\frac{8}{20} = \frac{2}{5} = 40\%$ e. $\frac{6}{16} = \frac{3}{8} = 37.5\%$ f. $\frac{6}{8} = \frac{3}{4} = 75\%$

2.

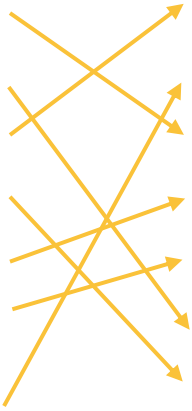
Diagram	Fraction	Decimal	Percentage
	$\frac{1}{4}$	0.25	25%
	$\frac{3}{5}$	0.6	60%
	$\frac{3}{10}$	0.3	30%
	$\frac{45}{100} = \frac{90}{20}$	0.45	45%

3. Smallest: 0.21 $\frac{1}{4}$ 30% $\frac{1}{2}$ $\frac{2}{3}$ Largest

4. a. $\frac{3}{4}$ b. 7% c. $\frac{7}{8}$

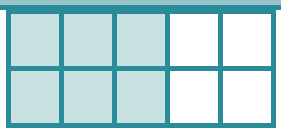
5.

50% of 8	30%
	0.7
$\frac{3}{10}$	$\frac{1}{4}$ of 16
$\frac{1}{5}$ of 15	$\frac{18}{25}$
72%	60%
$\frac{3}{5}$	0.5
$\frac{3}{5} + \frac{1}{10}$	3



6. Smallest: 0.057 29.5% 36% 0.37 $\frac{4}{7}$ $\frac{3}{5}$ Largest

Challenge answers

1. a.  b. 28 bottles left for Sunday

2. $\frac{3}{8} = 0.375 = 37.5\%$

$\frac{7}{8} = 0.875 = 87.5\%$

RP

Ratio and proportion answers

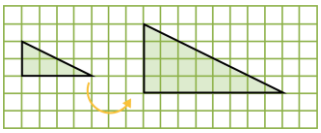
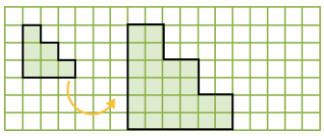
RP1 – Relative sizes answers

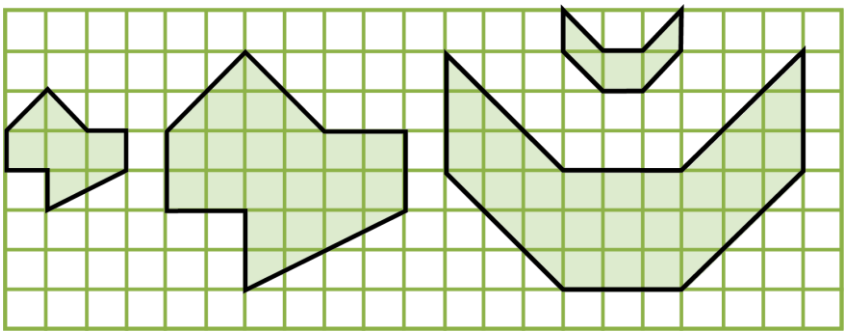
	Answers					
1.	a.	10 : 15	b.	6 : 24	c.	15 : 25
2.	a.	£16 : £40	b.	£36 : £30		
3.		21 milk chocolates				
4.		4 bags				
5.	a.	21 cups	b.	18 cups		
6.	a.	21 yellow beads	b.	75 green beads and 15 necklaces		
7.		£49.50				
8.		£18				
	Challenge answers					
1.		6 g fibre				

RP2 – Percentage calculations answers

	Answers					
1.	a.	45%	b.	30%	c.	15%
2.		65%				
3.		30%				
4.	a.	£6	b.	£1.20	c.	£14
5.		70				
6.		45				
7.	a.	£12	b.	£48		
8.	a.	$\frac{1}{5}$	b.	80%		
9.		200				
10.	a.	72	b.	72%		
11.	a.	60% of £3 = 1.8 (A is a better offer)	b.	25% of 7= 1.75		
	Challenge answers					
1.	a	260 male members	b.	35 female child members		

RP3 – Scale factors answers

	Workings out	Answers				
1.	40 pence					
2.	£1.20					
3.	6 m					
4.	1 cm : 4 m					
5. a.	SF = 4	b.	SF = 4.5	c.	SF = 2.5	
6.	a. 	b. 		c. 		
7.	AB = 60 km					
8.	Apple = 165 g					
9.	140 m					
10. a.	20 m	b.	2.5 m			

	Challenge answers
1.	

RP4 – Unequal sharing answers

	Answers		
1.	Erica has 21 marbles		
2.	5 metres		
3.	Clive 11, Beth 22		
4.	20 altogether		
5. a.	5 pancakes	b.	80 g flour
6.	Alex has 19 cards		
7.	29 sweets		
8.	210 pencils		
9.	48 eggs		

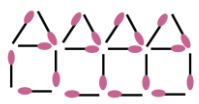
	Challenge answers
1.	40 blue, 60 red and 80 white

A Algebra answers

A1 – Use simple formulae answers

		Answers							
1.	a.	21	b.	4	c.	19	d.	6	
2.	a.	18	b.	24	c.	8			
3.		£1.03							
4.		C = 25B, £1.50							
5.	a.	T = 30H + 40	b.	£160					
6.	a.	17	b.	1	c.	3	d.	12	
7.		£4.30							
8.	a.	T = 45k + 30	b.	3 hours and 30 minutes	c.	2 kg chicken			
		Challenge answers							
1.	a.	Peppa's cost £6, Salty's cost £6.50. Peppa's is cheaper by 50p.							
	b.	Mr Jones ordered 8 pizzas. Cost from Peppa's would be £16.							

A2 – Linear sequences answers

		Answers									
1.	a.	1,4,**7**,10,**13**,**16**, …	b.	4,10,**16**,**22**,28,**34**, …							
	c.	2,**8** ,14,20,**26**,**32**, …	d.	30,**26**,22,**18**,**14**,…							
2.		1, 5, 9, 13, …									
3.	a.	In: 2, 5, 4, 7	Function: × 5 − 2	Out: 8, 23, 18, 33	b.	In: 4, 8, 10, 30	Function: ÷ 2 + 3	Out: 5, 7, 8, 18			
4.		Rule is ×3 (n^{th} term = 4n + 3), 20^{th} term is 64									
5.		Rule: × 7 then − 5	In: 4, 6, 2, 9, 8	Out: 23, 37, 9, 58, 51							
6.	a.	7, 13, 19, 25, …	b.	10, 22, 34, 46, …	c.	3, 9, 15, 21, 27, …					
7.	a.		b.	Number of houses: 1, 2, 3, 4 Number of matchsticks: 6, 11, 16, 21 Formula: 5n + 1							
		Challenge answers									
1.	a.	M = 6N + 1	b.	eight complete shapes, with one spare matchstick.							

A3 – Express missing numbers algebraically answers

		Answers					
1.	a.	34	b.	12	c.	3	
2.	a.	$p = 13$	b.	$q = 4$	c.	$r = 16$	
3.		2m + 3					
4.		$f = g - 7$, $f + 7 = g$ or $g - f = 7$					
5.		$a = 7$, $b = 9$, $c = 3$, $d = 21$					
6.		4					
7.		60 pence					
8.	a.	25	b.	$d = 4$			
9.	a.	$x = 9$	b.	$x = 6$			
10.		4					
11.		5					
		Challenge answers					
1.		$x = 7$					

A4 – Working with two variables answers

		Answers							
1.		1 + 11	2 + 10	3 + 9	4 + 8	5 + 7	6 + 6		
2.	a.	1 + 9	2 + 8	3 + 7	4 + 6	5 + 5			
	b.	9 – 4	8 – 3	7 – 2	6 – 1	5 – 0			
3.	a.	i. $y = 7$	ii. $x = 3$	b.	i. $y = 8$	ii. $x = 2$			
4.		q	1	2	3	4	5	6	7
		p	4	8	12	16	20	24	28
5.	a.	$g = 5$		b.	$h = 7$				
6.	a.	$x = 3$, $y = 6$	$x = 6$, $y = 2$...	b.	$x = 6$, $y = 4$	$x = 9$, $y = 8$ ...			
7.		(2, 1)	(3, 4)	(4, 7)	(5, 10)	(6, 13)	(7, 16)	(8, 19)	(9, 22)...
8.		$e = 2$, $f = 1$	$e = 4$, $f = 4$	$e = 6$, $f = 7$	$e = 8$, $f = 10$				
		Challenge answers							
1.	a.	r = 11 and $s = 5$	b.	v = 2 and $w = 5$					

GM1

Geometry and measures - measurement

GM1.1 – Units of measure answers

	Answers						
1. a.	4500 m	b.	360 cm	c.	3450 g	d.	8.5 mm
e.	1375 ml	f.	3.25 kg	g.	0.65 m	h.	0.875 km
2.	2.73 km						
3.	5.9 litres						
4.	1.305 kg						
5.	15 days						
6.	7 weeks 4 days						
7.	3:25 pm						
8.	1.47 kg						
9.	200 ml						
10. a.	Kate	b.	13.93 km				
11. a.	5.04 kg	b.	3 packs				

	Challenge answers		
1.	Offer A: 9L for £7.11	Offer B: 4 packs £8	Offer A is the better option
2.	Gap = 52 millimetres		

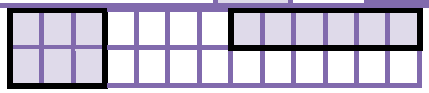
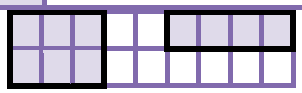
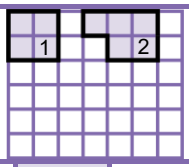
GM1.2 – Convert between miles and kilometres answers

	Answers					
1. a.	16 km	b.	40 km	c.	4.8 km	
2. a.	15 miles	b.	35 miles	c.	6.25 miles	
3.	Distance in miles			Distance in km		
	15 miles			24 km		
	20 miles			32 km		
	125 miles			200 km		
	18 miles			28.8 km		
	100 miles			160 km		
	2.25 miles			3.6 km		
4.	a. 1.6 km		b. 14.4 km		c. 43.2 km	
	d. 5 miles		e. 12.5 miles		f. 32.5 miles	
5.	UK: 70 mph = 112 km/h		or Spain: 130km/h= 81.25 mph		Spain is faster	
6.	David: 4.5 miles = 7.2 km		or Jenny: 7 km = 4.375 miles		David ran further	
7.	Day 1: 50 km = 31.25 miles		Day 2: 21.25 miles		Day 3: 47.5 miles left	

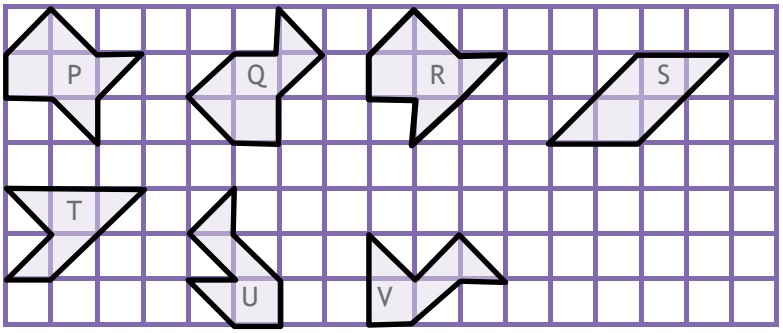
	Challenge answers		
1.	Jasmine runs at 10.8 km/h = 6.75 mph	Alice runs at 7 mph	Alice is faster
2.	England costs £48.60	Germany costs £48.00	Germany is cheaper

GM1.3 – Area and perimeter of squares and rectangles answers

Answers

1.	a.	A = 12 cm^2 P = 16 cm	b.	A = 15 cm^2 P = 16 cm	c.	A = 12 cm^2 P = 14 cm
2.	a.	P and Q both have 10 cm perimeter.	b.			Area = 2 cm^2
	c.	Perimeter = 10 cm 				Perimeter = 14 cm
3	a.	P = 24 cm	b.	P = 12 m		
4.		Two possible examples: Area = 6 cm^2 				Area = 4 cm^2
5.		Shape 1: Area = 4, Perimeter = 8 Shape 2: Area = 5, Perimeter = 10 There are others. 				
6.	a.	Perimeter = 30 cm Area = 36 cm^2	b.	Perimeter = 42 cm Area = 54 cm^2		

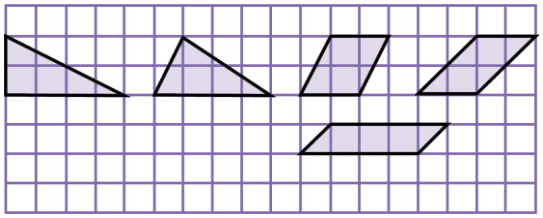
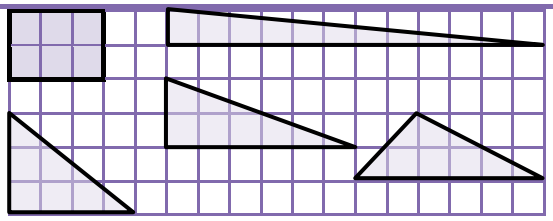
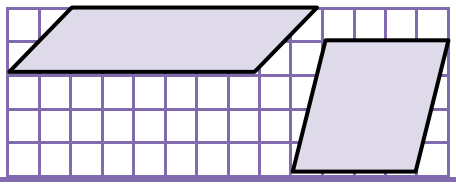
Challenge answers

1.		Q, R, S same area and perimeter as P. T, U and V have a smaller area.

GM1.4 – Area and volume formulae answers

		Answers								
1.	a.	240 cm^3	b.	75 cm^3	c.	30 m^3				
2.		Height = 3 cm								
3.		Examples	30 × 1 × 1	15 × 2 × 1	10 × 3 × 1	6 × 5 × 1	5 × 3 × 2			
4.		Examples	1 × 12	2 × 6	3 × 4					
5.		Volume = 64 cm^3								
6.		Volume = 123 cm^3								
		Challenge answers								
1.	a.	Box A volume = 6000 cm^3	Box B volume = 5000 cm^3		b.	Box A will hold most water				

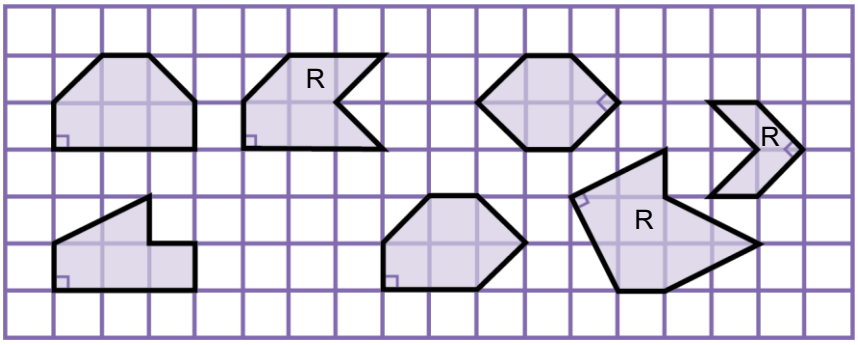
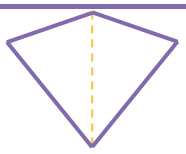
GM1.5 – Area of triangles and parallelograms answers

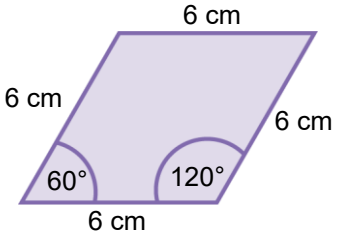
		Answers				
1.	a.	15 cm^2	b.	28 cm^2	c.	27 m^2
2.	a.	Area = 24 cm^2	b.	Area = 30 cm^2		B is bigger
3.	a.	96 mm^2	b.	225 cm^2	c.	16 000 m^2
4.	a.	Area = 56 cm^2	b.	Area = 54 cm^2		B is smaller
5.		Examples 				
6.		Examples 				
7.		Examples 				
8.		64 cm^2				
9.		39 cm^2				
		Challenge answers				
1.		169 cm^2 – 4 × 18cm^2 = 97 cm^2				

GM2

Geometry and measures – properties of shape

GM2.1 – 2D shapes answers

	Answers		
1.	108°		
2.	Triangle 1: Angles: 50°, 50°, 80°	Triangle 2: Angles: 50°, 65°, 65°	
3.	A, C and E all have a right angle.		
4.	 Some examples.		
5.	Students' drawings.	6.	Students' drawings.
7. a.	The dashed orange lines represent the diagonals that should bisect each other at right angles. All four sides should measure the same length.		
b.	There are many different trapeziums that can be made, and they don't need to be isosceles, so long as there is one pair of parallel lines.		
8.	Sides are: 4 cm, 4 cm, 6 cm, 6 cm		

	Challenge answers
1.	

GM2.2 – 3D shapes answers

Workings out

1.	a. Cuboid	b.	Triangular prism	c.	Tetrahedron	d.	Sphere

2. Cube; Cuboid; Pentagonal pyramid

3.

	At least one square face	No square faces
One or more curved faces		Sphere Cone Cylinder
No curved faces	(Cuboid) Square-based pyramid Cube	(Cuboid) Tetrahedron Triangular prism Hexagonal prism

4.

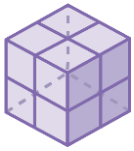
		3	
1	5	4	2
		6	

5.

	Number of faces	Number of Vertices	Number of edges
Cuboid	6	8	12
Cylinder	3	0	2
Tetrahedron	4	4	6
Hexagonal prism	8	12	18
Cube	6	8	12

6.	a. Cuboid	b.	Cone	c.	Pentagonal prism	d.	Sphere

7.

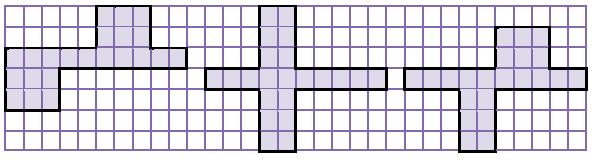


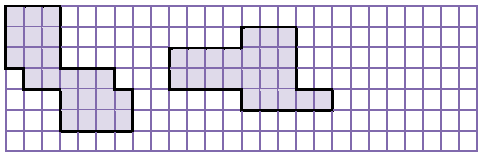
2x2x2 cube

Challenge answers

1. a. Net C does not make the cuboid.

b.





2.

Triangular faces	Octagonal faces	Edges	Vertices
8	6	36	24

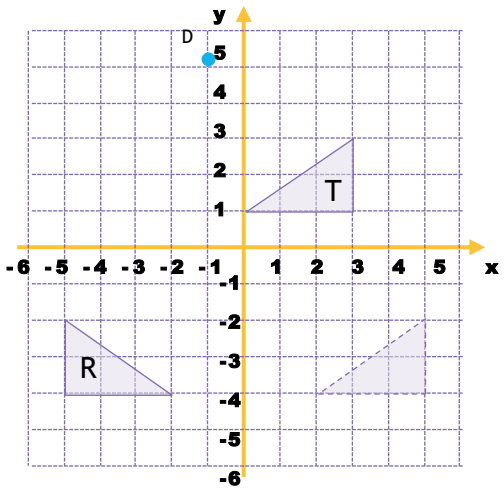
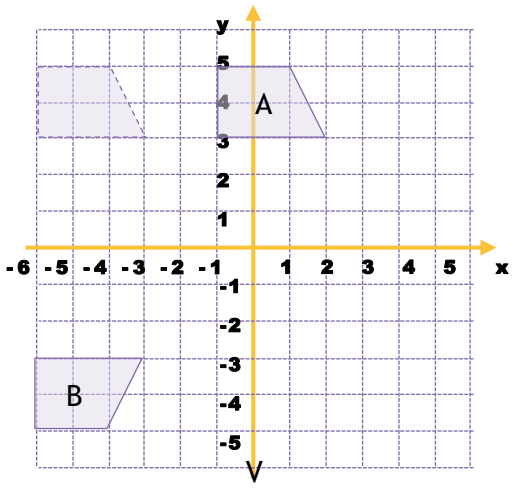
GM2.3 – Parts of the circle answers

	Answers					
1.	d = 24 cm					
2.	r = 3.5 m					
3. a.	circumference	b.	diameter	c.	radius	
4. a.	d = 18 cm	b.	r = 5 cm	c.	180 cm of ribbon	
5. a.	41 10p coins	b.	£4.10			
6.	thickness = 2 mm					
	Challenge answers					
1.	diameter = 20 cm					
2.	144 cm^2					

GM2.4 – Angles answers

	Answers					
1. a.	a = 41°	b.	b = 29°	c.	c = 55°	
2.	No, because 49° + 74° + 67° = 190° not 180°					
3. a.	d = 154°	b.	e = 31°	c.	f = 49°	
4.	w = 160°					
5.	x = 60°					
6.	100° and 200°					
7.	h = 130°	i = 145°		j = 15°		
8.	s = 50°	t = 40°	u = 65°	v = 25°		
	Challenge answers					
1.	a = 49°	b = 38°				

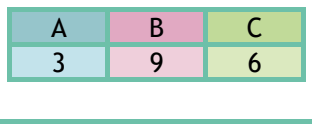
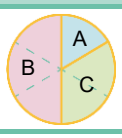
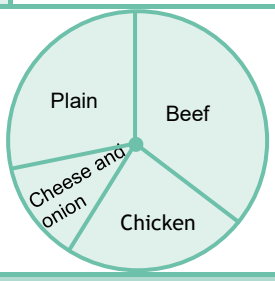
GM3.1 – Translation and reflection in four quadrants answers

	Answers						
1.	A = (2, -4) 		2.	P = (-6, 5) 			
	Challenge answers						
1. a.	(-1, 5).	b.	(0, 0)	c. i.	(-4, -1)	ii.	(4, 1)

S

Statistics

S1 – Pie charts and line graphs answers

	Answers											
1.	 											
2.	a - f		b - g		c - h		d - e					
3.	a.	7am	b.	15 km	c.	35 km	d.	1 hour	e.	1½ hours	f.	5½ hours
4.	a.	19°C	b.	3 hours	c.	4pm	d.	7pm – 8pm				
5.	a.	50	b.	100 more	c.	50 or less						
6.		Flavour	Angle									
		Beef	126°									
		Chicken	90°									
		Cheese and Onion	45°									
		Plain	99°									
												

	Challenge answers				
1.	a.	40 girls passed	b.	16 boys failed	
2.	a.	Thursday 2750 drinks	Saturday 3000 drinks	More water was drunk on Saturday	
	b.	Saturday was most likely warmer as more water was drunk during that day.			

S2 – The mean answers

	Answers									
1.	a.	5	b.	6	c.	5				
2.	16°C									
3.	11									
4.	Any two numbers that sum to 6.									
5.	10									
6.	13									
7.	14 points									
8.	10									
9.	9									
10.	8									

	Challenge answers
1.	$1 \times 4 + 2 \times 8 + 3 \times 5 + 4 \times 12 + 5 \times 9 + 6 \times 12 = 200$. Mean = $200 \div 50 = 4$