ALDERLEY EDGE SCHOOL FOR GIRLS

11+ ENTRANCE EXAM

SAMPLE MATHS PAPER

Time allowed: 1 hour

There are **two main sections** and **one extension section** for this paper:

Section A contains questions that will assess your numeracy skills, you should try to do these in your head. You should aim to spend no more than 25 minutes on Section A. The invigilator will tell you when 25 minutes have elapsed and you should move onto Section B.

Section B contains questions that will test your understanding of more complex questions, or those given in context. You should aim to spend 35 minutes on Section B.

You may return to section A at the end if you need to and if you have time. This is a non calculator examination so make sure you show clear workings for each question.

There is an extension section that follows section B. This is designed for the more able Mathematicians so that we can identify suitable candidates for scholarship. **Only attempt the extension questions if you are confident you have answered most of sections A and B correctly.**

Section A (30 questions)

Write down your answers in the boxes provided. Working may be included at the side, although you should aim to answer these questions using mental arithmetic.

1.	What is 3·6 × 100?	
2.	Work out 5 + 4 × 2	
3.	Write down the largest factor that 8, 12 and 20 have in common	
4.	Write 2.4 kg in g	g
5.	Write in figures the number four thousand and twenty two	
6.	What is the fifth prime number?	
7.	Which of these fractions is the largest? $\frac{3}{5}$ $\frac{4}{6}$ $\frac{5}{7}$ $\frac{6}{8}$	
8.	Put brackets in this calculation to make it correct: 3 × 4 - 2 + 3 = 9	3 × 4 - 2 + 3 = 9
9.	Find 20% of £80	£
10.	Freya's bus leaves at 08:05. She arrives 12 minutes early for the bus. When does she arrive?	
11.	How much more than – 3°C is 4°C?	°C
12.	£6 – £3·24 = ?	£
13.	Mel has 27 marbles. She gives $\frac{1}{3}$ of them to Vix and a half of the rest to Sarah. How many are left?	
14.	Find $\frac{2}{5}$ of £40	£
15.	Ruby has collected thirty-five 5p coins for charity. How much more does she need to reach £5?	£

16.	I buy 2 cakes for 45p each and a drink for 90p. What change will I have from a £5 note?	£
17.	How many 6cm pieces of string can be cut from a piece of string 50 cm long?	pieces
18.	Jill scores 17 out of twenty on a test. What percentage is this?	%
19.	$82 - 27 = 5 \times ?$	
20.	Small egg boxes can hold six eggs. How many egg boxes are needed to hold 50 eggs?	boxes
21.	I am thinking of a two-digit number that is a multiple of seven. The digits add up to 10. What is the number?	
22.	Two angles of a triangle are 49° and 52°. What is the third angle?	°
23.	Find the area of a square whose perimeter is 20cm	cm^2
24.	How many mm is three-fifths of a metre?	mm
25.	Seven out of forty pupils said they watch the news on television. What angle would this be on a pie chart?	°
26.	What is $5 \times 4 \times 3 \times 2 \times 1 \times 0$?	
27.	A triangle has a base of 6cm and a height of 4cm. It has the same area as another triangle of base length 8cm. How tall is the triangle?	cm
28.	What is the missing number in this number sentence? $3{\cdot}6 \times \ ? \ = 1{\cdot}8 \times 7$	
29.	What fraction is $\frac{2}{3}$ of $\frac{3}{4}$?	
30.	The mean of two numbers is six. One of the numbers is minus two. What is the other number?	

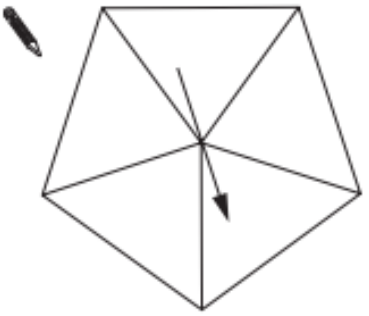
Section B (18 questions)

Write down your answers in the spaces provided. Include any necessary working out, methods or explanation as these may be worth marks.

1.

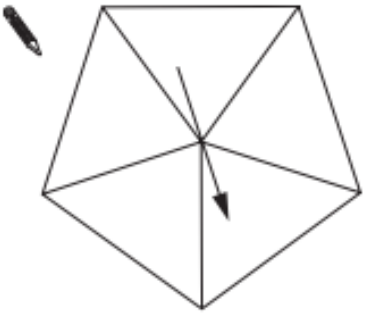
On each spinner **write five numbers** to make the statements correct.

It is **certain** that you will get a number **less than 6**



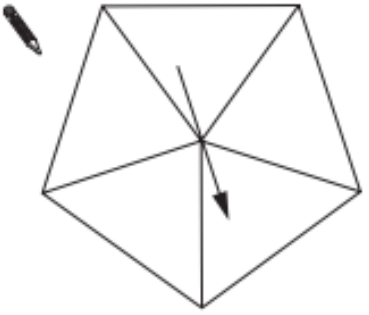
1 mark

It is **more likely** that you will get an **even** number than an **odd** number.



1 mark

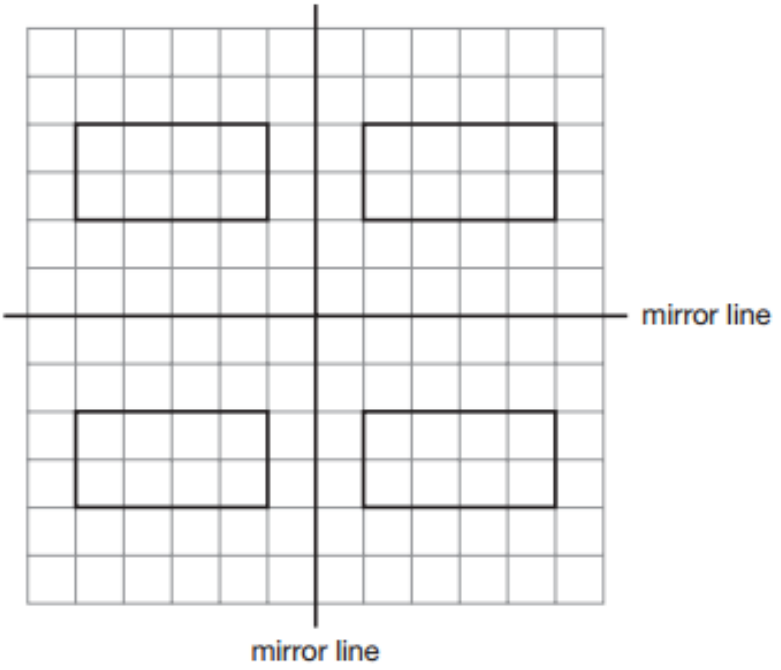
It is **impossible** that you will get a **multiple of 3**



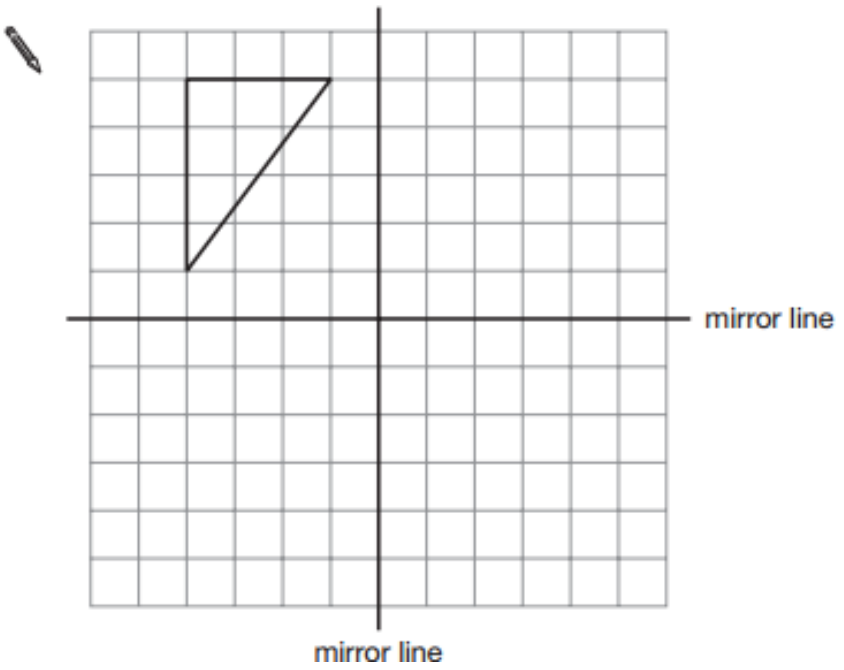
1 mark

2.

The square grid shows a rectangle reflected in **two mirror lines**.



On the square grid below, show the **triangle** reflected in the two mirror lines.



2 marks

3.

(a) These rules show how to get from one number to the next in these sequences.

Use the rules to write the next **two** numbers in each sequence.

Rule: **Add 8**				
	4	12	_____	_____

1 mark

Rule: **Multiply by 3**				
	4	12	_____	_____

1 mark

Rule: **Divide by 4 then add 11**				
	4	12	_____	_____

1 mark

(b) A sequence of numbers starts like this:

30 22 18

Could the rule be **Subtract 8**?

☐ Yes ☐ No

Explain your answer.

1 mark

4.

Write the missing numbers in the boxes.

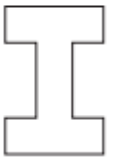
4 × ☐ + 20 = 180 _____ 1 mark

4 × 20 + ☐ = 180 _____ 1 mark

4 × ☐ − 20 = 180 _____ 1 mark

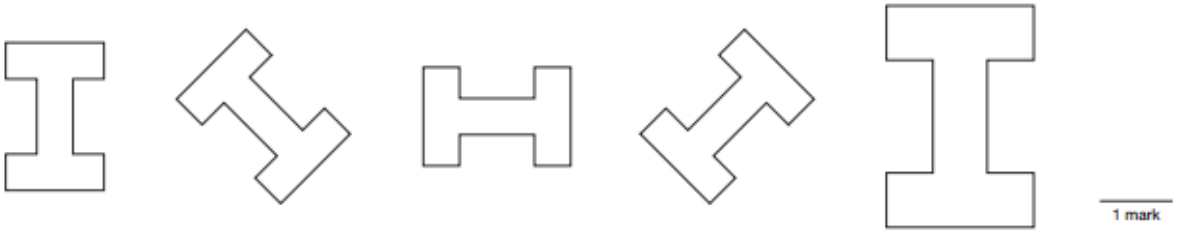
5.

Here is a shape.



I turn the shape through **45° clockwise**.

Tick (✓) the diagram that shows the shape **after** the turn.



_____ 1 mark

6.

Work out the missing numbers.

In each part, you can use the first line to help you.

(a)

$16 \times 15 = 240$

$16 \times \_\_\_\_ = 480$

1 mark

(b)

$46 \times 44 = 2024$

$46 \times 22 = \_\_\_\_$

1 mark

(c)

$600 \div 24 = 25$

$600 \div \_\_\_\_ = 50$

1 mark

7.

The table shows the average length of pregnancy for different mammals.

Mammal	Average length of pregnancy
Dolphin	276 days
Horse	337 days
Seal	350 days
Whale	365 days
Camel	406 days
Elephant	640 days

Use the information in the table to answer these questions.

(a) Which mammal has an average length of pregnancy of **1 year**?

_____

1 mark

(b) Which mammal has an average length of pregnancy of **50 weeks**?

_____

1 mark

(c) A human has an average length of pregnancy of **about 9 months**.

Which other mammal also has an average length of pregnancy of about 9 months?

_____

1 mark

8.

The pupils in a class had a sponsored swim.

They collected **£429.24**

(a) How much is £429.24 to the **nearest hundred pounds**?

£ _____

1 mark

(b) How much is £429.24 to the **nearest ten pounds**?

£ _____

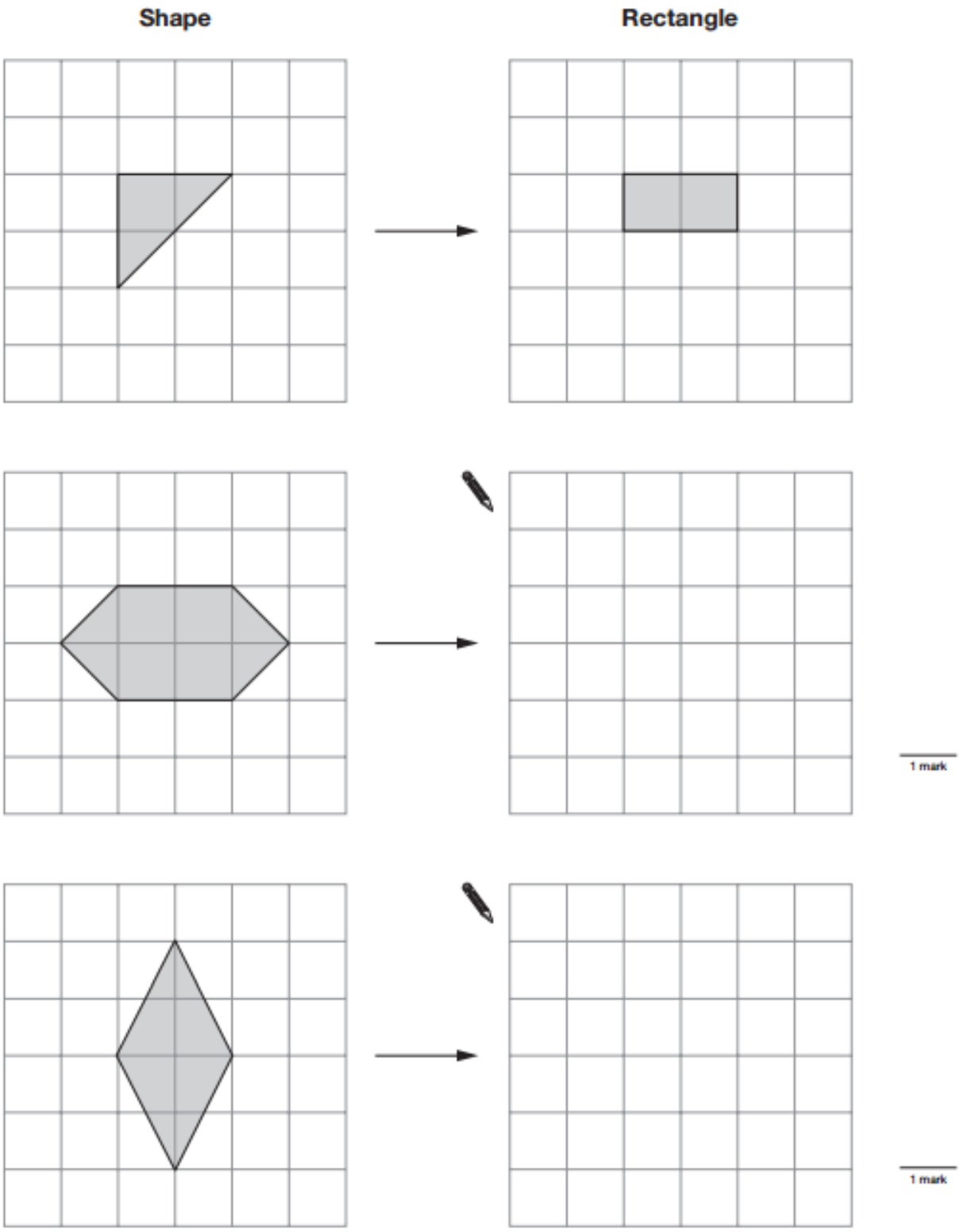
1 mark

9.

The grids in this question are centimetre square grids.

For each shape on the left, draw a **rectangle** that has the **same area**.

The first one is done for you.



1 mark

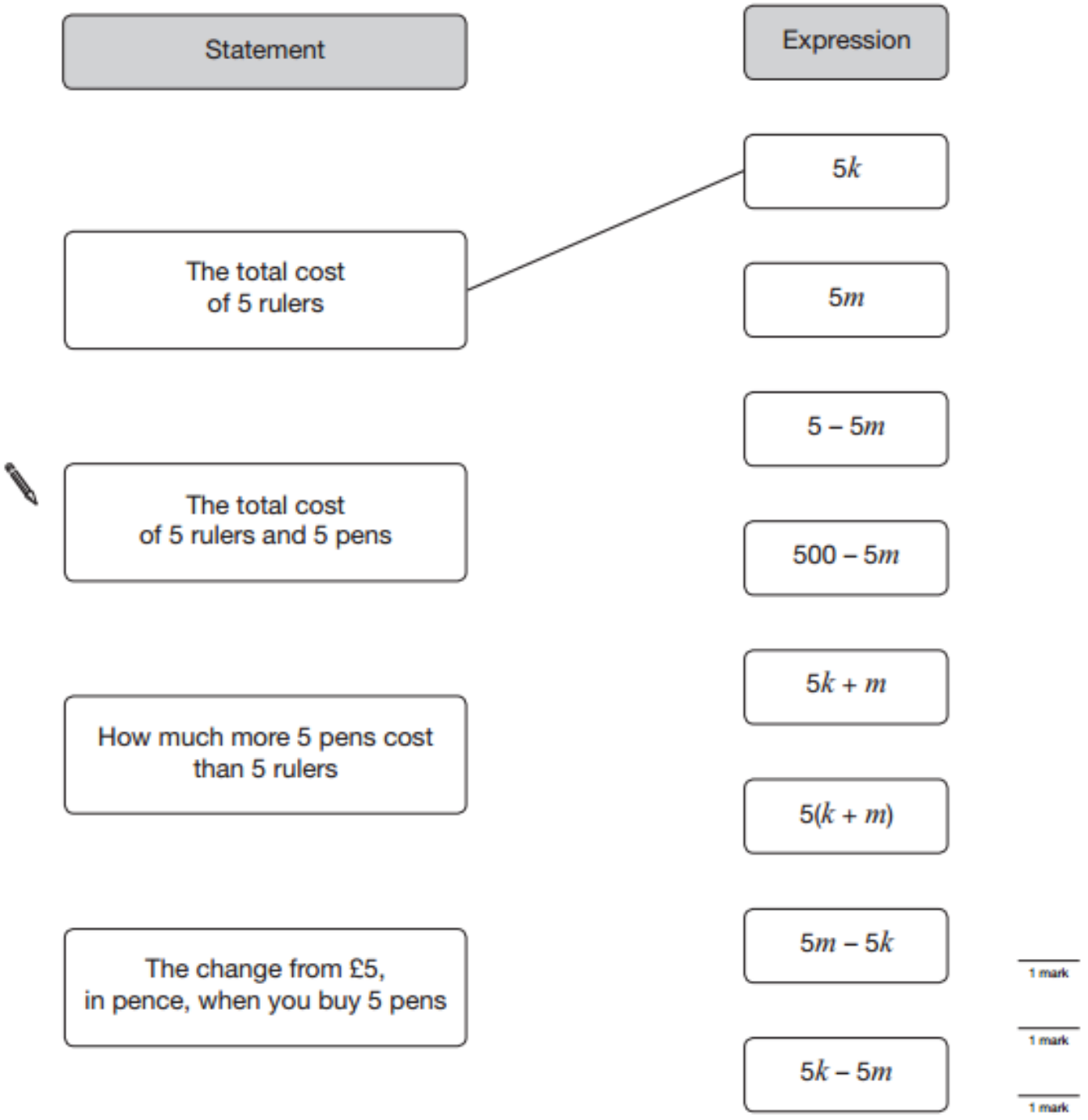
1 mark

10.

A ruler costs k pence.
A pen costs m pence.

Match each statement with the correct expression for the amount in pence.

The first one is done for you.



1 mark

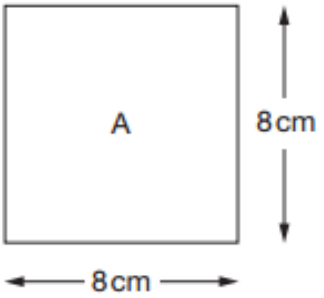
1 mark

1 mark

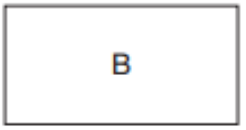
11.

(a) I have a square piece of paper.

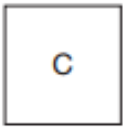
The diagram shows information about this square labelled A.



I fold square A **in half** to make rectangle B.



Then I fold rectangle B **in half** to make square C.



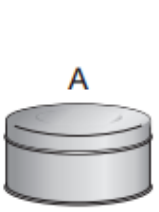
Complete the table below to show the area and perimeter of each shape.

	Area	Perimeter
Square A	cm^2	cm
Rectangle B	cm^2	cm
Square C	cm^2	cm

3 marks

12.

Here are two containers and the amounts they hold.



750 millilitres

0.5 litre

Not drawn accurately

Which container holds the greater amount?

☐ A ☐ B

How much **more** does it hold?

Give your answer in millilitres.

_____ millilitres

1 mark

13.

(a) Work out **5%** of **360**

_____

1 mark

(b) Work out **15%** of **360**

You can use part (a) to help you.

_____

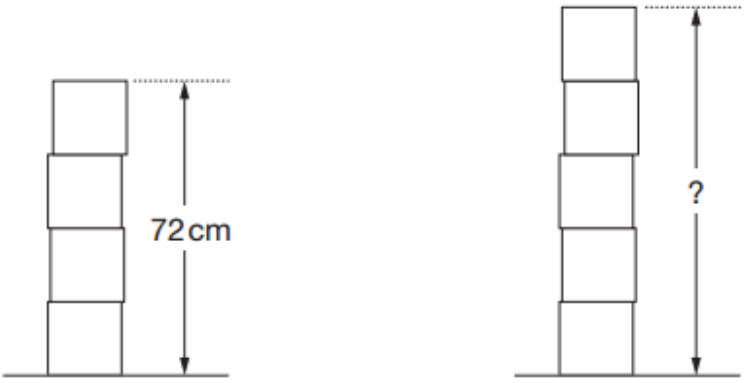
1 mark

14.

Lisa has some boxes that are all cubes of the same size.

She uses four of the boxes to make a pile with a height of **72cm**.

She puts one more box on top of the pile.



Work out the height of the pile of **five** boxes.

_____ cm

2 marks

15.

A rectangle has an **area** of **24 cm^2**

How long could the sides of the rectangle be?

Give three **different** examples.

_____ cm and _____ cm

_____ cm and _____ cm

_____ cm and _____ cm

2 marks

16.

Look at this equation.

$$y = 2x + 10$$

(a) When $x = 4$, what is the value of y?

_____ 1 mark

(b) When $x = -4$, what is the value of y?

_____ 1 mark

(c) Which equation below gives the **same** value of y for both $x = 4$ and $x = -4$?

Put a ring round the correct equation.

$y = 2x$ $y = 2 + x$ $y = x^2$ $y = \frac{x}{2}$

1 mark

17.

In a bag there are only red, blue and green counters.

(a) I am going to take a counter out of the bag at random.

Complete the table below.

Colour of counters	Number of counters	Probability
Red	6	
Blue		$\frac{1}{5}$
Green	6	

2 marks

(b) Before I take a counter out of the bag, I put **one extra blue** counter into the bag.

What effect does this have on the probability that I will take a **red** counter?

Tick (✓) the correct box.

- ☐ The probability has increased.
- ☐ The probability has decreased.
- ☐ The probability has stayed the same.
- ☐ It is impossible to tell.

1 mark

18.

(a) Some of the fractions below are **smaller than** $\frac{1}{9}$

Tick (✓) them.

☐ $\frac{1}{10}$ ☐ $\frac{4}{9}$ ☐ $\frac{1}{2}$ ☐ $\frac{1}{100}$ ☐ $\frac{1}{8}$

1 mark

(b) To the nearest per cent, what is $\frac{1}{9}$ **as a percentage**?

Tick (✓) the correct percentage.

☐ 0.9% ☐ 9% ☐ 10% ☐ 11% ☐ 19%

1 mark

(c) Complete the sentence below by writing a **fraction**.

$\frac{1}{9}$ is half of _____

1 mark

END OF MAIN SECTION

EXTENSION SECTION

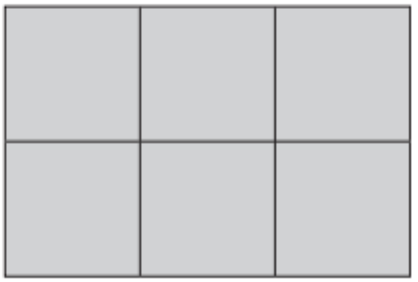
Only attempt this section if you are confident you have answered most questions in sections A and B correctly.

C1

The diagram shows a square with a **perimeter** of **12cm**.

Not drawn accurately

Six of these squares fit together to make a rectangle.



Not drawn accurately

What is the **area** of the **rectangle**?

You **must** give the correct unit with your answer.

1 mark

1 mark

C2

The table shows whether pupils in a class walk to school.

	Walk to school	Do **not** walk to school
Boys	2	8
Girls	5	10

(a) What percentage of the **boys** walk to school?

_____ %

1 mark

(b) What percentage of the **pupils** in this class walk to school?

_____ %

2 marks

C3

10. Work out

$$\frac{1 \times 2 \times 3 \times 4 \times 5}{1 \times 2 \times 3} = \_\_\_\_\_$$

1 mark

$$\frac{(1 \times 2 \times 3 \times 4 \times 5)^2}{(1 \times 2 \times 3)^2} = \_\_\_\_\_$$

1 mark

C4

Gita threw three darts.

Use the information in the box to work out what numbers she threw.

> The lowest number was 10
>
> The range was 10
>
> The mean was 15

Gita's numbers were _____, _____ and _____

1 mark

C5

In this question, consider only positive values of x

Look at this function.

$p = 3x$	As x increases, p increases.

For each function below, tick (✓) the correct box.

$q = x - 2$	As x increases,	☐ q increases	☐ q decreases
$r = \frac{1}{2}x$	As x increases,	☐ r increases	☐ r decreases
$s = 2 - x$	As x increases,	☐ s increases	☐ s decreases
$t = \frac{1}{x}$	As x increases,	☐ t increases	☐ t decreases

2 marks

C6

(a) The **perimeter** of a regular hexagon is $42a + 18$

Write an expression for the length of **one** of its sides.

_____

1 mark

(b) The **perimeter** of a different regular polygon is $75b - 20$

The length of one of its sides is $15b - 4$

How many sides does this regular polygon have?

_____

1 mark

(c) The **perimeter** of a square is $4(c - 9)$

Find the perimeter of the square when $c = 15$

_____

1 mark

C7

To find the nth triangular number, you can use this rule.

$$n\text{th triangular number} = \frac{n}{2}(n+1)$$

Example: 3rd triangular number $= \frac{3}{2}(3+1)$

$= 6$

(a) Work out the **10th** triangular number.

_____

1 mark

(b) Now work out the **100th** triangular number.

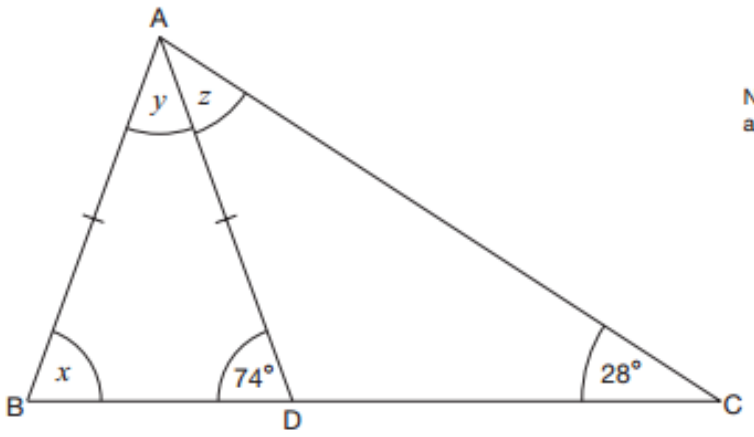
_____

1 mark

C8

Look at triangle ABC.

ABD is an **isosceles** triangle where AB = AD.



Not drawn accurately

Work out the sizes of angles x, y and z

Give reasons for your answers.

$x =$ _____ ° because _____

_____

$y =$ _____ ° because _____

_____

$z =$ _____ ° because _____

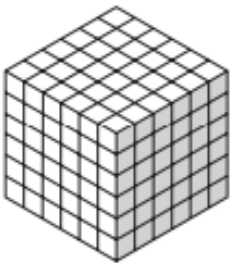
_____

2 marks

C9

Kaylee has some 1cm cubes.

She makes a solid cube with side length **6cm** out of the cubes.



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Then she uses all these cubes to make some cubes with side length **2cm**.

How many of these **2cm** cubes can Kaylee make?

_____

_____

2 marks

C10

(a) Bags A and B contain some counters.

Bag A

Bag B

The number of counters in each bag **is the same**.

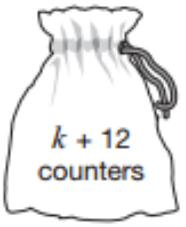
Work out the value of y

_____

2 marks

(b) Bag **C** contains **more** counters than bag **D**.

Bag C



Bag D

What is the **smallest** possible value of k?

_____

2 marks

C11

Look at this information.

$$\frac{27}{40} = 0.675$$

$$\frac{29}{40} = 0.725$$

Use this information to write the missing **decimals** below.

$\frac{31}{40} =$ _____ 1 mark

$\frac{23}{40} =$ _____ 1 mark

END OF EXTENSION SECTION