AKADEMEIA
HIGH SCHOOL

Candidate name	
If you are placed in a specific maths set at your current school, please indicate the name or level of that set (for example: Express, Top, Middle, Core, etc.)	

Academic Potential Assessment Test

Mathematics Year 9

ENGLISH VERSION

January 2025

Time allowed: 75 minutes

Instructions:

- Use black/blue ink or ball-point pen.
- Answer the questions in the spaces provided
  – *there may be more space than you need*.
- Only answers are required to the questions in **Section A** (Q1-Q8)
- For questions in **Section B** (Q9-Q13), you should give full written solutions.
  Just stating an answer will not receive full marks.

- You are **NOT** allowed to use a calculator.

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 50.

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Check your answers if you have time at the end.
- Try to answer every question, but you might not have enough time to solve all of them.

Good luck!

Why 10+10 = 11+11?
Because ten plus ten is twenty and eleven plus eleven is twenty too.

SECTION A

Only answers are required to the questions in Section A (Q1-Q8)

Q1. Only answers are required.

(a) Work out

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

.....

(1)

(b) Work out

$$3\frac{1}{2} \div \frac{2}{3}$$

Give your answer as a mixed number.

.....

(1)

(c) Write 4.4347 correct to 2 decimal places.

.....

(1)

(d) Here is a list of ingredients for making 10 scones.

Ingredients for 10 scones	
75 g	butter
350 g	self-rising flour
40 g	sugar
150 ml	milk
2	eggs

Mia wants to make 25 scones.
Work out how much sugar she needs.

.....

(1)

(e) In a shop, a TV has a normal price of £500
The shop has a sale.

On Monday, the normal price of the TV is reduced by $\frac{1}{10}$ to give the sale price.

On Tuesday, the sale price of the TV is reduced further by 20%.

Work out the final price of the TV.

.....

(1)

Q2. Only answers are required.

(a) $\boldsymbol{k = 6x^2 - 5x}$

Work out the value of *k* when $x = -2$

.....

(1)

(b) Expand and simplify $4(y + 3) - (4 - 2y)$

.....

(1)

(c) Expand and simplify $(2m + 7)(m - 3)$

.....

(1)

(d) Simplify fully

$$\frac{p^3 \times p^4}{p^2}$$

.....

(1)

(e) Solve $4x - 11 = 2(x + 3)$

.....

(1)

Q3. Only answers are required.

(a) *EFG* is a triangle.
AB is parallel to *CD*.
Work out the size of the angle marked *p*.

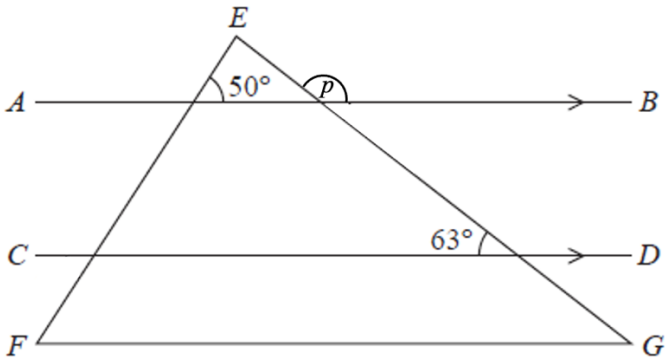


Diagram **NOT** accurately drawn

.....

(1)

(b) This shape is made from an equilateral triangle and 3 identical isosceles triangles.
Work out the size of the angle marked *y*.

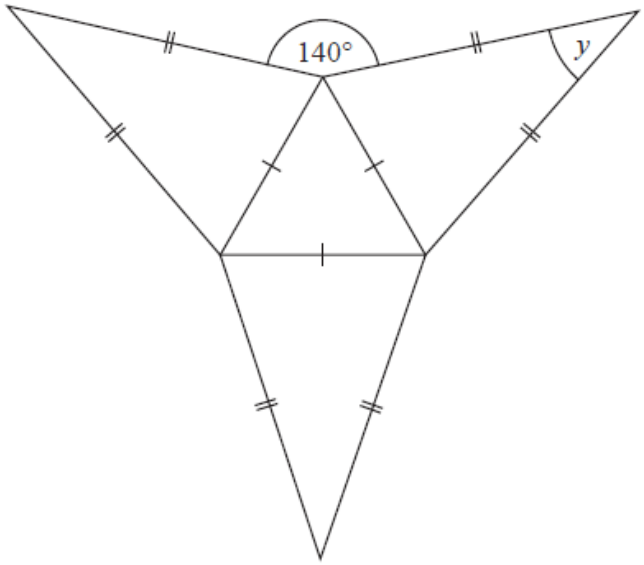
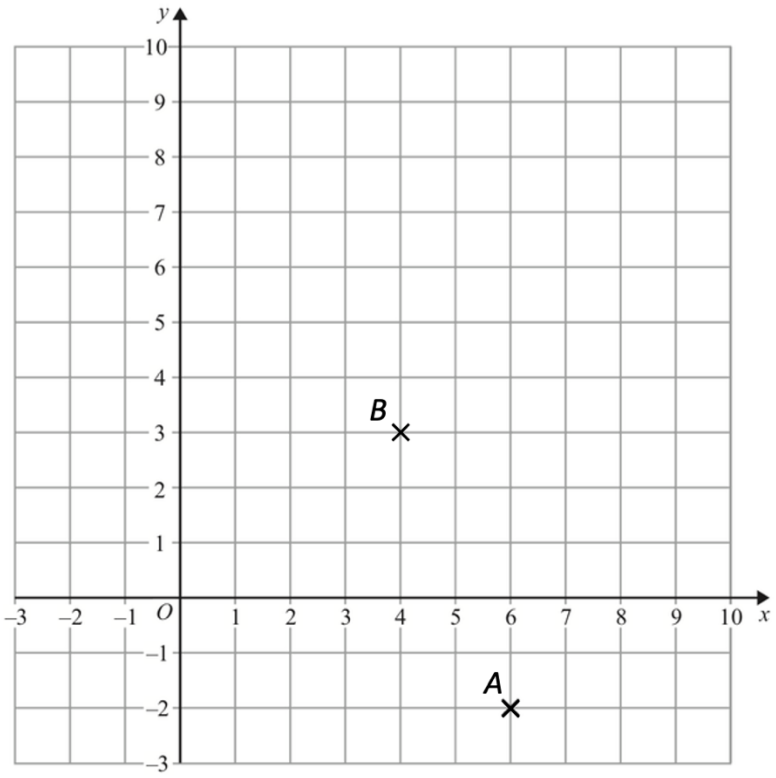


Diagram **NOT** accurately drawn

.....

(1)

(c) Two points, *A* and *B*, are plotted on a centimetre grid.



(i) Write down the coordinates of point *A*.

(..... , ...)

(1)

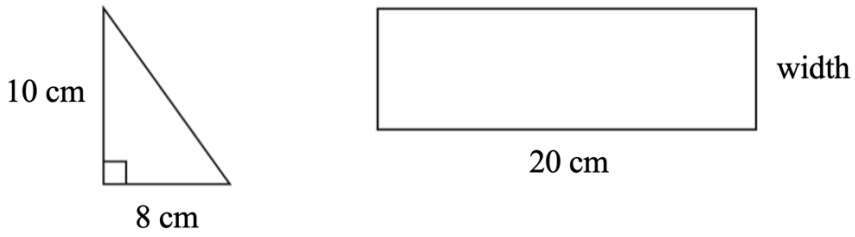
(ii) Point B is a midpoint of AC. Work out the coordinates of point C.

(..... , ...)

(1)

(d) Here are a triangle and a rectangle.
The area of the rectangle is 3 times the area of the triangle.
Work out the width of the rectangle.

Diagram **NOT** accurately drawn

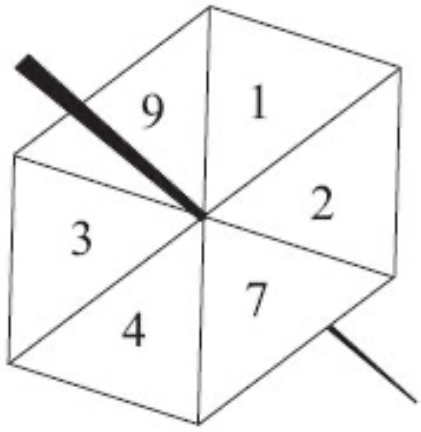


.....

(1)

Q4. Only answers are required.

(a) Here is a fair 6-sided spinner. Jake is going to spin the spinner once.



(i) Write down the probability that the spinner will land on 4

.....

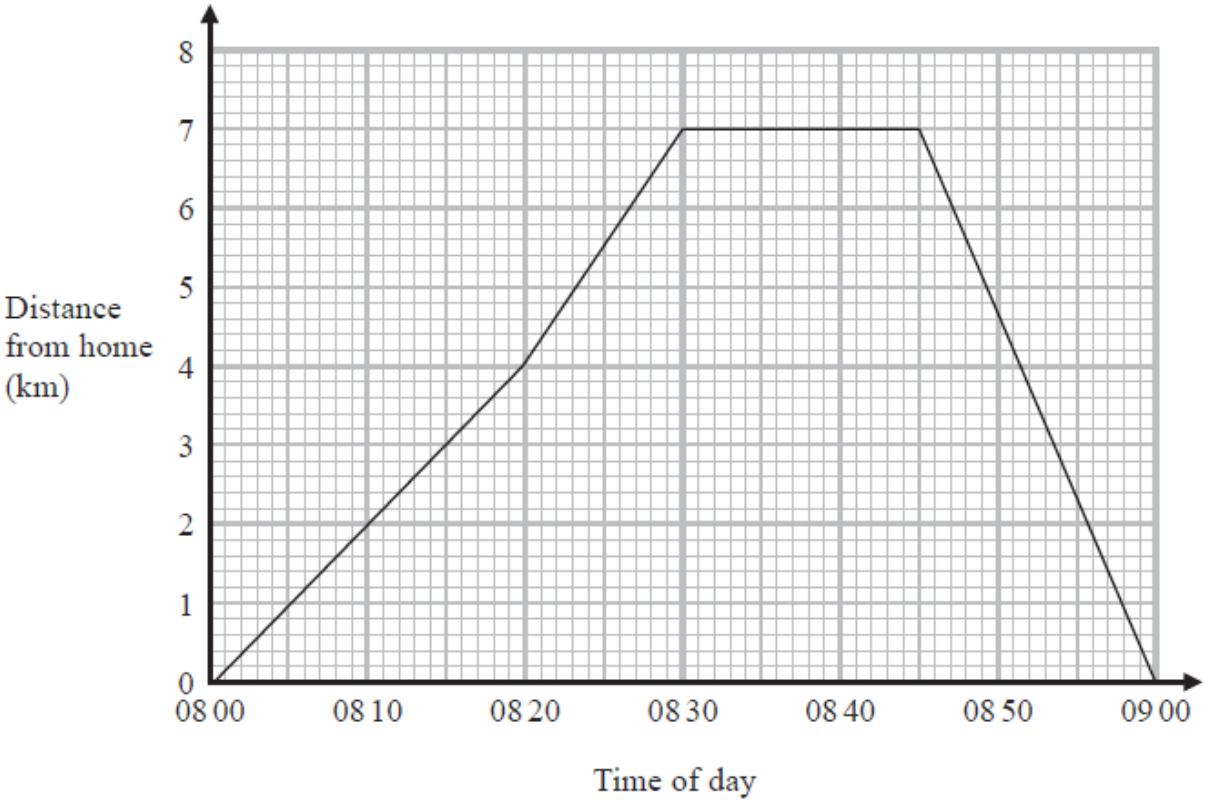
(1)

(ii) Write down the probability that the spinner will land on a number greater than 10

.....

(1)

(b) Carly cycles to her friend's house.
She stays at her friend's house for a number of minutes.
Then she cycles home.
Here is the travel graph for her journey.



(i) For how many minutes did Carly stay at her friend's house?

..... min

(1)

(ii) How many kilometers did Carly cycle in total?

..... km

(1)

(iii) Work out Carly's speed, in km/h, for the first 20 minutes of her journey.

..... km/h

(1)

Q5. Only answers are required.

(a) Write these numbers in order of size.
Start with the smallest number.

$$\frac{1}{2} \quad 0.55 \quad 40\% \quad \frac{5}{12}$$

.....

(1)

(b) A shop offers 20% off everything in a sale.

The sale price of a pair of designer shoes is £40.
Calculate the cost of the shoes before the sale.

.....

(1)

(c) Write these numbers in order of size.
Start with the smallest number.

6.72×10^5 67.2×10^{-4} 672×10^4 0.000 672

.....

(1)

(d) Write 126 as a product of its prime factors.

.....

(1)

(e) Ali, Beth and Celia divide £280 in the ratio 2 : 5 : 3
Work out how much Ali gets.

.....

(1)

Q6. Only answers are required.

(a) Kiaria is *x* years old.
Kiaria is 7 years older than Jay.
Martha is twice as old as Kiaria.

(i) Write down an expression, in terms of x, for:

Jay's age

.....

Martha's age

.....

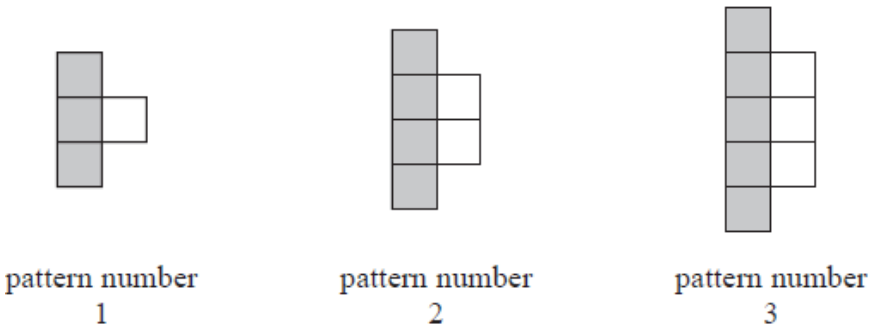
(1)

(ii) Knowing that the sum of their three ages is 77.
Work out Jay's age.

.....

(1)

(b) Here is a sequence of patterns made with grey square tiles and white square tiles.



pattern number 1 | pattern number 2 | pattern number 3

Find the total number of tiles in pattern number *20*

.....

(1)

(c) Make v the subject of the formula

$E = \frac{mv^2}{2}$

.....

(1)

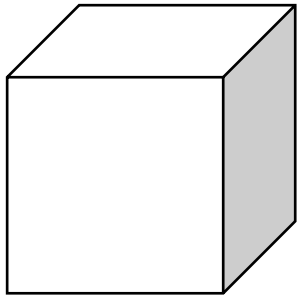
(d) Simplify $(2x^3)^5$

.....

(1)

Q7. Only answers are required.

(a) The volume of a cube is $64\ cm^3$
Work out its total surface area.



.....

(1)

(b) The diagram shows a trapezium.
Work out its area. Write correct units in your answer.

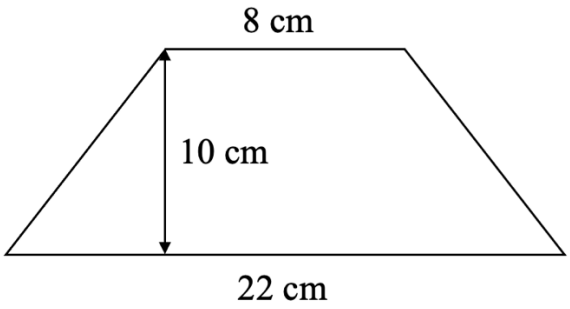


Diagram NOT accurately drawn

.....

(1)

(c) Here is a right-angled triangle.
Work out the value of x.

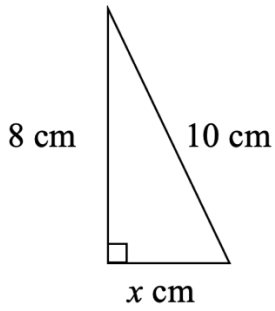


Diagram NOT
accurately drawn

.....

(1)

(d) Amy has some toy bricks.
Each brick is a cube of side 1 cm.

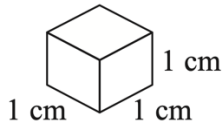
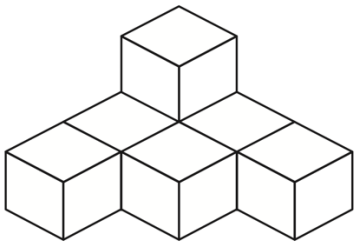


Diagram **NOT**
accurately drawn

Amy uses some of the bricks to make this solid shape.



Amy adds some more of the bricks to this solid shape to make a cube of side 3 cm.
How many bricks does Amy add?

.....

(1)

(e) The diagram shows a square with perimeter 16 cm.
Work out the area of the shaded region.

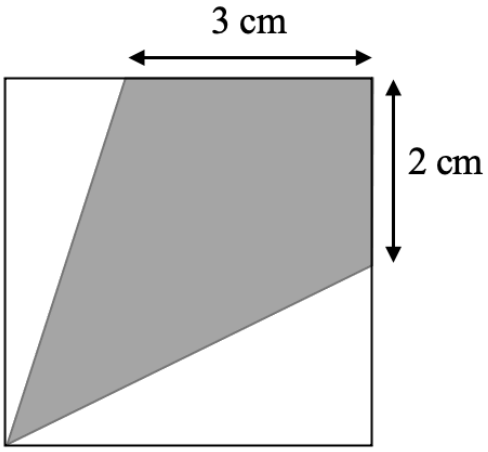


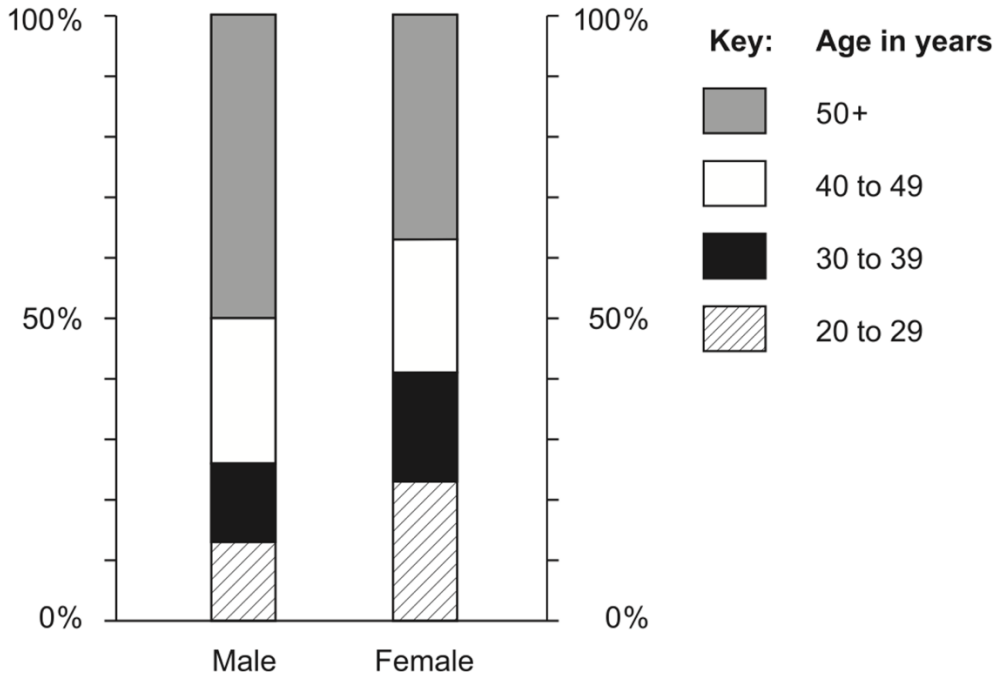
Diagram NOT accurately drawn

.....

(1)

Q8. Only answers are required.

(a) A newspaper predicts what the ages of secondary school teachers will be in six years' time. They print this chart.



The chart shows **24%** of male teachers will be aged 40 to 49.

(i) About what percentage of female teachers will be aged 40 to 49?

.....

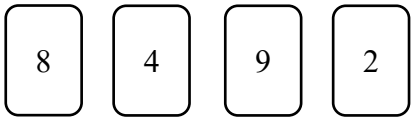
(1)

(ii) The newspaper predicts there will be about 18 000 male teachers aged 40 to 49. Estimate the number of male teachers that will be aged 50+

.....

(1)

(b) Here are four cards.
Each card has a number on it.



Write all the three-digit numbers, less than 450, that can be made using these cards.
For one number, each card can be used only once.

.....

(1)

(c) Here are Ryan's scores in eight French tests.

4 6 4 7 8 6 7 6

(i) Work out the mean of Ryan's scores.

.....

(1)

(ii) Ryan has to sit one more test. Ryan wants his mean mark for all nine tests to be at least 7. Work out the least mark that Ryan needs to get for the last test.

.....

(1)

SECTION B

For questions in Section B you should give full written solutions.
Just stating an answer will not receive full marks.

Q9.

George spent $\mathbf{25}\%$ of his pocket money on a movie ticket.

Then he spent $\frac{\mathbf{3}}{\mathbf{5}}$ of the remaining money on a large popcorn and a small drink.

Finally, he had $\$\mathbf{9}$ left.

Work out how much pocket money George had initially.

Show all steps of your working.

.....

(2)

Q10.

Solve

$$\frac{5-x}{2}-\frac{2x+1}{3}=1$$

Show clear algebraic working.

.....

(2)

Q11.

A pattern is made from four identical squares.

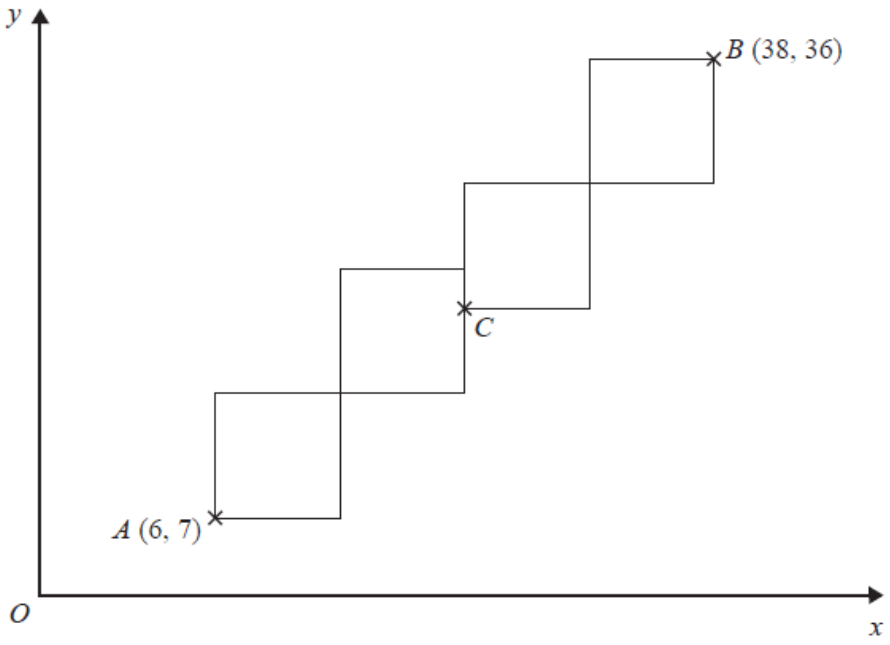
The sides of the squares are parallel to the axes.

Point *A* has coordinates (6,7)

Point *B* has coordinates (38,36)

Point *C* is marked on the diagram.

Work out the coordinates of *C*.



.....

(2)

Q12.

Bill has some beads in a bag.

18 of the beads are red

42 of the beads are blue

The rest of the counters are yellow.

Bill takes at random one bead from the bag.

The probability that he takes a yellow bead is $\frac{2}{7}$

Work out how many yellow beads are in the bag before Bill takes a bead.

.....

(2)

Q13.

The example of a particular type of number chain is shown below.

97 → 63 → 18 → 8

The first number must be a positive integer. Each number after the first is the product of the digits of the previous number, so in this case 63 = 9 × 7; 18 = 6 × 3; 8 = 1 × 8.
The chain stops when a single-digit number is reached.

Another example can be found below.

53 → 15 → 5

Suppose that in such a chain the final number is **6**.
Find all possible two-digit numbers for which the final number in the chain is **6**.

.....

(2)

BLANK PAGE