Name	Date started	Target end date

WJEC GCSE Mathematics and Numeracy (Double Award) — Question Pack

Foundation sequences and patterns: recognising linear (arithmetic) sequences, describing the rule in words, finding the common difference, predicting

REVISE
.wales

F2.11 — Sequences, patterns & linear nth term

Spec 2.3.1, 2.3.2, 2.3.3, 2.3.4 — Unit 2 (no calculator)

Foundation sequences and patterns: recognising linear (arithmetic) sequences, describing the rule in words, finding the common difference, predicting later terms, and writing a linear nth term of the form dn + c. Sourced from legacy WJEC GCSE Mathematics-Numeracy Foundation papers (3300U10/U20) and accessible content from Intermediate papers (3300U30/U40), organised for revision under the 2025 spec.

2025 SPECIFICATION

Estimated time for entire question pack: ~2 hours 20 minutes

*Derived from the GCSE Higher pace of **~1.5 min/mark** (93 marks across 41 questions).*

*You are advised to **not** attempt to complete all of this in one sitting.*

ABOUT THIS QUESTION PACK

This is a **focused single-topic practice pack**, not a single mock paper. Questions are organised against the 2025 specification.

Questions are ordered chronologically by sitting, with custom-written and SAM questions at the end.

INSTRUCTIONS

Use black ink or black ball-point pen. Show all working — method marks are awarded for clear setup.

*A calculator is **not** permitted on any question in this pack (Unit 2 is the non-calculator paper).*

Sequences, patterns & linear nth term — what the new spec asks

WJEC GCSE Mathematics (first teaching 2025) · Unit 2: non-calculator.

Generating sequences 2.3.1

- Continue a sequence given the first few terms.
- Generate a sequence from a term-to-term rule.
- Generate a sequence from a position-to-term rule.

Describing patterns 2.3.2

- Describe a sequence rule in words.
- Find the common difference of a linear sequence.
- Recognise simple patterns including squares and triangulars.

nth term 2.3.3

- Write the nth term of a linear sequence as $dn + c$.
- Use the nth term to find any term.
- Decide whether a given number is in the sequence.

Exam strategy 2.3.4

- Non-calculator — show the common difference d.
- Check the formula by substituting $n = 1, 2, 3$.
- Distinguish ‘next term’ from ‘nth term’.

Crib sheet »

Sequences, patterns & linear nth term in one page

Quick-reference notes — revisit before each question. Don't use during the questions.

Spotting a linear sequence

The same number is added or subtracted each time.

4, 7, 10, 13, … common difference d = 3.

Describing the rule

In words: 'add 3 each time', 'subtract 2 each time', 'double the previous term'.

nth term of a linear sequence

$$\text{nth term} = dn + c$$

d is the common difference; c makes term 1 match.

4, 7, 10, … ⇒ 3n + 1.

Finding c

Once d is known, work out c from term 1.

d = 3, term 1 = 4 ⇒ 3(1) + c = 4 ⇒ c = 1.

Predicting later terms

Substitute n into the nth term to jump ahead.

For 3n + 1, term 20 = 3×20 + 1 = 61.

Common traps

- Mixing up term number and term value.
- Forgetting that d can be negative (decreasing sequence).
- Stopping at '3n' without adding c.

Examiner only

1. *(a)* Write down the next two numbers in the following sequence. [2]

35, 25, 16, 8, ... , ...

(b) Find the value of $2x + 7y$ when $x = -3$ and $y = 10$. [2]

(c) Simplify the expression $8k + 3m - 2k - 8m$. [2]

2. Write down 0·4, 15% and $\frac{7}{20}$ in ascending order.

You must show all your working. [3]

....

Smallest value ⟶ Greatest value

Examiner only

6. *(a)* Write down the first three terms of the sequence whose nth term is given by $2n - 5$. [2]

.....

.....

.....

.....

The first three terms are ..... , ... and .....

(b) Write down an expression for the nth term of the following sequence. [2]

7, 11, 15, 19, ...

.....

.....

.....

Examiner only

9. Use a ruler and a protractor to make an accurate drawing of this triangle. [3]

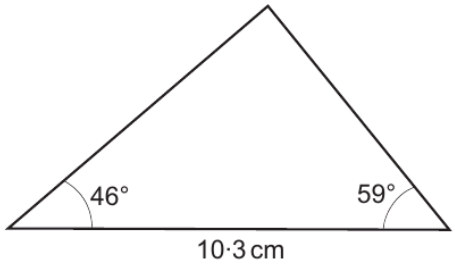

Diagram not drawn to scale

Examiner only

17. *(a)* Write down the first three terms of the sequence whose nth term is given by $2n - 5$. [2]

.....

.....

.....

.....

The first three terms are ..... , ... and .....

(b) Write down an expression for the nth term of the following sequence. [2]

7, 11, 15, 19, ...

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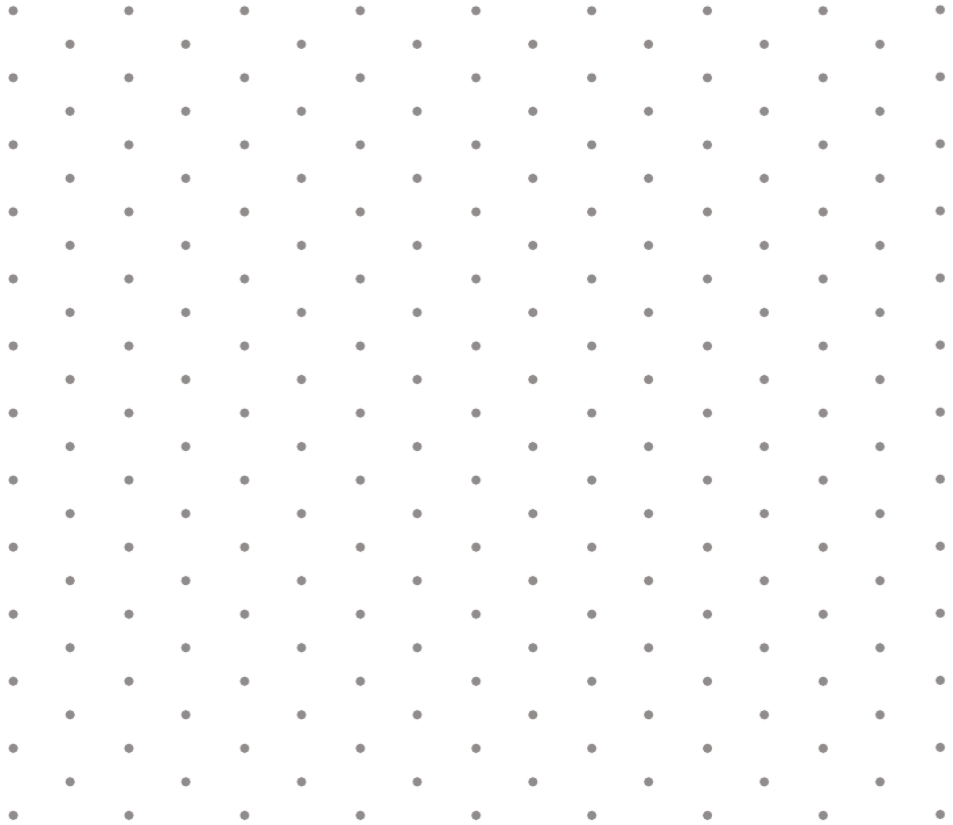
Examiner only

5. *(a)* Draw an isometric representation of a cuboid measuring 6 cm by 4 cm by 3 cm.
Use the grid below. [2]



(b) Calculate the volume of the cuboid.
Give the units of your answer. [3]

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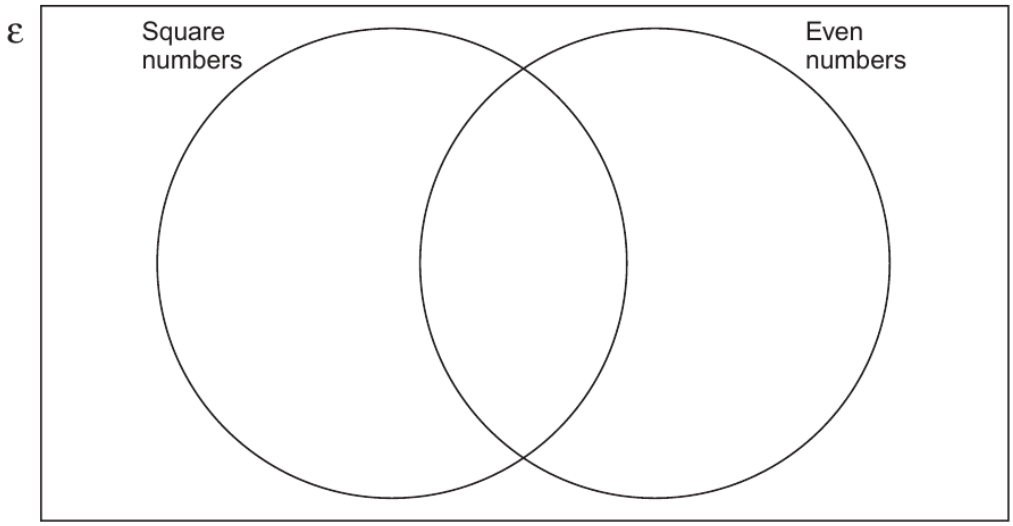
Examiner only

5. The Venn diagram below is used for showing square numbers and even numbers.

Place the numbers **1**, **2**, **3**, **4** and **5** in the Venn diagram. [2]



6. *(a)* Describe the rule for continuing each of the following sequences.

(i) 27, 32, 37, 42, 47, ... [1]

Rule:

.....

.....

(ii) 6, 12, 24, 48, 96, ... [1]

Rule:

.....

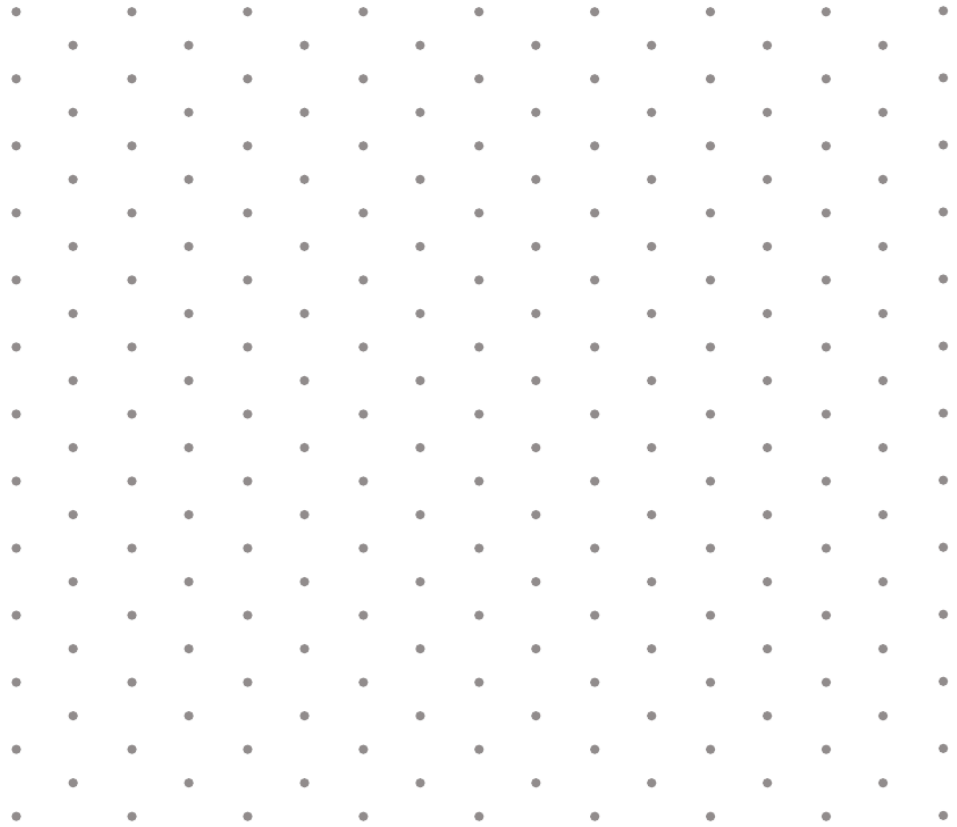
.....

(b) Write the next term in the sequence below. [1]

0·2, 0·4, 0·6, 0·8, ...

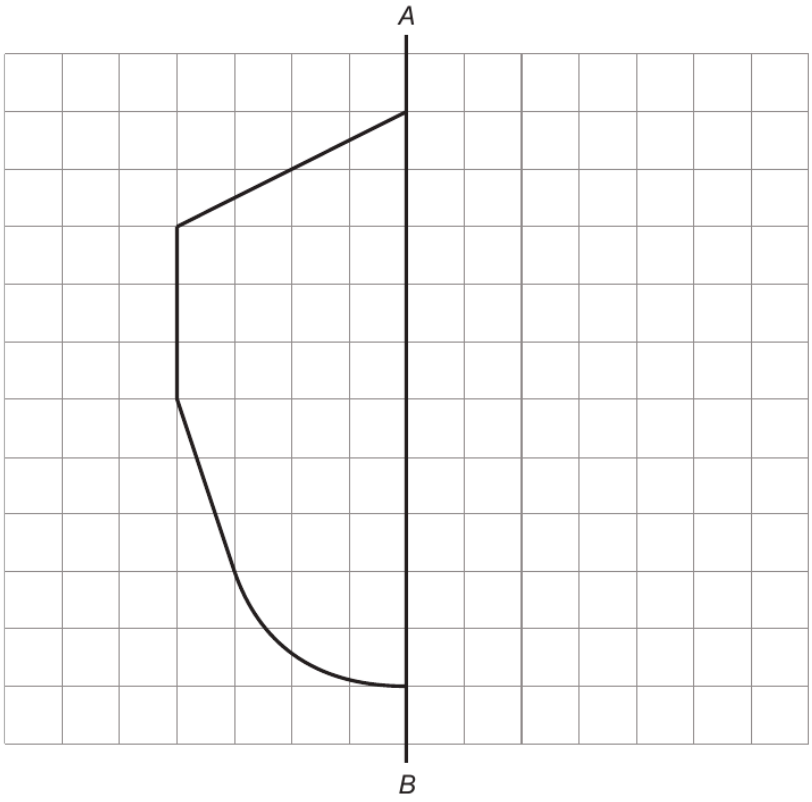
Examiner only

14. Draw an isometric representation of a cuboid measuring 6 cm by 4 cm by 3 cm.
Use the grid below. [2]



Examiner only

5. *(a)* Complete the following figure so that it is symmetrical about the line AB. [2]



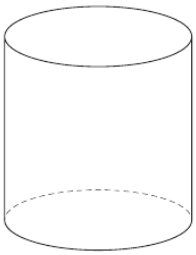
(b) Ben draws a shape that has:

- 4 sides,
- 4 angles of equal size,
- a pair of sides of length 4 cm, and
- a pair of sides of length 6 cm.

What type of shape has Ben drawn?
Circle the correct answer. [1]

square rhombus trapezium rectangle kite

(c) Write down the special name for the shape below. [1]



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Examiner only

5. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

ABC is an isosceles triangle and *ABP* is a straight line.
$AC = BC$ and $\hat{ACB} = 76°$.

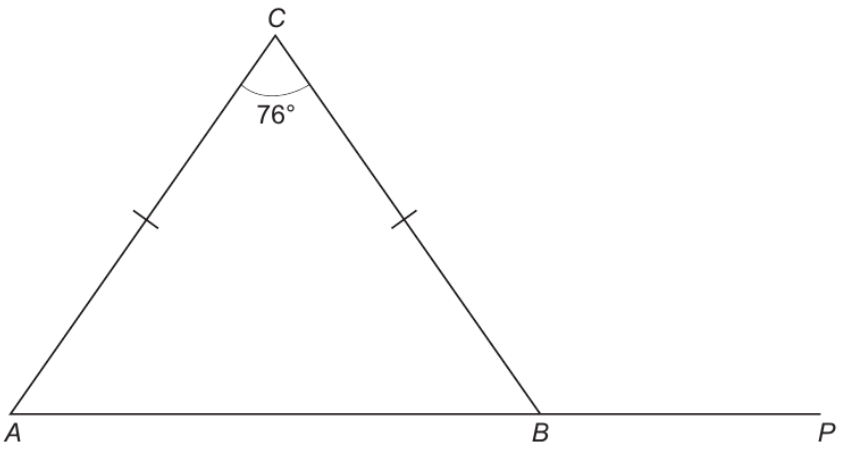


Diagram not drawn to scale

Calculate the size of $\hat{CBP}$.
You must show all your working. [3 + 2 OCW]

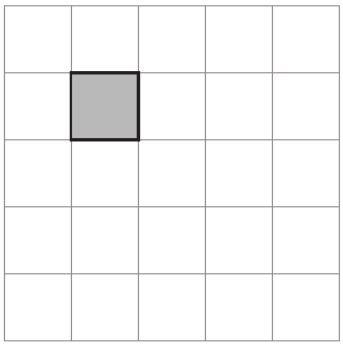
Examiner only

12. Choose any number.

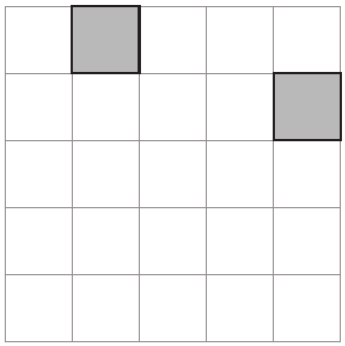
Show that $\frac{1}{5}$ of 25% of your number = $\frac{1}{4}$ of 20% of your number. [4]

Examiner only

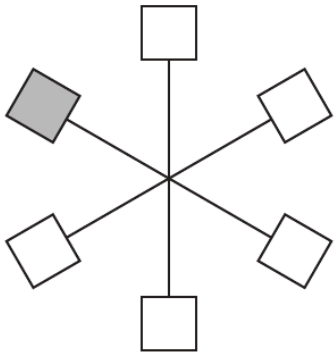
3. *(a)* Shade **one square** so that the diagram below has rotational symmetry of order 2. [1]



(b) Shade **two squares** so that the diagram below has rotational symmetry of order 4. [1]

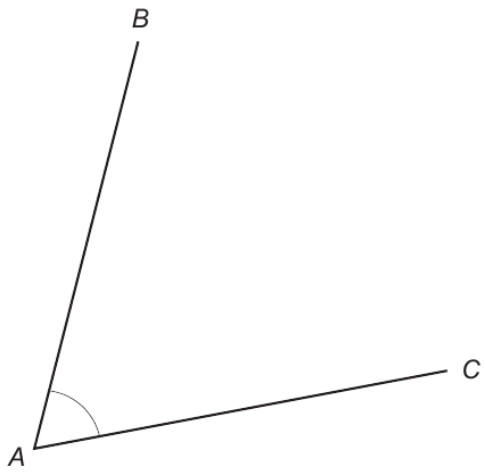


(c) Shade **two squares** so that the diagram below has rotational symmetry of order 3. [1]



Examiner only

8. *(a)* Measure $B\hat{A}C$. [1]



$B\hat{A}C$ = ... °

(b) One of the angles below is a reflex angle.
Circle the correct answer. [1]

45° 90° 135° 180° 225°

(c) The diagram below shows two angles on a straight line.
The large angle is 5 times the size of the small angle.
Find the size of each angle. [2]

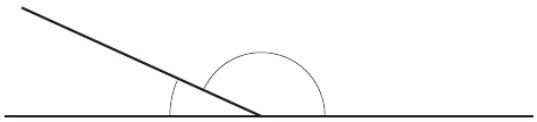


Diagram not drawn to scale

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Small angle = ... ° Large angle = ... °

Examiner only

8. Alison and Sarfraz play a game. They each have a different bag of cards.

Alison has the following cards in her bag.

Sarfraz has the following cards in his bag.

They each take a card at random from their own bag. They make a note of the letter, and return the card to the bag.

They each do this 100 times.

Who do you think is likely to choose the letter R more often?

Alison ☐ Sarfraz ☐

You must explain your decision and show all your working. [4]

Examiner only

10. Twenty-five balls have numbers printed on them.
Some of the balls are coloured yellow (Y), the others are coloured blue (B).
The list below shows both the colour of each ball and the number printed on it.

Y 76	Y 217	B 54	B 126	Y 21
Y 438	Y 32	B 561	B 194	Y 69
B 37	B 518	Y 94	Y 157	Y 208
Y 382	B 56	B 234	Y 72	B 84
Y 68	Y 271	Y 53	B 100	Y 321

(a) Complete the frequency table. [2]

Type of ball	Yellow		Blue	
	Number < 100	Number $\geqslant 100$	Number < 100	Number $\geqslant 100$
Frequency	8			

(b) How can you use your table to check that all the balls have been counted? [1]

(c) The 25 balls are placed in a box.
One ball is chosen at random.
What is the probability that it is a yellow ball numbered less than 100? [2]

Examiner only

13. The exterior angle of a regular polygon is 36°.

(a) How many sides does the polygon have? [2]

(b) Calculate the sum of all the interior angles of this regular polygon. [2]

14. *(a)* Write down the first three terms of the sequence whose nth term is given by $n^2 - 6$. [2]

1st term = ... 2nd term = ... 3rd term = ...

(b) Write down an expression for the nth term of the following sequence. [2]

5, 11, 17, 23, …

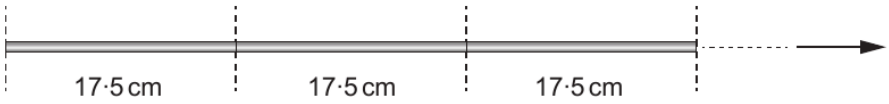
Examiner only

2. *(a)* Write down the next two numbers in the following sequence. [2]

50 39 28 17 ....

(b) Use the formula $x = 4a + 3b$ to find the value of x when $a = 7{\cdot}2$ and $b = -4{\cdot}6$. [2]

3. Identical rods can be placed end to end, as shown below.
Each rod is 17·5 cm long.



How many of these rods can be placed, in this way, between two points 4 metres apart? [4]

Number of rods = ...

Examiner only

6. Write down the next number in each of the following sequences.

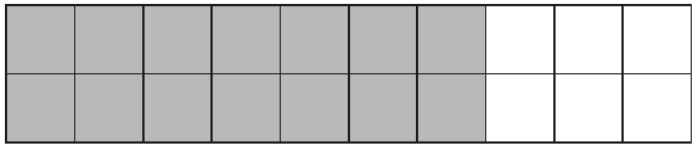
(a) 29, 35, 41, 47, ... [1]

.....

(b) 2000, 1000, 500, 250, ... [1]

.....

7. *(a)* What **percentage** of this diagram has been shaded? [1]



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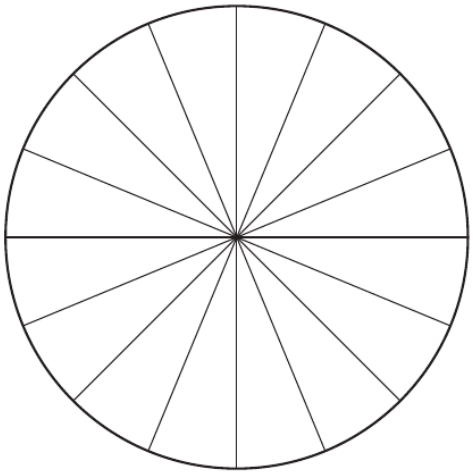
(b) Shade $\frac{3}{8}$ of this diagram. [1]



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Examiner only

11. *(a)* Write an expression for the nth term of the following sequence. [2]

2 7 12 17 .....

.....

.....

nth term = ...

(b) The first four diagrams in a sequence are shown below.

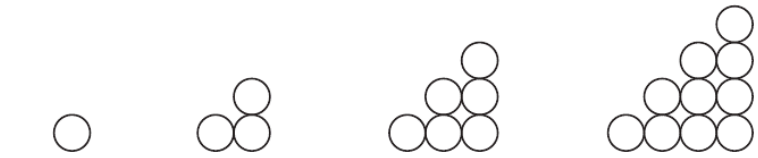

Diagram 1 Diagram 2 Diagram 3 Diagram 4

Complete the following subtraction. [1]

Number of circles in Diagram 17	–	Number of circles in Diagram 16	=	

(c) The first three diagrams in another sequence are shown below.

Diagram 1 Diagram 2 Diagram 3

Give an expression, in terms of n, for the number of dots (●) in Diagram n.
You must simplify your expression. [2]

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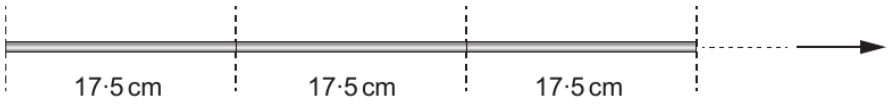
Examiner only

11. *(a)* Write down the next two numbers in the following sequence. [2]

50 39 28 17 ....

(b) Use the formula $x = 4a + 3b$ to find the value of x when $a = 7{\cdot}2$ and $b = -4{\cdot}6$. [2]

12. Identical rods can be placed end to end, as shown below.
Each rod is 17·5 cm long.



How many of these rods can be placed, in this way, between two points 4 metres apart? [4]

Number of rods = ...

Examiner only

5. In the grid below:

- each column must add to 250,
- each row must add to 250.

Complete the grid. [3]

.....	60	78	.....
26	.....	27	112
95	105	.....	8
58	0	103	.....

Space for working:

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Examiner only

8. Geraint is running a game in a school fair.
A large number of balls are placed in a box.
Each of the balls is one of three colours: bronze, silver or gold.

In the game, a ball is chosen at random from the box.
The table below shows the probability of choosing a bronze ball and the probability of choosing a silver ball.

Colour	Bronze	Silver	Gold
Probability	0·68	0·22	

In the game, each person pays £2 to choose a ball at random from the box.
The ball is then returned to the box.

The person wins £3 if a silver ball is chosen.
The person wins £8 if a gold ball is chosen.
There is no prize for choosing a bronze ball.

100 people each play the game once.

How much profit would you expect Geraint to make?
You must show all your working. [5]

Examiner only

7. (a) Describe **in words** the rule for continuing the sequence below. [1]

79, 65, 51, 37, ...

Rule:

.....

.....

(b) Write down the next term in the sequence below. [1]

46, 92, 184, 368, ...

.....

(c) Adrian has n grapes. He eats 4 of them.
Write down, in terms of n, the total number of grapes Adrian now has. [1]

.....

8. Complete the table below so that each row will show equivalent fractions, decimals and percentages.
The first row has been completed for you. [4]

Fraction	Decimal	Percentage
$\frac{1}{4}$	0·25	25%
$\frac{7}{10}$	.....	..... %
$\frac{.....}{20}$	.....	5%

.....

9. Find $\sqrt{11{\cdot}56} + 2{\cdot}5^2$. [1]

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Examiner only

13. Write down an expression for the nth term of the following sequence. [2]

15, 9, 3, –3, ...

.....

.....

.....

.....

Examiner only

15. (a) Find a whole number value of n, so that $7n-9$ is a multiple of 4.
You must show all your working. [2]

When n = ..., $7n-9$ is a multiple of 4.

(b) Find a whole number value of n, so that $3n-5$ is a prime number.
You must show all your working. [2]

When n = ..., $3n-5$ is a prime number.

Examiner only

5. (a) Simplify $3a + 2a - a$. [1]

(b) (i) Draw Diagram 4 in the sequence below. [1]

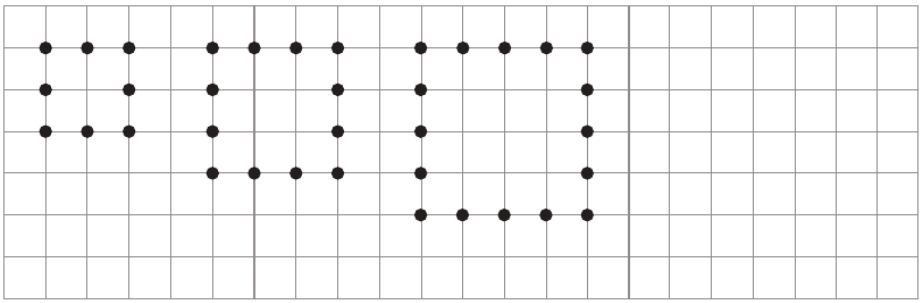

Diagram 1 Diagram 2 Diagram 3 Diagram 4

(ii) How many dots will there be in Diagram 6? [2]

(c) *In this part of the question, you will be assessed on the quality of your linguistic and mathematical accuracy in writing.*

Find the value of $7w + 5y$ when w = 36 and y = 29.
You must show all your working. [2 + 1 W]

Examiner only

10. Estimate the value of $\dfrac{20\cdot4\times59\cdot1}{407}$.

You must show all your working. [2]

11. The nth term of a sequence is given by $3n-13$.

Write down the value of

(a) the 10th term, [1]

(b) the 4th term. [1]

Examiner only

20. Estimate the value of $\frac{20\cdot4\times59\cdot1}{407}$.

You must show all your working. [2]

21. The nth term of a sequence is given by $3n-13$.

Write down the value of

(a) the 10th term, [1]

(b) the 4th term. [1]

Examiner only

22. Samira has a dice. Its faces are numbered 1 to 6.
She wants to know whether her dice is biased or not.
Samira rolled this dice 300 times.
Her results are shown in the table below.

Number shown on dice	1	2	3	4	5	6
Frequency	65	40	52	10	23	110

The relative frequency of throwing a 5 is $\frac{23}{300}$.

What is the relative frequency of throwing a 2?
Give your answer as a fraction in its simplest form. [2]

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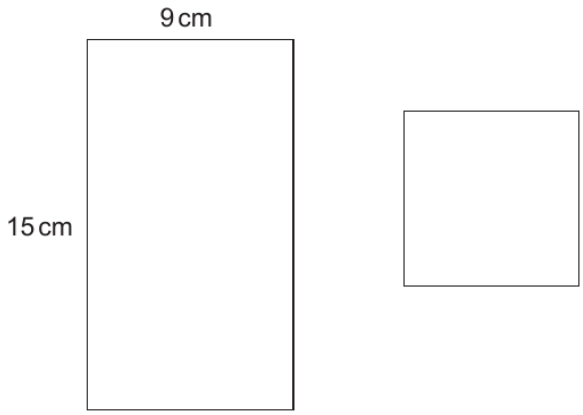
Examiner only

23. A rectangle and a square are shown below.



Diagrams not drawn to scale

The total area of the two shapes is 184 cm^2.
Find the **perimeter** of the square. [5]

END OF PAPER

Examiner only

3. Alice is 9 years younger than Isaac.
Nadia is one third of Isaac's age.
Dewi is twice Nadia's age.

Alice is 27 years old.

What are the ages of Isaac, Nadia and Dewi? [3]

Isaac is ..... years old. Nadia is ..... years old. Dewi is ..... years old.

4. (a) Write down the next two numbers in the following sequence. [2]

−26 −20 −14 −8 ....

(b) $f = 3g + 2h$.

Calculate the value of f when g = 9·3 and h = −13·6. [2]

Examiner only

7. (a) What is the special name given to an angle greater than 0° and less than 90°? [1]

.....

(b) What is the special name of a quadrilateral with rotational symmetry of order four? [1]

.....

8. (a) Describe **in words** the rule for continuing each of the following sequences.

(i) 62, 51, 40, 29, … [1]

Rule:

.....

.....

(ii) 2, 8, 32, 128, … [1]

Rule:

.....

.....

(b) Solve the following equations.

(i) $4x = 124$ [1]

.....

.....

(ii) $w + 6{\cdot}9 = 110$ [1]

.....

.....

9. (a) Calculate $\frac{3}{8}$ of 142. [2]

Write your answer as a decimal.

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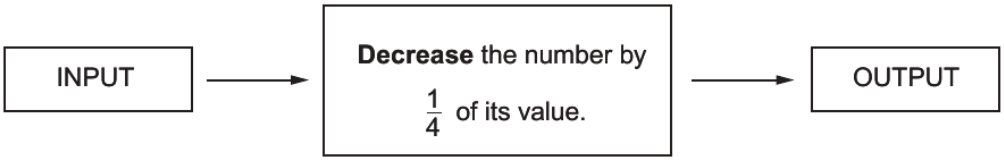
Examiner only

10. A number machine is shown below.



For a given INPUT number, there will be an OUTPUT number.
The OUTPUT is then put back in the number machine as the next INPUT.
This process is then repeated many times.

The first INPUT number is 512.
What will be the first OUTPUT number that is less than 300? [4]

First OUTPUT number that is less than 300 = ...

Examiner only

12. (a) Which **one** of the following fractions can be written as a recurring decimal? Circle your answer. [1]

$\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{8}$ $\frac{1}{10}$

.....

.....

(b) Which **three** numbers from the list below are prime numbers? [2]

27 31 35 39 43 47 51 55

The three prime numbers are:

..... , ... and .....

Examiner only

1. Write down the next term in each of the sequences below.

(a) 53, 80, 107, 134, ... [1]

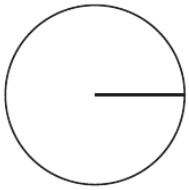
.....

(b) 24, 72, 216, 648, ... [1]

.....

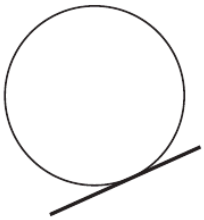
2. Write the special name for the line drawn on each of the circles below.

(a)



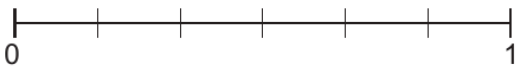
..... [1]

(b)

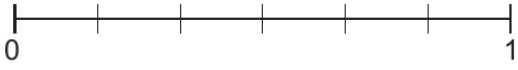


..... [1]

3. (a) A fair coin is thrown once.
On the probability scale below, mark with an arrow the probability of throwing a head. [1]

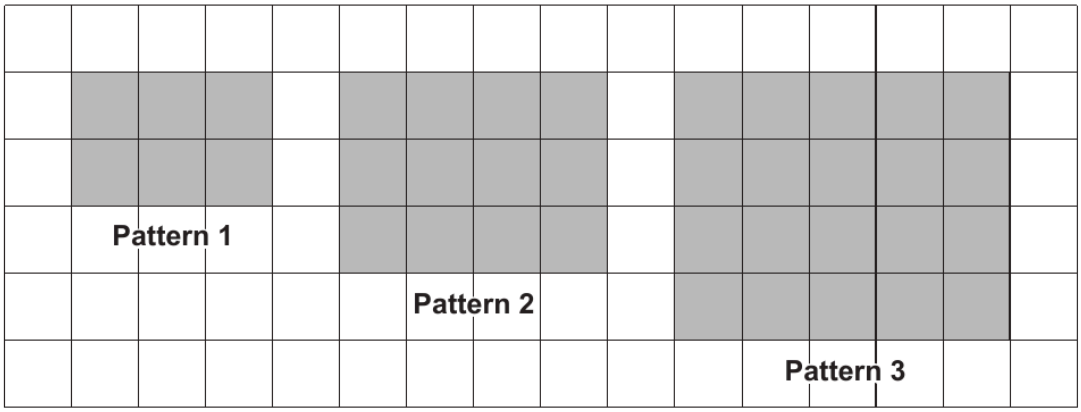


(b) A fair six-sided dice is thrown once.
On the probability scale below, mark with an arrow the probability of throwing a 5. [1]

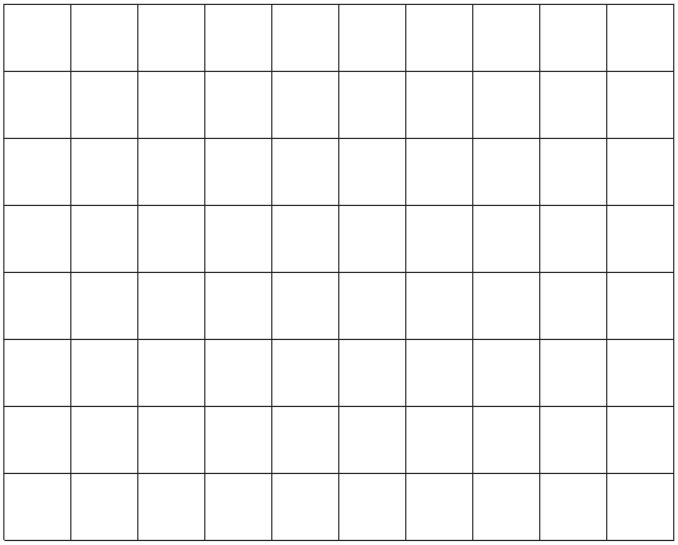


Examiner only

4. Here is a sequence of patterns.

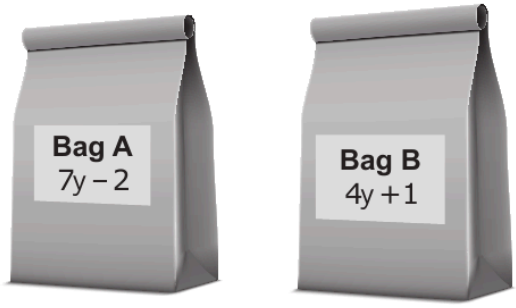


On the grid below, draw **Pattern 5**. [2]



Examiner only

8. There are $7y - 2$ counters in Bag A.
There are $4y + 1$ counters in Bag B.



9 counters are added to Bag B.
There are now the same number of counters in each bag.

Form an equation in terms of y.
Solve the equation to find the value of y.
You must show all your working. [4]

9. A cup contains some tea.

Elsie drinks $\frac{5}{7}$ of the tea.

There are 44 ml of tea left in the cup.
How much tea was in the cup before Elsie drank any? [2]

Examiner only

19. Solve the equation $\frac{10x+2}{3}-\frac{7x-3}{5}=9$. [4]

END OF PAPER

Examiner only

2. (a) Which of the following is the nearest value to 488 grams?
Circle the correct answer. [1]

0·5 kg 500 kg 50 kg 5 tonnes 0·05 kg

(b) Circle the correct answer for the following. [1]
15 miles is approximately equal to

1500 m 24 km 15 km 2·4 km 3000 m

3. The nth term of a sequence is given by $5n - 1$.

Calculate the sum of the first three terms.
You must show all your working. [3]

Sum of the first three terms = ...

Examiner only

5. Ben thinks of a number sequence.
The difference between each term and the next is the same.

The first term in the sequence is 11.
The fourth term in the sequence is 23.

What are the values of the second and third terms in Ben's sequence? [2]

.....

.....

.....

.....

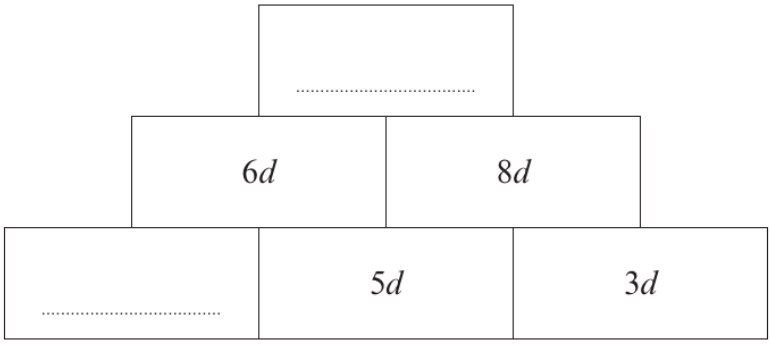
Second term = ...

Third term = ...

6. In the diagram shown below, the term in each box in the top two rows is found by using the following rule.

The term in each box is the sum of the terms in the two boxes below it.

Some terms are already shown.
Use the rule to write down the missing terms in the two empty boxes. [2]



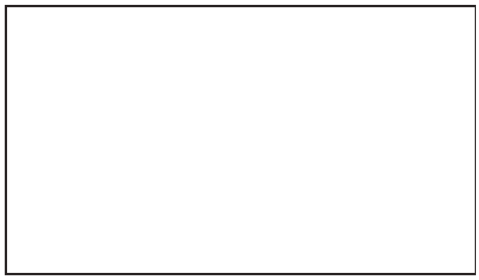
Space for working:

.....

.....

Examiner only

5. Find the perimeter of the rectangle below.
Give the units of your answer. [3]



Perimeter = ...

6. (a) Write down the next number in this sequence. [1]

71, 79, 87, 95, ...

(b) Write down the next two numbers in this sequence. [2]

40 000, 20 000, 10 000, 5000, ..., ...

Examiner only

13. (a) Which of the following is the nearest value to 488 grams?
Circle the correct answer. [1]

0·5 kg 500 kg 50 kg 5 tonnes 0·05 kg

(b) Circle the correct answer for the following. [1]
15 miles is approximately equal to

1500 m 24 km 15 km 2·4 km 3000 m

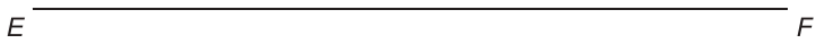
14. The nth term of a sequence is given by $5n - 1$.

Calculate the sum of the first three terms.
You must show all your working. [3]

Sum of the first three terms = ...

Examiner only

4. (a) Draw $\hat{DEF} = 57°$.
The line EF has been drawn for you. [1]



(b) Dafydd draws an acute angle.
The angle is the same size as half a right angle.
What is the size of the acute angle? [2]

.....

The size of the acute angle is ..... °

3300U101
05

5. (a) Write 25 378 correct to the nearest 100. [1]

.....

(b) Write down the next number in this sequence. [1]

13, 25, 37, 49, ...

.....

(c) Divide 10 kg by 4.
Give your answer in grams. [2]

.....

.....

.....

Answer is ..... g