GCSE LINKED PAIR PILOT

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4363/01

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W16-4363-01

METHODS IN MATHEMATICS
UNIT 1: Methods (Non-Calculator)
FOUNDATION TIER

A.M. MONDAY, 11 January 2016

1 hour 30 minutes

CALCULATORS ARE
NOT TO BE USED
FOR THIS PAPER

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	10	
2.	8	
3.	3	
4.	5	
5.	8	
6.	5	
7.	3	
8.	5	
9.	5	
10.	10	
11.	7	
12.	3	
13.	8	
Total	80	

ADDITIONAL MATERIALS

A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **6**.

Formula List

Area of trapezium $= \frac{1}{2}(a + b)h$
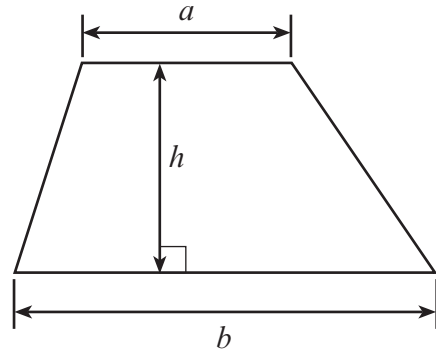
Volume of prism = area of cross-section × length

Examiner only
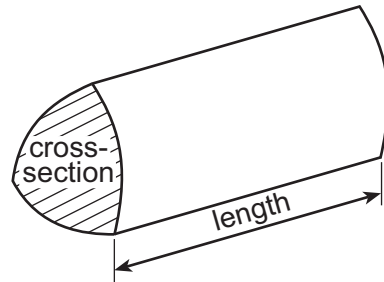
1. *(a)* (i) Write down, in figures, the number fifteen thousand two hundred and five. [1]

....

(ii) Write down, in words, the number 475 000. [1]

....

....

(b) (i) Write down the sum of 49 and 61. [1]

....

....

....

(ii) Write down the answer when 7 is multiplied by 6. [1]

....

(c) (i) Write 1329 correct to the nearest 100. [1]

....

(ii) Write 53 505 correct to the nearest 1000. [1]

....

(d) Write down all the factors of 15. [2]

....

(e) Circle the numbers that are divisible by **both** 2 **and** 3. [2]

9   **10**   **11**   **12**   **13**   **14**

15   **16**   **17**   **18**   **19**

20   **21**   **22**   **23**

10

2.
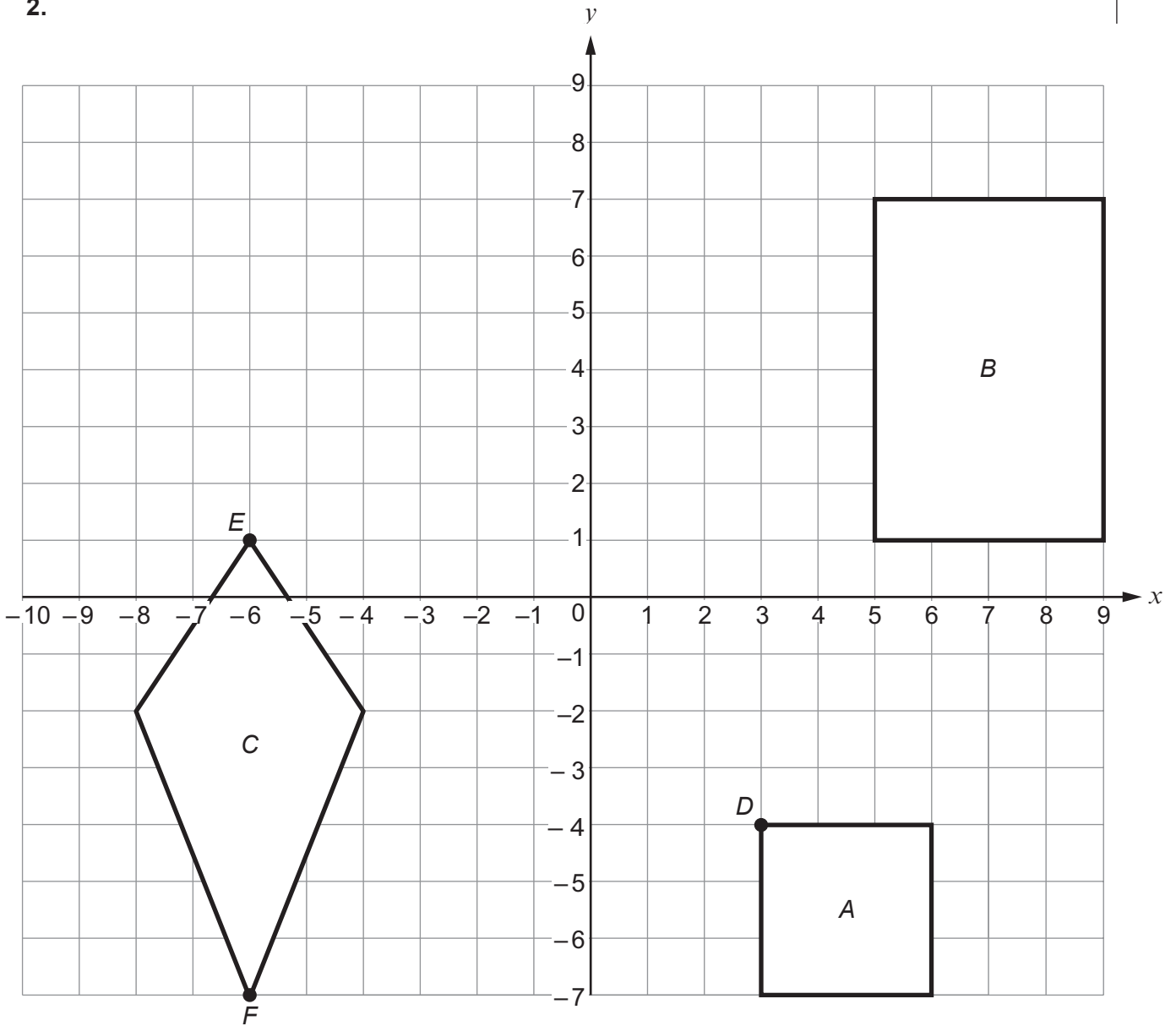
(a) Write down the special name given to each of the shapes shown above. [3]

SHAPE	A	B	C
SPECIAL NAME			

(b)   Write down the coordinates of the following vertices.   [3]

   D (................. , ...)   *E* (................. , ...)   *F* (................. , ...)

(c)   (i)   Shape *A* could be changed into a trapezium by changing the coordinates of one of the vertices. Give an example of this.   [1]

         Changing coordinates (................. , ...) to (................. , ...)

       (ii)   Shape *C* could be changed into a rhombus by changing the coordinates of one of the vertices. Give an example of this.   [1]

         Changing coordinates (................. , ...) to (................. , ...)

3.   Choose one term from the list below to describe the chance of each of the following events happening.

   impossible   **unlikely**   **even chance**   **likely**   **certain**

(a)   Obtaining a black counter when one counter is taken at random from a bag containing 98 black and 2 yellow counters.   [1]

   ....

(b)   Obtaining a number less than or equal to 3 when a fair dice numbered 1 to 6 is rolled once.   [1]

   ....

(c)   It will snow in Aberystwyth on August 1st 2016.   [1]

   ....

4. The two circles on each **arm** from the centre circle add up to 5.
All the six circles in the **inner ring** add up to 0.
Two arms have been completed.

Fill in the blanks. [5]

Inner ring

Arm

....

....

....

....

....

....

....

....

....
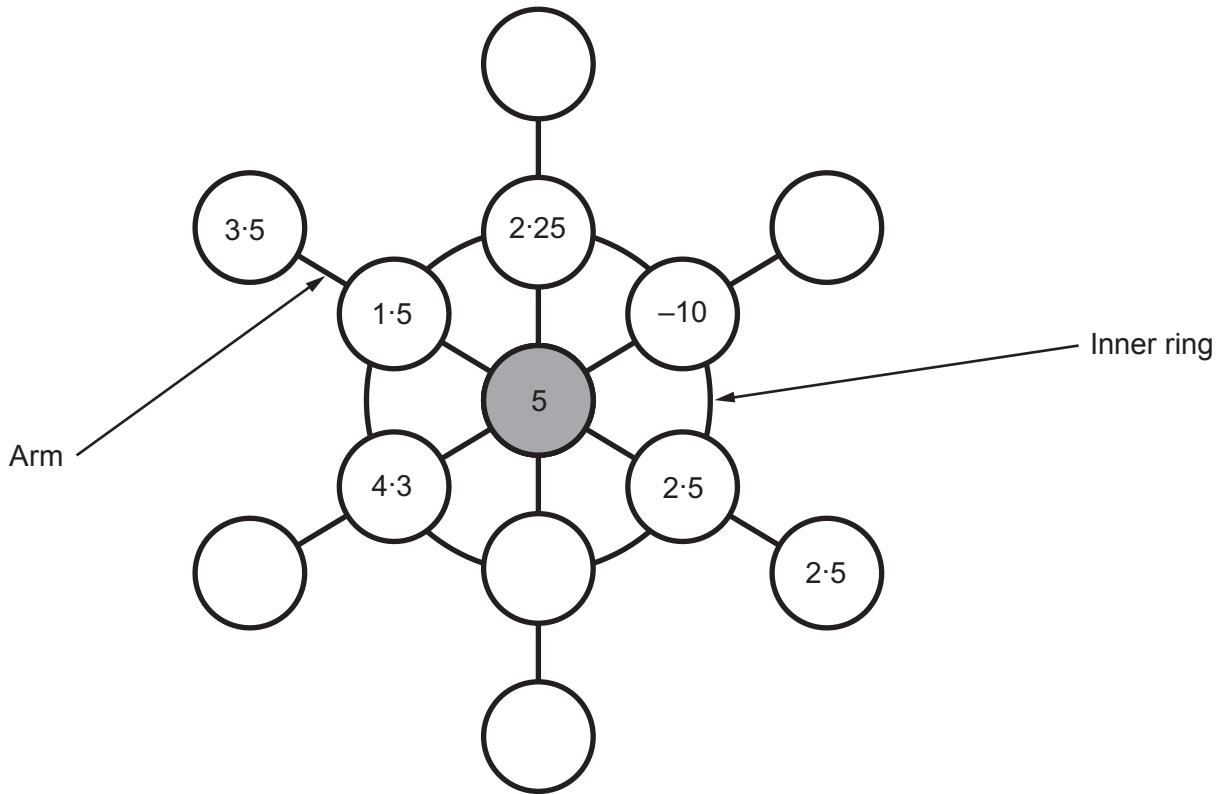
5

5. *(a)* Write down the next term in the following sequence and describe a rule for continuing the sequence. [2]

4, 11, 18, 25, ...

Rule: ....

....

(b) The diagram below shows a number machine.

INPUT	→	ADD 5	→	MULTIPLY BY 4	→	OUTPUT
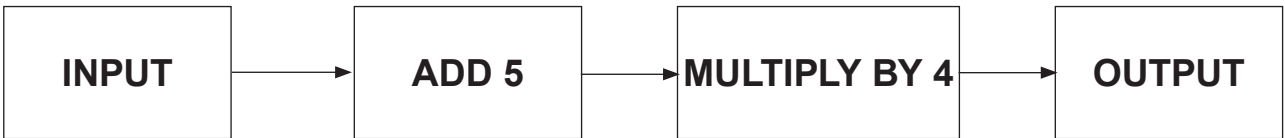
Using the number machine, calculate:

(i) the **OUTPUT** when the **INPUT** is 2 [1]

....

(ii) the **OUTPUT** when the **INPUT** is –3 [1]

....

(iii) the **INPUT** when the **OUTPUT** is 44. [1]

....

(c) Use the following clues to find the missing number. [3]

- The number is between 5 and 40.
- It is not an odd number.
- It is a multiple of 3.
- It is a square number.

....

....

....

....

Missing Number is ....

8

6. *You will be assessed on the quality of your written communication in this question.*

Geraint, Sian and Mari receive the same amount of pocket money as each other each week. They all start saving some money towards buying the same model of laptop computer.

- Geraint saves $\frac{3}{10}$ of his pocket money each week.

- Sian saves $\frac{2}{5}$ of her pocket money each week.

- Mari saves $\frac{1}{4}$ of her pocket money each week.

Who will be the first to buy the laptop computer?
You must show all your working. [5]

....

....

....

....

....

....

....

....

....

5

7. Sara wants to buy a ring to wear for a special occasion.

There is a choice of 3 metals and 3 gems for Sara to choose from.

- Metals: She has a choice of gold, platinum or titanium.
- Gems: She has a choice of diamond, sapphire or emerald.

Write down all the possible combinations for the ring that is made using one metal and one gem. [3]

....

....

....

....

....

....

3

8. Using the two instructions given, fill in the blanks in the grid below. [5]

Each column must add up to 0 ↓			
1	**–1**	*a*	**–*a***
5			**3*a***
	2	**2*a* – 6**	**4**
2*a* – 6	**4**		

Each row must add up to 0 ←

....

....

....

5

(4363-01) **Turn over.**

9.

Diagram not drawn to scale

Triangle *ABC* is an equilateral triangle.
Triangle *CDE* is an isosceles triangle.

The line *FG* is perpendicular to the line *CD*.
The line *FG* is parallel to the line *HI*.

Find the size of $B\hat{C}E$. [5]

....

....

....

....

....

5

Examiner
only

10. *(a)* Simplify $21a - 6b + 14a - 9b$. [2]

....

....

(b) Find the value of $6x + 2y$ when $x = 7$ and $y = -10$. [2]

....

....

(c) Given that $a = 2$, $b = -1$ and $c = -6$, find the value of $\dfrac{4a - 3c}{b^2 + 1}$. [2]

....

....

....

....

(d) Expand $x(3x + 7)$. [2]

....

(e) Factorise $20a - 5ab$. [2]

....

10

Turn over.

11. A spinner is labelled with the numbers 1, 2, 3, 4 and 5.
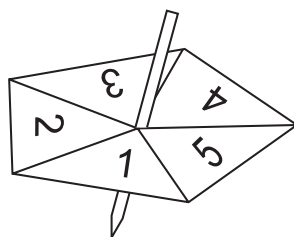
After 100 spins, the outcomes were recorded.
The table shows some of the results.

Number	1	2	3	4	5
Frequency	44	....	22	10	....

(a) The frequencies of the numbers 2 and 5 are in the ratio 1 : 2.
Complete the table above. [3]

....

....

....

....

....

....

(b) Write the best estimate of the probability of each of the following:

(i) the number 3 occurring, [1]

....

....

(ii) a number greater than 1 occurring. [2]

....

....

....

(c) Would you consider this to be a fair spinner?
You must give a reason for your answer. [1]

....

....

....

7

12. Use **estimation** to complete the table below. [3]

Number	Accuracy required	Rounded number
35^2	Correct to the nearest 100	1200
3^4	Correct to the nearest 10	80
$\sqrt{122}$	Correct to 2 significant figures	....
$\sqrt{(80 \cdot 805 + 63 \cdot 23)}$	Correct to 1 significant figure	....
25^2	Correct to the nearest 100	....

....

....

....

....

....

....

3

13. *(a)* Write each of 450 and 270 as products of prime factors using index notation. [4]

(b) Hence write down the lowest common multiple and the highest common factor of 450 and 270.
You must evaluate your answers. [4]

Lowest common multiple:

Highest common factor:

....

....

....

....

....

....

8

END OF PAPER