

Surname	Centre Number	Candidate Number
Other Names		0



GCSE LINKED PAIR PILOT

4361/01



W15-4361-01

APPLICATIONS OF MATHEMATICS

UNIT 1: Applications 1

FOUNDATION TIER

A.M. WEDNESDAY, 14 January 2015

1 hour 30 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	6	
2.	9	
3.	2	
4.	3	
5.	10	
6.(a)(b)(c)(d)	7	
6.(e)(f)	3	
6.(g)	7	
7.	8	
8.	6	
9.(a)(b)	9	
9.(c)	2	
10.	8	
Total	80	

ADDITIONAL MATERIALS

A calculator will be required for this paper.

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 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

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

Unless stated, diagrams are not drawn to scale.

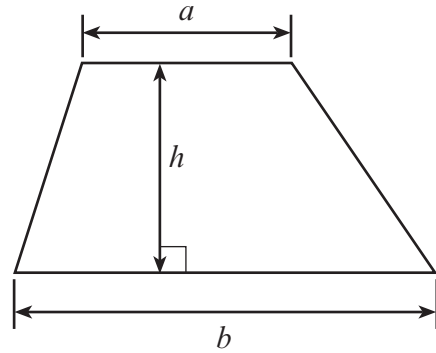
Scale drawing solutions will not be acceptable where you are asked to calculate.

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

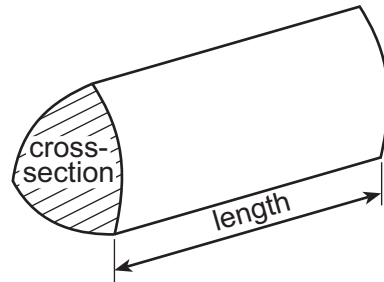
You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 2(a).

Formula List

Area of trapezium = $\frac{1}{2}(a + b)h$



Volume of prism = area of cross-section \times length



- 1. (a) In December, 5738 people watched an international hockey match. In a newspaper report, 5738 is written correct to the nearest 1000.

Write 5738 correct to the nearest 1000. [1]

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- (b) At the hockey match, 1632 people were children under the age of 16. Write 1632 correct to the nearest 100.

[1]

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- (c) At half-time, 4500 drinks were sold. Of these drinks, $\frac{4}{9}$ were cups of coffee. How many cups of coffee were sold at half-time?

[2]

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- (d) Each of the 5738 people at the hockey match bought one raffle ticket. Of the tickets bought, 3200 tickets were sold to people supporting the home team and the rest were sold to those supporting the away team.

One of the supporters said:

"The chance that the winner of the raffle will be a home supporter is equal to the chance that the winner will be an away supporter."

- (i) Explain fully why this statement is incorrect. [1]

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- (ii) What is the probability that the winner of the raffle is a home supporter? [1]

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2. (a) *You will be assessed on the quality of your written communication in this part of the question.*



On her birthday, Casey was given two gift vouchers for her favourite store. One voucher was worth £25 and the other was worth £20.

She bought a pair of jeans for £26 and two tops for £15.99 each.

Casey used both of her vouchers when she bought the jeans and tops.
How much extra did she have to pay?
You must show all your working.

[6]

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- (b) Casey noticed that shops had gift vouchers in a variety of different shapes. One is shown below.



Diagram not drawn to scale

- (i) Write down the special name given to each of the angles at the bottom of the gift voucher. [1]

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- (ii) Find the size of angle x . [2]

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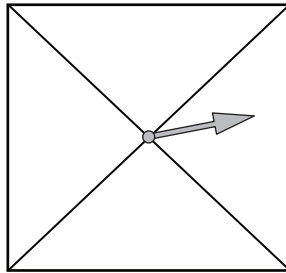
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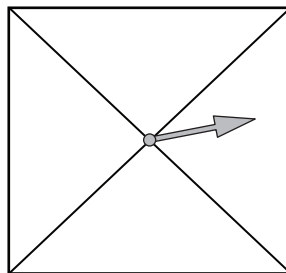
3. Jay and Alex design a game for their school fete. They each have a copy of a fair spinner as shown below.



The game is based on the probability of obtaining certain numbers on the spinner, when the spinner is spun once.

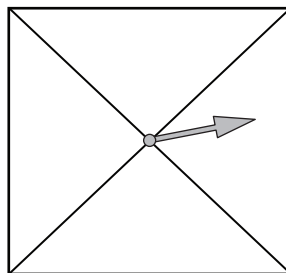
- (a) Jay decides that she wants to place numbers on her spinner that would give an **even chance** of getting a number **greater than 4**.
Place 4 numbers on Jay's spinner to show this. [1]

Jay's Spinner

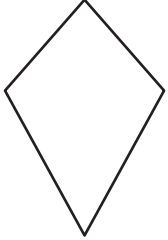


- (b) Alex decides that he wants to place numbers on his spinner that would make it **certain** that you would get a number **less than 3**.
Place 4 numbers on Alex's spinner to show this. [1]

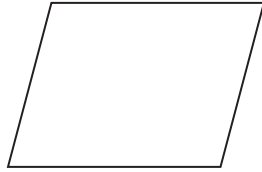
Alex's Spinner



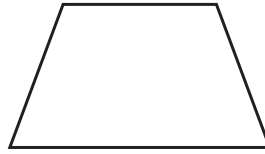
4. Daniel is asked to match the following quadrilaterals to statements that are given to him. The quadrilaterals are



kite



parallelogram



trapezium



square

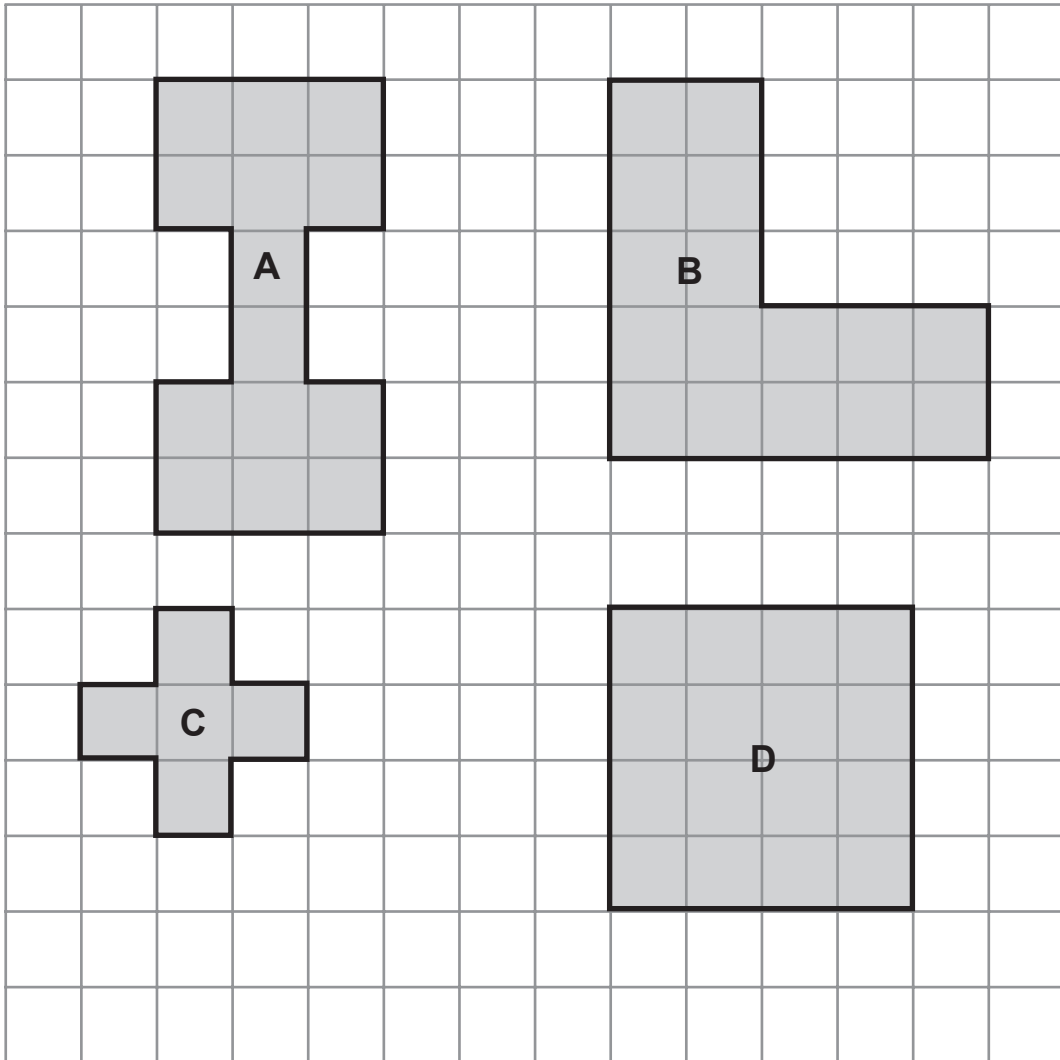
The statements that Daniel is given are in the table below. Each quadrilateral can only be used once.

Match each statement to a quadrilateral.

[3]

Statement	Quadrilateral
This quadrilateral has all 4 sides equal in length	
This quadrilateral has opposite sides equal in length	
This quadrilateral only has one pair of parallel sides	
This quadrilateral does not have any parallel sides	

5. (a) Plastic shapes are placed onto centimetre squared paper.



(i) Which 2 shapes have the same area?

[2]

Shapes and

(ii) Which shape has the largest perimeter?
Show all your working.

[2]

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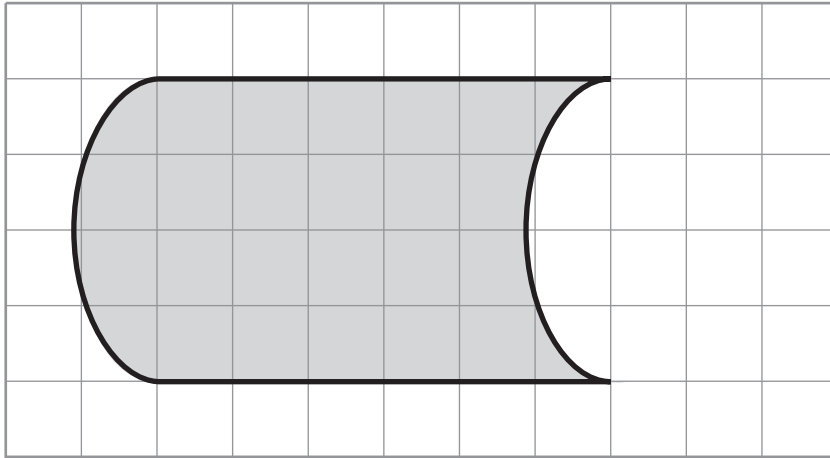
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Shape

- (b) A different shape is placed on the centimetre squared paper.



Estimate the area of the shape.
State the units of your answer.

[3]

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- (c) An isosceles triangle is another different shape.
The side that is not equal in length to any other side is 9 cm long.
The angles that are equal are 55° each.
Draw this isosceles triangle accurately.

[3]

6. Last summer, Mr Williams had 10 tomato plants like the one shown below.



The number of tomatoes that grew on each plant is given below.

42 37 48 34 44 41 39 42 38 45

- (a) Calculate the mean number of tomatoes per plant. [3]

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- (b) Find the median number of tomatoes per plant. [2]

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- (c) What is the modal number of tomatoes per plant? [1]

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- (d) Next summer, Mr Williams plans to buy more tomato plants like the one above.

He says:

"On average, I should get about 41 tomatoes from each plant."

- Give a reason why his data shows he is correct. [1]

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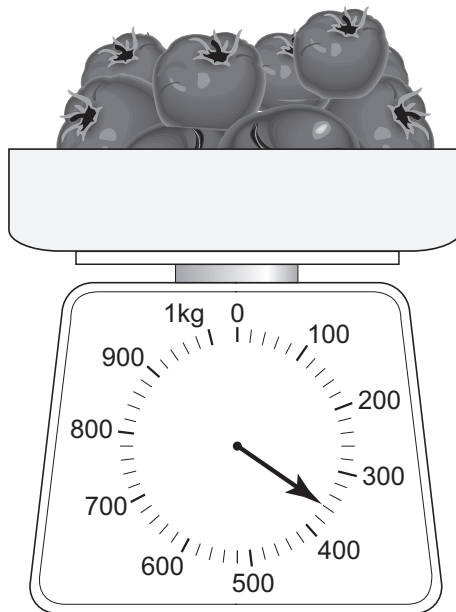
- (e) When Mr Williams plants his tomato plants in his greenhouse, he has to leave a gap of 40 cm between each plant.
Given that 2.5 cm is approximately equal to 1 inch, change 40 cm into inches. [2]

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- (f) Mr Williams decided to weigh some tomatoes.
What is the weight of the tomatoes? [1]



The tomatoes weigh grams.

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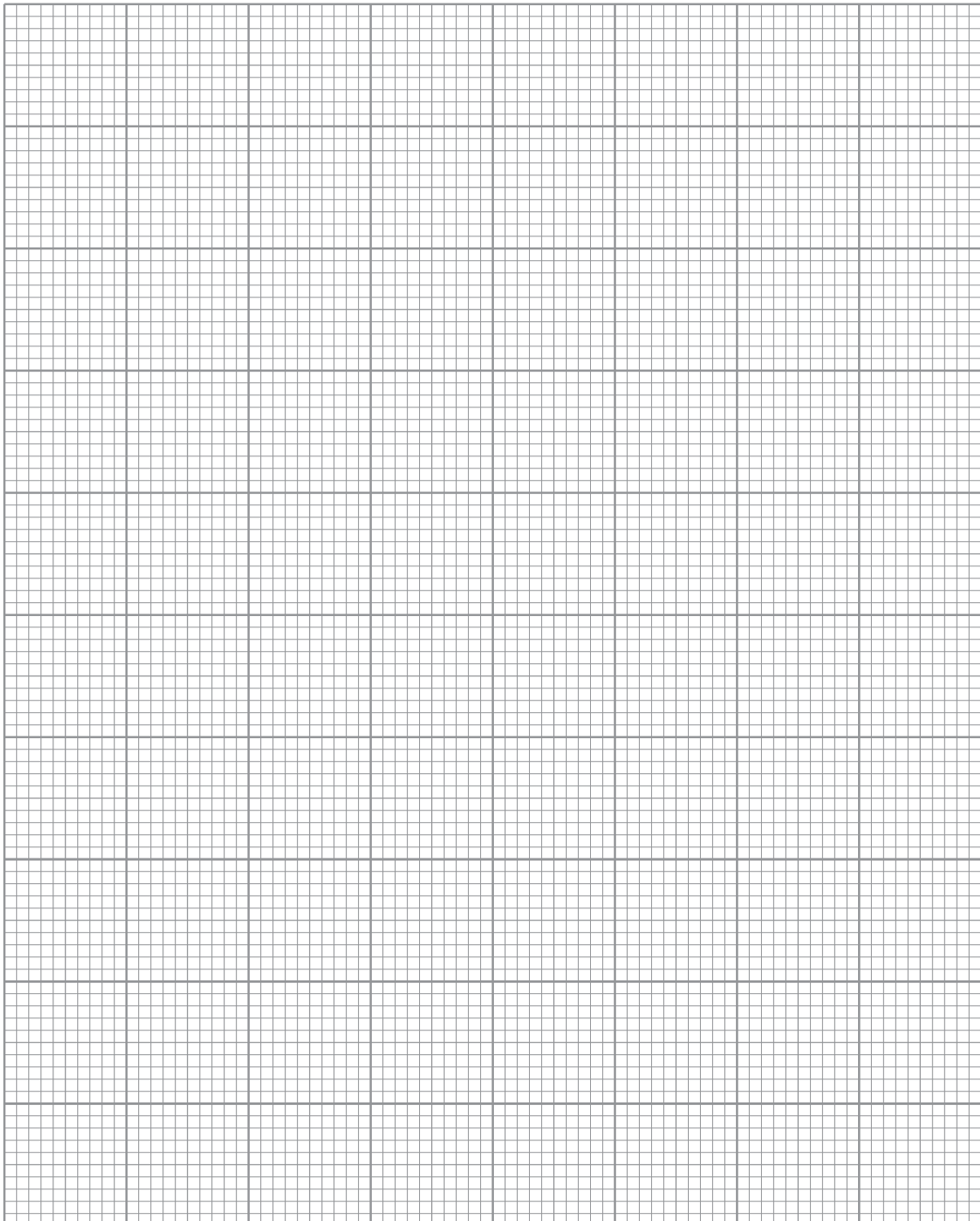
- (g) The temperature inside Mr Williams's greenhouse was recorded every three hours over a 24 hour time period. The results are shown in the table below.

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Time	00:00	03:00	06:00	09:00	12:00	15:00	18:00	21:00	24:00
Temperature (°C)	5	3	7	12	16	18	15	8	4

- (i) Draw a time series graph to show the above information.

[4]



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(ii) Describe clearly what the trend in the graph shows about the temperature in Mr Williams's greenhouse. [1]

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(iii) Calculate the range of the temperatures measured inside the greenhouse over the 24 hour period. [2]

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7. Graham and Lisa go on holiday to Copenhagen, Denmark.

- (a) They need to change currency between pounds (£) and the Danish kroner (DKK). They both go into the same currency shop. Graham changes £200 and receives 1800DKK. Lisa changes £300 and receives 2700DKK.

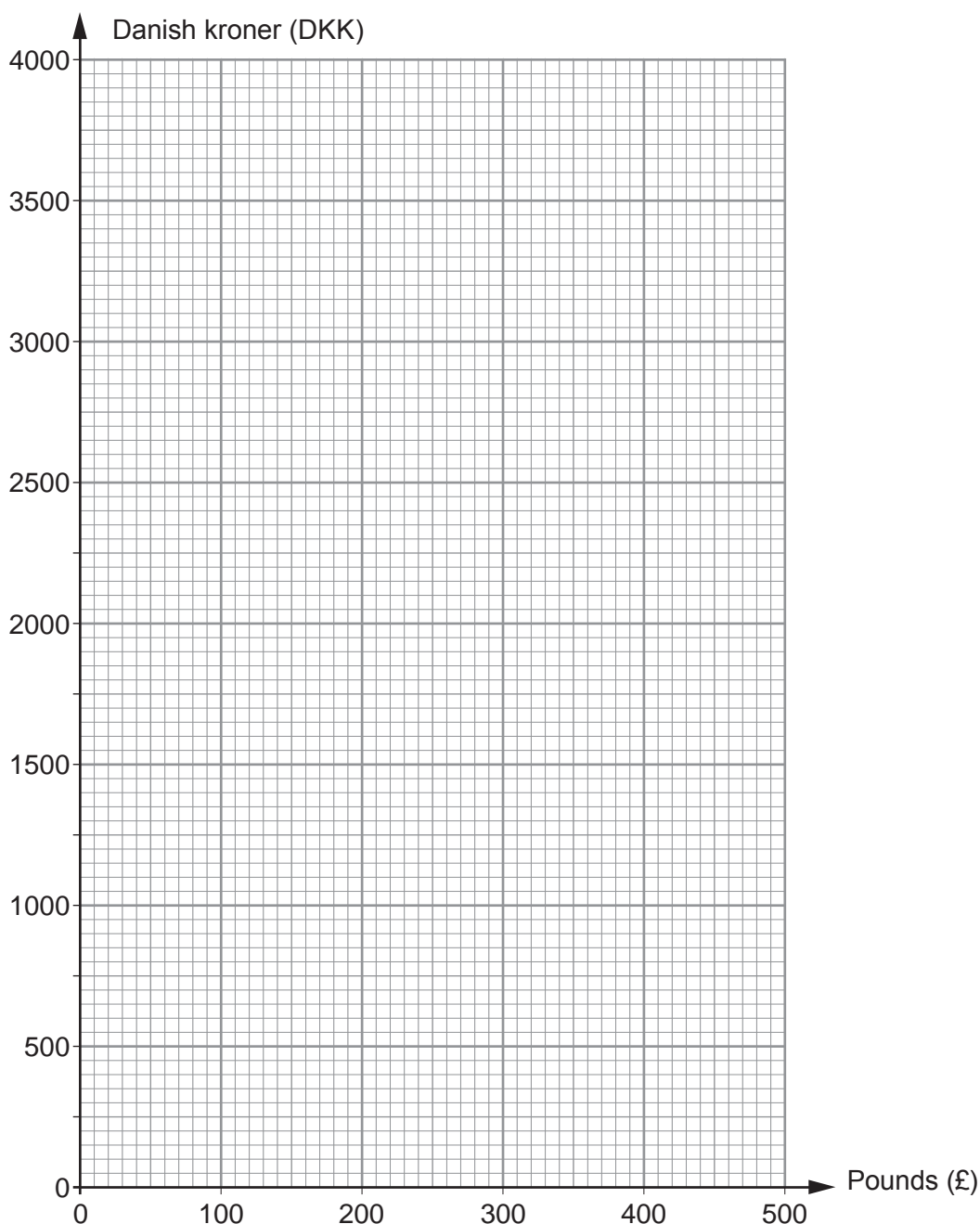
- (i) Draw a conversion graph that can be used to change pounds (£) to Danish kroner (DKK). [2]

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8. (a)



Berlin's main railway station is known as the Hauptbahnhof. Bellevue and Wildau are two railway stations in opposite directions from the Hauptbahnhof.

On a particular day,

- trains leave the Hauptbahnhof to Bellevue every 14 minutes
- trains leave the Hauptbahnhof to Wildau every 12 minutes.

A train to Bellevue and a train to Wildau both leave the Hauptbahnhof at 10:00.

When will a train to Bellevue and a train to Wildau next leave the Hauptbahnhof at the same time? [4]

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(b) Raimund records the arrival time of the first 10 trains each hour. A summary of his results is shown in the table below.

Time, after	Number of trains late	Number of trains on time or early
1 p.m.	2	8
2 p.m.	1	9
3 p.m.	5	5
4 p.m.	1	9
5 p.m.	3	7

Calculate the best estimate of the relative frequency of a train arriving late. [2]

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9. (a) Jack is planning to build a fence across his field. He has placed a note on the sketch of his field to show where he intends to place the fence.

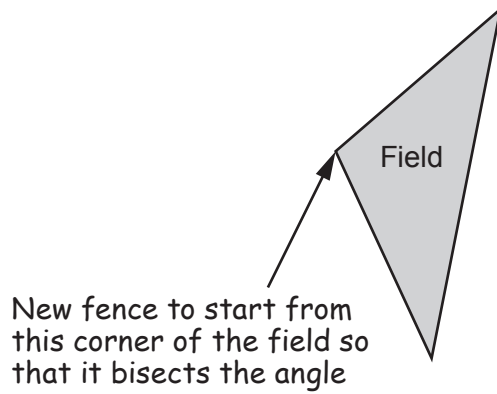
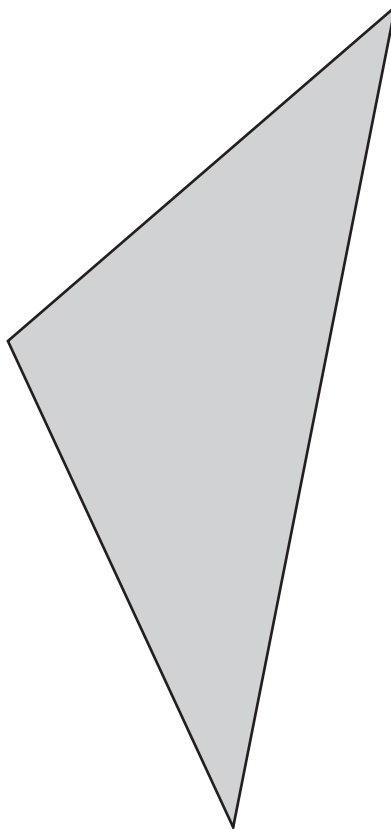


Diagram not drawn to scale

Complete the scale drawing below to show where the new fence is to be placed. You must use a pair of compasses and a ruler to bisect the obtuse angle. You must show all of your construction marks on the diagram.

[2]



(b) Jack employs two workers, Siân and Dan.

He pays each of them as follows:

- £3.75 each day they work, for checking the hedges and fences on the way to work
- £16.25 per hour when working with the animals
- £18.50 per hour when working with equipment, such as fork lift trucks and tractors.

(i) Siân works 3 days a week.

Last week she spent 4 hours each day working with animals and 2 hours each day using the fork lift truck.

How much was Siân paid last week?

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(ii) Dan works 4 days a week.

He always spends y hours per day feeding the animals.

He always spends $2y$ hours per day driving the tractor.

Dan gets paid £ P per week.

Write down a formula for P in terms of y .

Give your answer in its simplest form.

[4]

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(c)



There is a duck pond on Jack's farm.

The duck pond is circular, with a diameter of 12 metres.
Calculate the surface area of the duck pond.

[2]

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- (b) The charges for mooring boats are displayed in the harbour.

Mooring charges for boats for 24 hours

Mooring charges depend on the length of your boat.

Boats up to 6 m in length:	charge is £4.80 per metre
Boats 7 m in length:	charge is £4.40 per metre
Boats 8 m in length:	charge is £3.90 per metre
Boats longer than 8 m:	charge is £3.55 per metre

Charge includes fresh water, electricity and use of the showers

The friends notice that, for boats between 6 m and 8 m in length, the charges were not very clear.

The Wave is 7.1 m in length.

The friends were charged £30.80 for mooring **The Wave**.

Explain how the charge was calculated and suggest how the charges could be displayed more clearly. [2]

END OF PAPER

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