

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
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TOTAL	



General Certificate of Secondary Education
Foundation Tier
January 2012

Applications of Mathematics (Linked Pair Pilot)

93702F

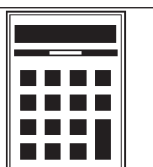
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Unit 2 Geometry and Measures

Thursday 26 January 2012 1.30 pm to 3.00 pm

For this paper you must have:

- a calculator
- mathematical instruments.



Time allowed

- 1 hour 30 minutes

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- The quality of your written communication is specifically assessed in Questions 8, 11 and 14.
These questions are indicated with an asterisk (*).
- You may ask for more answer paper, graph paper and tracing paper.
These must be tagged securely to this answer booklet.
- You are expected to use a calculator where appropriate.

Advice

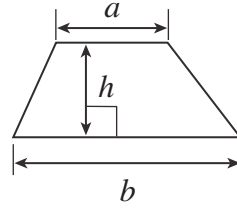
- In all calculations, show clearly how you work out your answer.



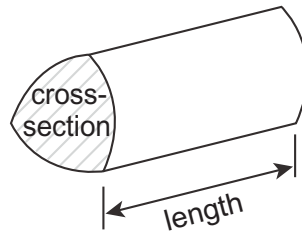
J A N 1 2 9 3 7 0 2 F 0 1

Formulae Sheet: Foundation Tier

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



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



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

1 Circle the most suitable measurement in each part.

1 (a) The height of a man.

5 metres 20 metres 1.75 metres 0.2 metres

(1 mark)

1 (b) The amount of water in a full kettle.

2 litres 20 litres 50 litres 100 litres

(1 mark)

1 (c) The weight of a packet of crisps.

1 kilogram 30 grams 8 milligrams 5 kilograms

(1 mark)

Turn over for the next question



2 Ezra has these coins in his pocket.



£1



£1



50p



50p



20p



20p



10p



10p



10p



10p



5p



5p



5p



5p



2p



2p



1p



1p



1p



1p

He buys a magazine for £1.65
He pays using as many coins as possible.

Write a list of the coins he has left in his pocket.

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Answer

..... (4 marks)



3 Noughts (O) and crosses (X) is a game for two players.
The players take turns to write O and X on a 3 by 3 grid.
The first player to write O O O or X X X in a horizontal, vertical or diagonal line wins the game.

3 (a) Amir starts a game against Mel.
He writes a O on the grid in square A1.

	A	B	C
1	O		
2			
3			

Write these next four turns on the grid.

- Mel (X) C3
- Amir (O) C1
- Mel (X) B1
- Amir (O) A3

(2 marks)

3 (b) Amir says
“After Mel’s next turn I can definitely win”.

Is he correct?
Explain your answer fully.

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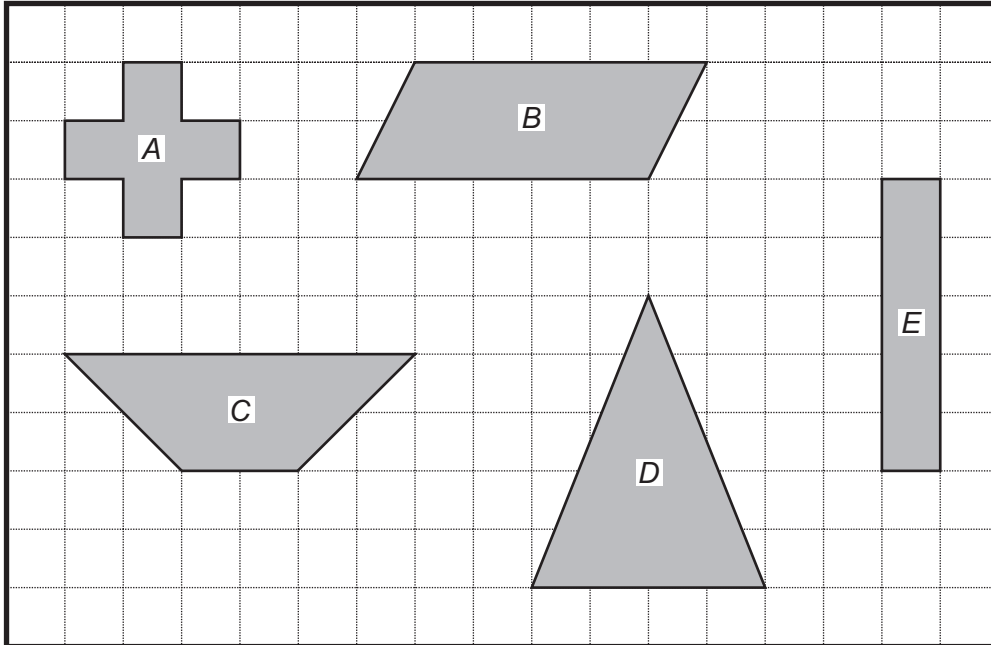
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(2 marks)



- 4 A toy has a rectangular tray with five shapes *A*, *B*, *C*, *D* and *E*. Each shape fits in exactly one place on the tray. All five shapes are shown in their places on the square grid.

Tray



- 4 (a) Write down the mathematical name of shape *B*.

Answer (1 mark)

- 4 (b) Circle the name that describes triangle *D*.

scalene equilateral right-angled isosceles

(1 mark)



4 (c) The shapes are taken out of the tray.

One side of each shape is red.
They are put back in their places with the red sides showing.

4 (c) (i) In how many different ways can shape *A* be put back?

Answer (1 mark)

4 (c) (ii) Write down the letter of a shape that can be put back in exactly two different ways.

Answer (1 mark)

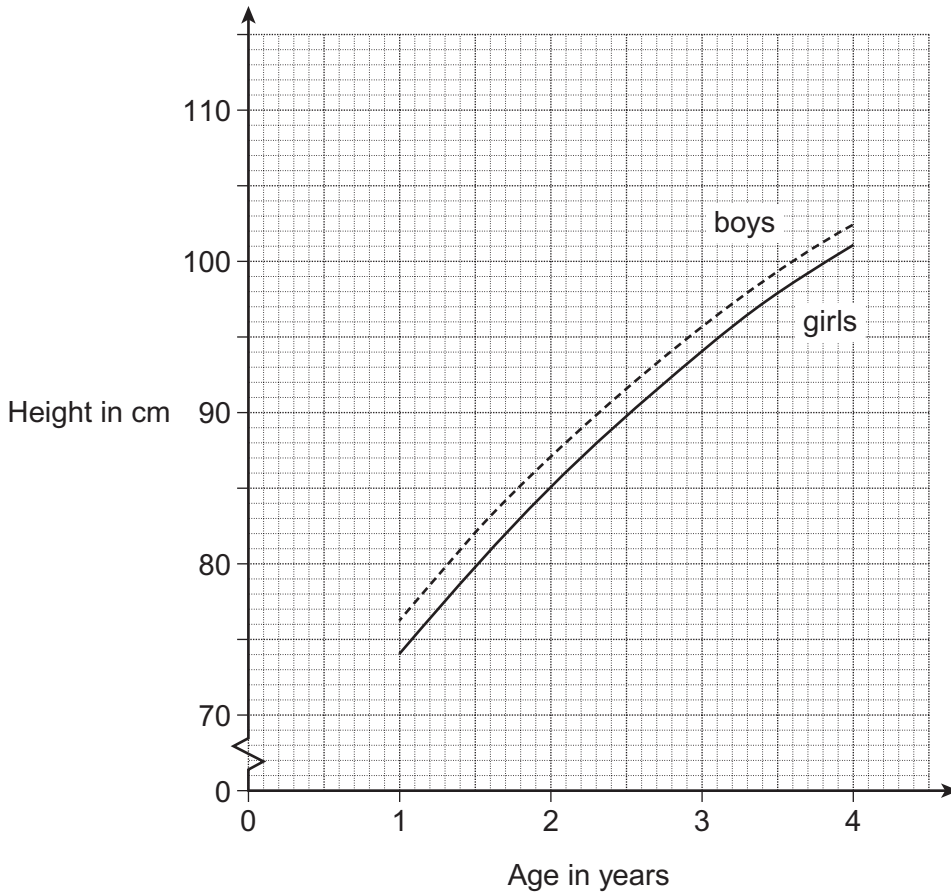
4 (c) (iii) Write down the letters of **two** shapes that can be put back in only one way.

Answer and (2 marks)

Turn over for the next question



5 (a) The graph shows the average heights, in centimetres, of boys and girls aged between 1 and 4 years old.



5 (a) (i) What is the average height of a 3-year-old girl?

Answer cm (1 mark)

5 (a) (ii) The height of a boy is 82 cm.

How old is he likely to be?

Give your answer in months.

.....

Answer months (2 marks)



5 (b) An estimate of the adult height of a child can be worked out as shown.

Boys

Add the mother's height and the father's height in centimetres.
Add 13 centimetres.
Divide by 2.

Girls

Add the mother's height and the father's height in centimetres.
Subtract 13 centimetres.
Divide by 2.

5 (b) (i) Tim and Mary are brother and sister.
Their mother's height is 1.60 metres.
Their father's height is 1.81 metres.

Estimate the adult height of Tim and the adult height of Mary.
Give your answers in centimetres.

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Answer Tim cm
 Mary cm (4 marks)

5 (b) (ii) Tim and Mary reach an adult height within 10 centimetres of the estimates worked out in part (b) (i).

Is it possible for Mary to be taller than Tim?
Show how you decide.

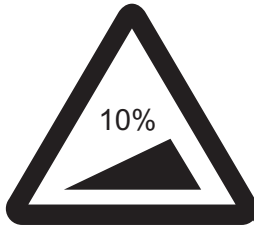
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(2 marks)



6

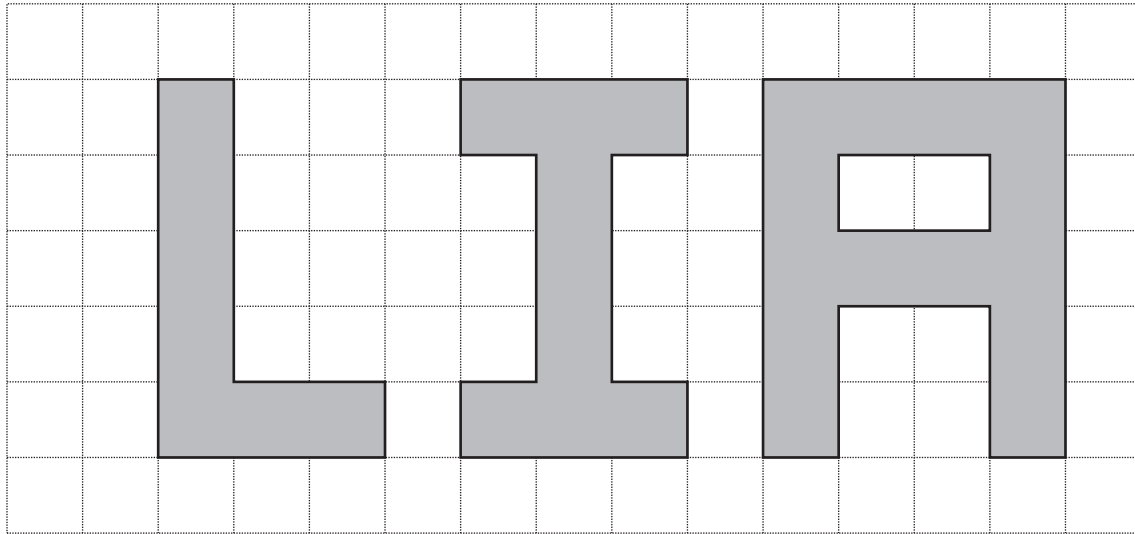
Match these road signs.
One has been done for you.



(3 marks)



7 David sells letters cut out from sheets of wood.
The letters making the name LIA are shown on this centimetre grid.



7 (a) Work out the area of letter A.

.....
Answer cm² (1 mark)

7 (b) David charges 20 pence per square centimetre for each letter.

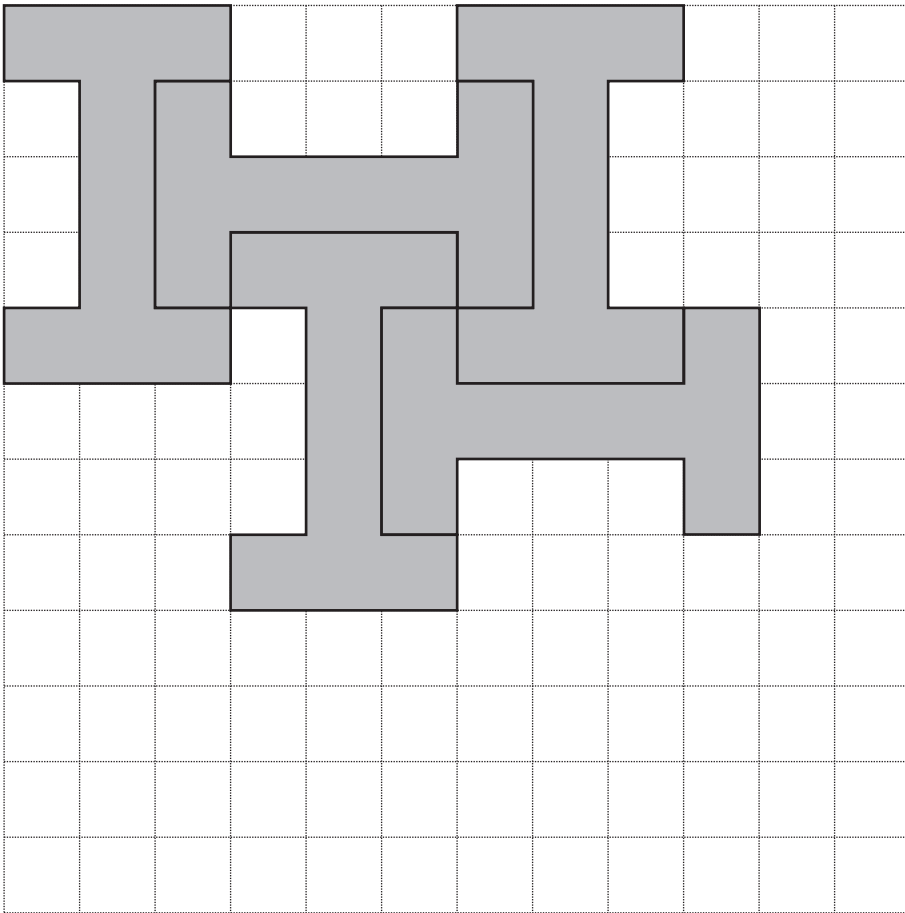
How much does he charge for the name LIA?
Give your answer in pounds.

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Answer £ (4 marks)

Question 7 continues on the next page



7 (c) David makes the letter I from a 12 cm by 12 cm sheet of wood.
This is how he starts.



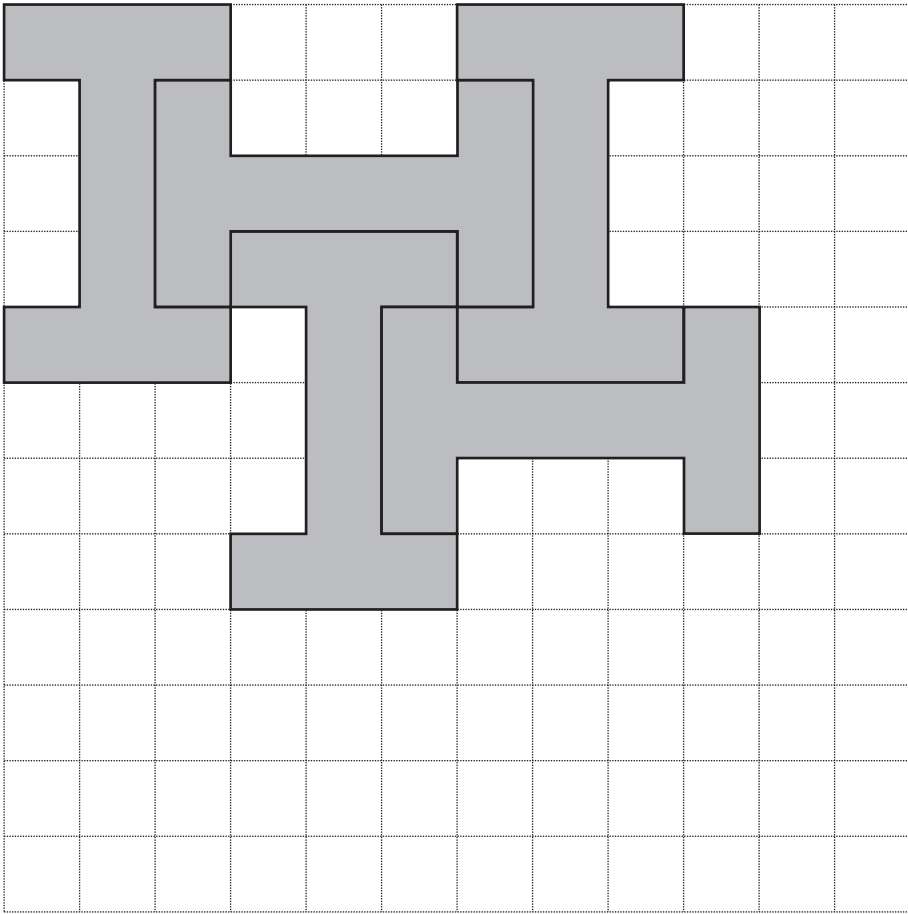
What is the largest number of the letter I that he can make from this sheet of wood?
You **must** show your letters on the grid above.

Use the spare grid on page 13 if you make a mistake.

Answer (3 marks)



Spare grid for 7(c)



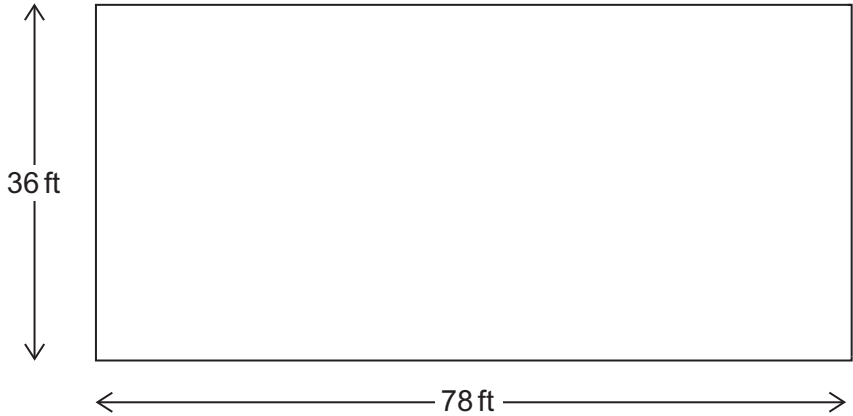
Turn over for the next question

3

Turn over ►



8 (a) The diagram shows the outside lines of a rectangular tennis court.
The measurements are in feet (ft).



Not drawn
accurately

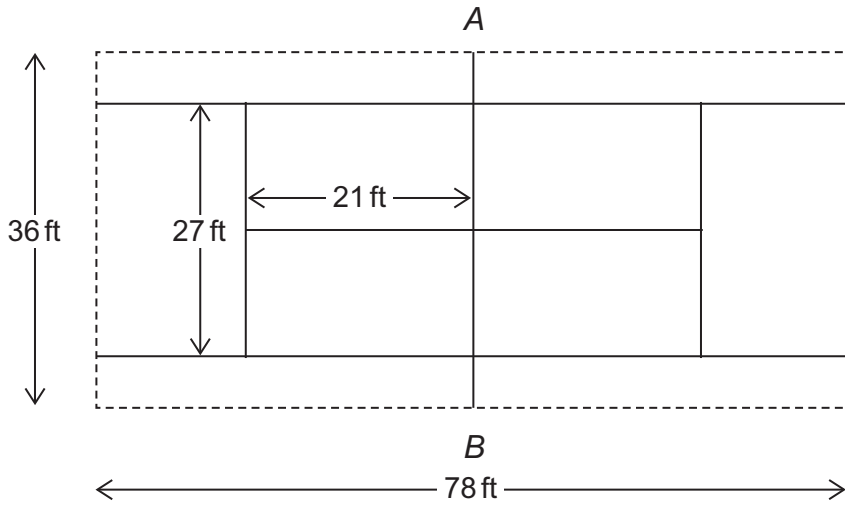
Work out the total distance around the outside of the tennis court.

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Answer ft (2 marks)



8 (b) There are other lines **inside** the tennis court, as shown. The outside lines are shown as dotted lines. AB is a line of symmetry.



Not drawn accurately

Show that the total length of the lines **inside** the tennis court is 288 ft.

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(4 marks)

***8 (c)** The outside **and** inside lines on the tennis court are painted. One kilogram of paint is needed for every 80 feet. A 5-kilogram pot of paint costs £29.75

Work out how much it costs to buy enough paint.

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Answer £

(4 marks)

Turn over ►



9 (a) A school sells juice in plastic cups.

9 (a) (i) The juice is bought in 3-litre bottles.
1 litre = 1000 millilitres.
Each cup holds 200 millilitres of juice.

Work out how many cups are filled from a 3-litre bottle.

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Answer (3 marks)

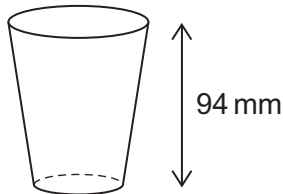
9 (a) (ii) The school sells each cup of juice for 40 pence.
A 3-litre bottle costs £3.65

How much profit is made on a 3-litre bottle?

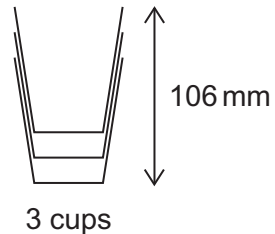
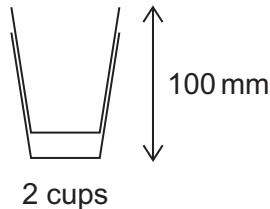
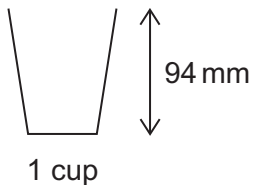
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Answer £ (2 marks)

9 (b) The diagram shows a plastic cup of height 94 millimetres.



The cups can be stacked.
The heights of some stacks are shown.



Not drawn accurately

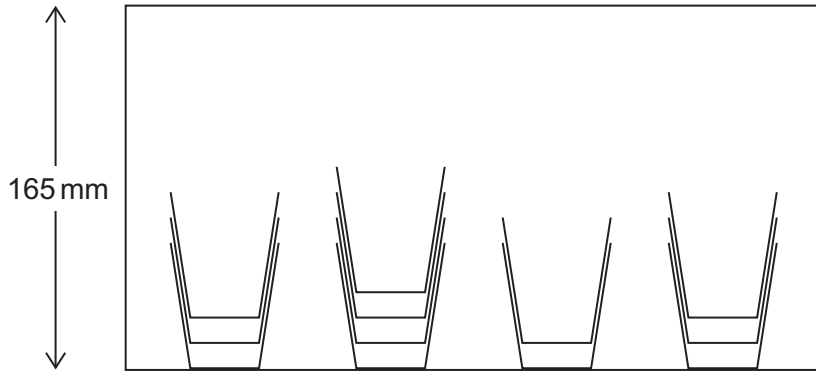


9 (b) (i) Complete the table.

Number of cups	1	2	3	4	5
Height of stack (mm)	94	100	106		

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(1 mark)

9 (b) (ii) Four stacks will fit on a shelf of height 165 mm as shown.



Not drawn
accurately

Work out the largest number of cups that will fit on the shelf.

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Answer (4 marks)



10 Delia is making food for a party.

10 (a) Delia makes a fruit salad from apples, oranges and pears.
For every 4 apples, she uses 3 oranges and 1 pear.
Delia uses 24 pieces of fruit altogether.

Work out the number of apples she uses.

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Answer (3 marks)

10 (b) These ingredients are needed to make 20 muffins.

Self-raising flour	600 grams
Sugar	180 grams
Cherries	500 grams
Chocolate	400 grams
Eggs	4
Milk	500 millilitres

Delia has enough flour, sugar, eggs and milk to make 20 muffins.
She has only 200 grams of cherries and 150 grams of chocolate.

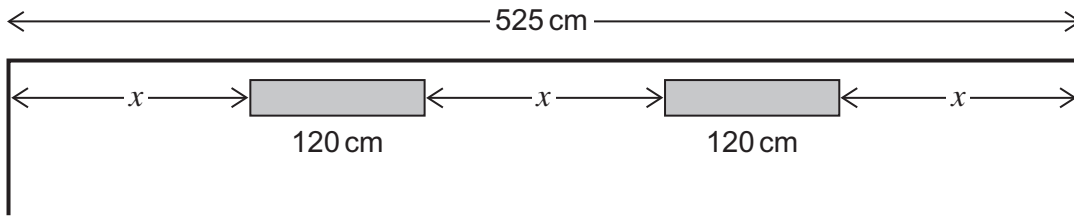
What is the largest number of muffins she can make?

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Answer (4 marks)



- *11 A wall is 525 centimetres long.
Two radiators, each 120 centimetres long, are fitted to the wall as shown.



Not drawn accurately

Set up and solve an equation to find the value of x .

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Answer $x =$ cm (4 marks)

- 12 Drinks are sold in packs of 12.
Chocolate bars are sold in packs of 15.
Chris buys the same number of drinks as chocolate bars.

What is the smallest possible number of each pack that he buys?

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Answer packs of drinks

..... packs of chocolate bars (2 marks)



13 Crude oil is sold in barrels.

1 barrel = 35 gallons
Cost of 1 barrel = £52

Crude oil is used to make petrol.
One litre of petrol costs £1.20

Jasmine says



One gallon of petrol costs
about twice as much as
one gallon of crude oil.

Jasmine

Is Jasmine correct?
You **must** show your working.

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(4 marks)



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