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F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

METHODS IN MATHEMATICS

B391/01

Methods in Mathematics 1 (Foundation Tier)

B31562061 1

Candidates answer on the question paper.

OCR supplied materials:
None

Other materials required:
- Geometrical instruments
- Tracing paper (optional)

Tuesday 21 June 2011
Afternoon

Duration: 1 hour

B391 01

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Your answers should be supported with appropriate working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

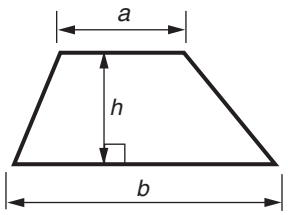
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- Your Quality of Written Communication is assessed in questions marked with an asterisk (*).
- The total number of marks for this paper is **60**.
- This document consists of **16** pages. Any blank pages are indicated.

WARNING
No calculator can be used for this paper

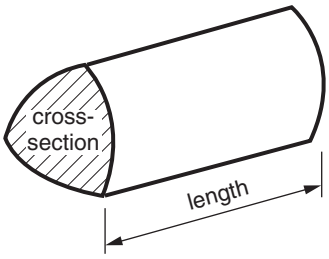
This paper has been pre modified for carrier language

Formulae Sheet: Foundation Tier

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



Volume of prism = (area of cross-section) × length



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1 A website gives predictions for temperature.
Here are the predictions for a particular night.

Time	6 pm	9 pm	midnight	3 am	6 am	9 am
Temperature (°C)	11	4	−2	−7	−8	−3

(a) For this night, give

(i) the lowest predicted temperature,

(a)(i) _____ °C **[1]**

(ii) the fall in predicted temperature between 9 pm and midnight,

(ii) _____ °C **[1]**

(iii) the rise in predicted temperature between 6 am and 9 am.

(iii) _____ °C **[1]**

(b) At 3 am on this night, the temperature was actually 10 degrees lower than predicted.

Calculate the actual temperature at 3 am.

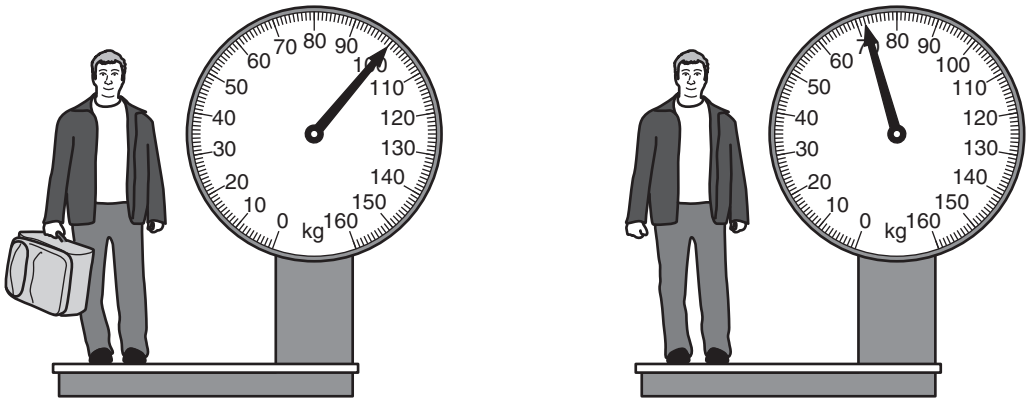
(b) _____ °C **[1]**

2 **(a)** Gerri buys a 19p fruit bar.
She pays with a £1 coin.

How much change should she get?

(a) _____ p **[1]**

(b)



When Fred stands on the scales holding his suitcase the scales read 100 kg.
When he stands on the scales without his suitcase they read 72 kg.

How much does his suitcase weigh?

(b) _____ kg **[1]**

(c) Work out.

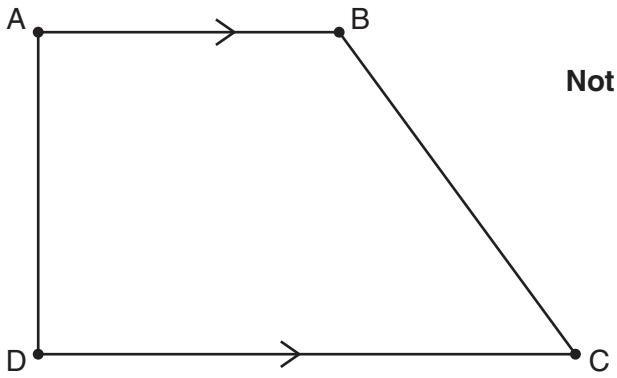
(i) 481 + 127

(c)(i) _____ **[1]**

(ii) 643 – 159

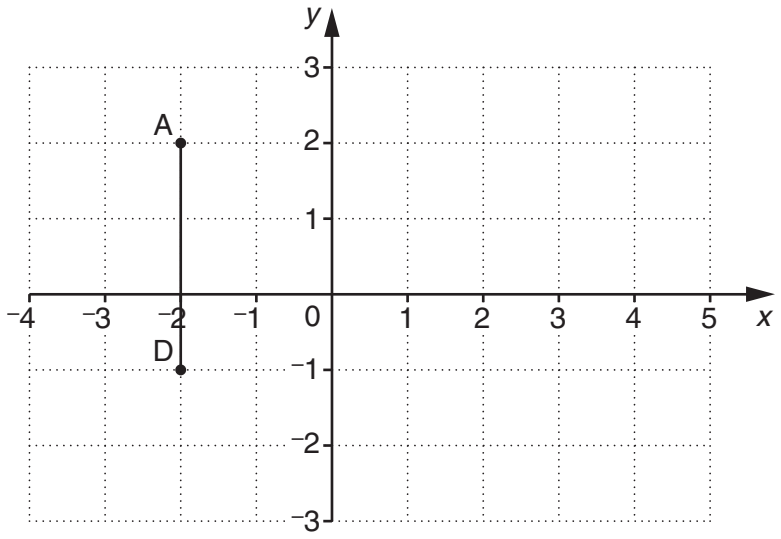
(ii) _____ **[2]**

3



Not to scale

Ali has started plotting this shape on the grid below.
He has plotted points A and D.



(a) Write down the coordinates of A. **(a)** (_____ , _____) **[1]**

(b) Point C is at (3, −1).

Plot C on the grid. **[1]**

(c) Mark a possible position for point B on the grid, and complete Ali's shape. **[1]**

(d) For Ali's shape, complete this sentence.

Sides _____ and _____ are perpendicular. **[1]**

4 Lydia is using these four cards to solve number puzzles.

1	4	5	8

(a) She makes positive 2-digit numbers using all the cards.
The smallest answer that she can get from a subtraction is 3.

5	1	-	4	8	= 3

What is the largest answer that she can get from a subtraction?
Fill in the spaces below to show this subtraction and the answer.

(a) ☐☐ - ☐☐ = _____ **[3]**

(b) Lydia now makes fractions using just two of the cards at a time.

Show how she can use two cards to make a fraction that is

(i) smaller than $\frac{1}{4}$,

$\frac{\square}{\square}$

[1]

(ii) bigger than $\frac{1}{2}$ but less than 1,

$\frac{\square}{\square}$

[1]

(iii) bigger than 1,

$\frac{\square}{\square}$

[1]

(iv) equivalent to $\frac{1}{2}$,

$\frac{\square}{\square}$

[1]

(v) equivalent to $\frac{7}{35}$.

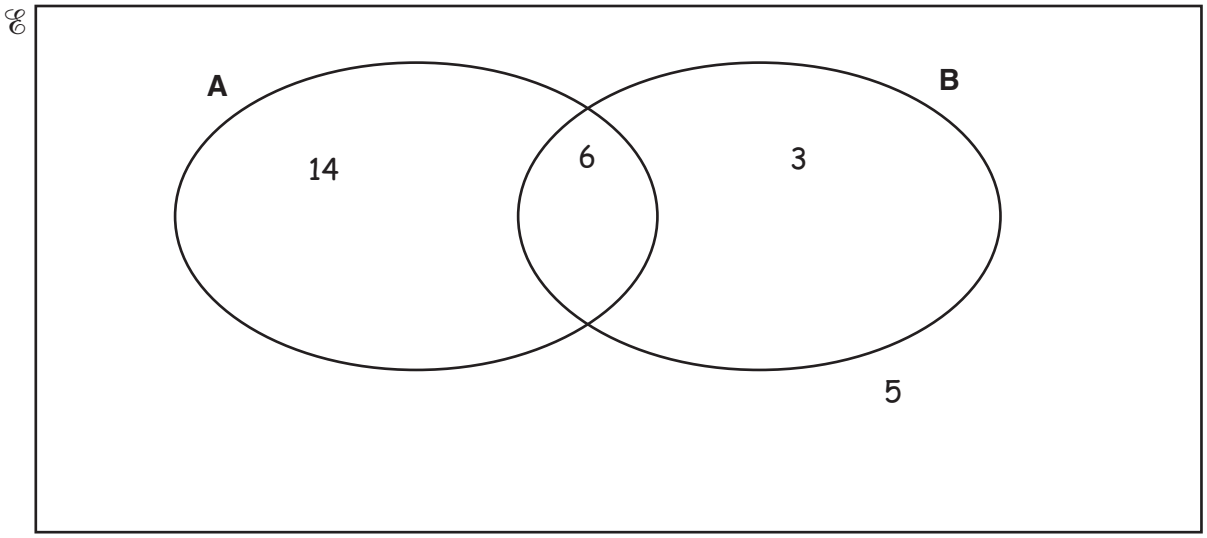
$\frac{\square}{\square}$

[1]

5 In this question

- $\mathscr{E}$ = { Whole numbers }
- A = { Even numbers }
- B = { Multiples of 3 }.

The numbers 3, 5, 6 and 14 have been placed correctly in the four separate regions of the Venn diagram.



Correctly place two extra numbers in **each** separate region of the Venn diagram. **[3]**

6 **(a)** Hafusa has 6 red counters and 8 blue counters.
She places **some** of them in a bag.
Liam picks a counter from the bag without looking.

Give a possible number of red counters and blue counters in Hafusa's bag so that

(i) there is an even chance that Liam will pick a blue counter,

(a)(i) _____ red and _____ blue **[1]**

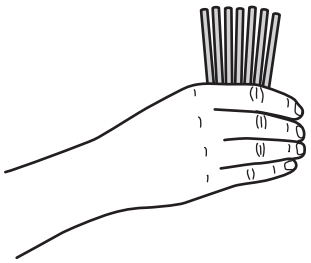
(ii) it is unlikely that Liam will pick a blue counter,

(ii) _____ red and _____ blue **[1]**

(iii) It is certain that Liam will pick a blue counter.

(iii) _____ red and _____ blue **[1]**

(b)



Liam has 7 straws.
The straws are all different lengths.
He holds the straws so that only one end of each is showing.
Hafusa picks a straw at random.

What is the probability that Hafusa picks

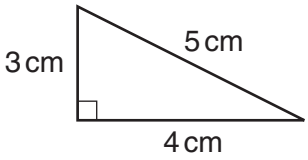
(i) the shortest straw,

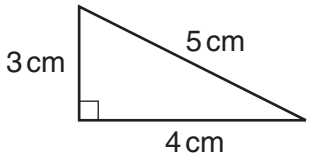
(b)(i) _____ **[1]**

(ii) a straw that is **not** the shortest one?

(ii) _____ **[1]**

7* Annabel has two triangles like the ones below.





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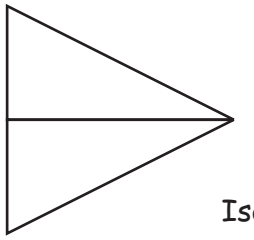
She joins her two triangles along a common edge to form this isosceles triangle.



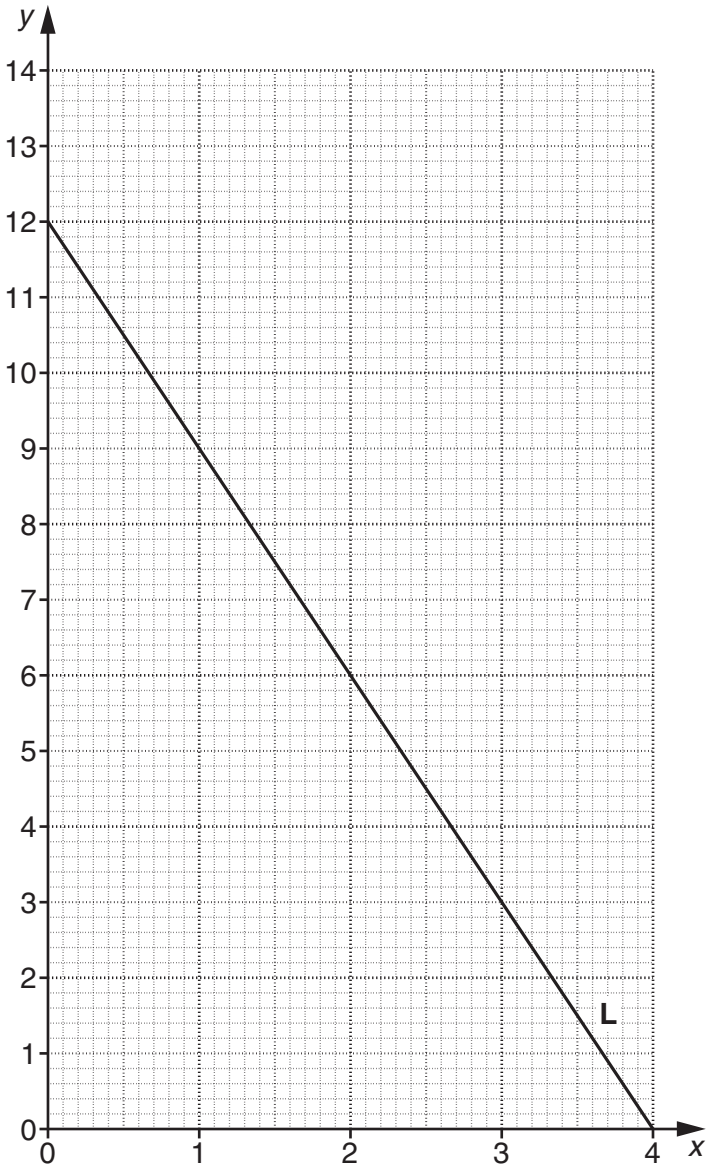
Not to scale

Isosceles Triangle

Next she wants to make quadrilaterals.

In the space below, show and name the different types of quadrilateral Annabel could make by joining her two triangles along a common edge. **[6]**

8 The grid shows the graph of a straight line, **L**.



(a) For line **L**, write down the value of y when x is 2.5.

(a) _____ **[1]**

(b) Marie says that the equation of this straight-line graph is $y = 2x + 1$.

Show that she is wrong.

_____

_____

_____ **[2]**

(c) The equation of another line, **M**, is $y = 3x + 1$.

(i) For line **M**, work out the value of y when x is 4.

(c)(i) _____ **[1]**

(ii) The line **M** cuts the y-axis at (0, 1).

Draw line **M** on the grid. **[2]**

(d) Write down the coordinates of the point where lines **L** and **M** cross.

(d) (_____ , _____) **[1]**

9 Work out.

(a) 5^2

(a) _____ **[1]**

(b) 10^3

(b) _____ **[1]**

(c) 2^5

(c) _____ **[1]**

10 When Jake catches the bus to school in the morning, it may be early, on time or late.
The probability that it is early is 0.05.
The probability that it is late is 0.4.

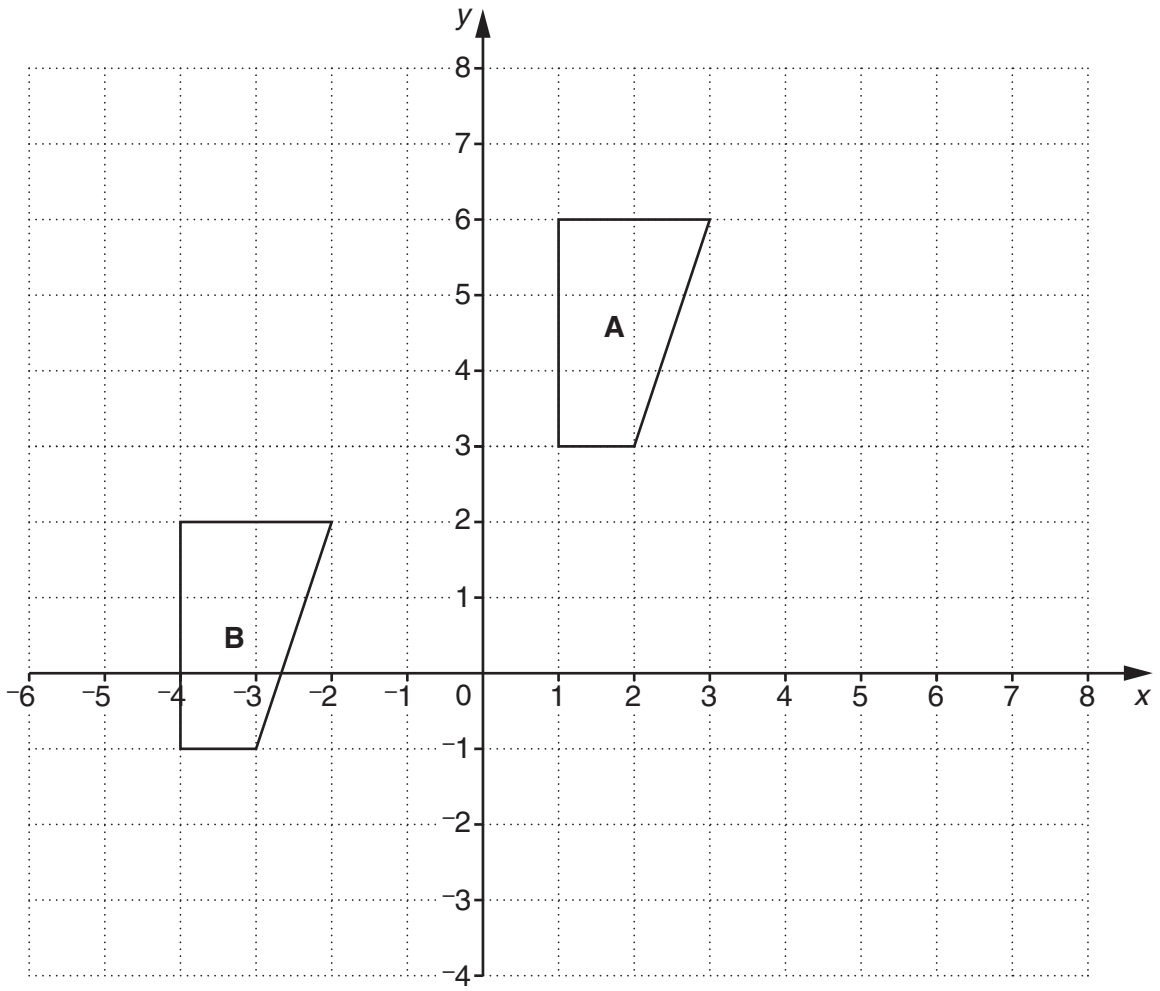
(a) What is the probability that the bus is on time?

(a) _____ **[2]**

(b) Calculate how many times you would expect the bus to be late in a school year of 190 days.

(b) _____ **[2]**

11



(a) Describe fully the **single** transformation that maps shape **A** onto shape **B**.

_____

_____ **[2]**

(b) Reflect shape **A** in the line $y = x$.
Label the image **C**. **[3]**

12 180 expressed as the product of its prime factors is $2 \times 2 \times 3 \times 3 \times 5$.

(a) Express 140 as a product of its prime factors.

(a) _____ **[2]**

(b) Find the highest common factor (HCF) of 180 and 140.

(b) _____ **[2]**

(c) Find the least common multiple (LCM) of 180 and 140.

(c) _____ **[2]**

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