

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

GCSE METHODS IN MATHEMATICS (LINKED PAIR)

H

Higher Tier Unit 1 Algebra and Probability

Wednesday 4 November 2015

Morning

Time allowed: 45 minutes

Materials

For this paper you must have:

- mathematical instruments.

You must **not** use a calculator.



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- 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 you do not want to be marked.
- You must **not** use your calculator in Section B. Your calculator must remain on the floor under your seat.
- When you have answered Section B you may work again on Section A but you must **not** use a calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 40.
- The quality of your written communication is specifically assessed in Questions 16, 17 and 19. 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 book.

Advice

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

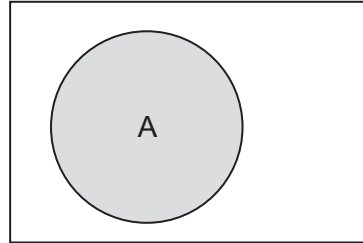
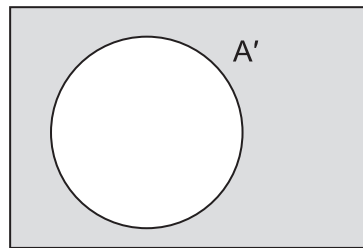
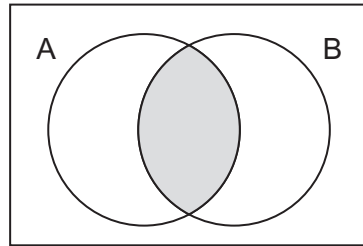
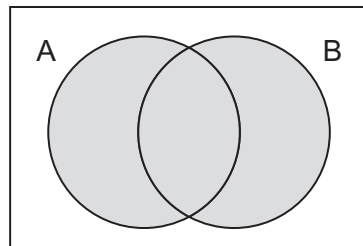


N 0 V 1 5 9 3 6 5 1 H B 0 1

Formulae Sheet: Higher Tier

Set notation

A

 A'  $A \cap B$  $A \cup B$ 

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

13 Work out $\frac{5}{8} \times 4$

Give your answer as a mixed number in its simplest form.

[2 marks]

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Answer

14 Rearrange the formula $b = 2a - 3$ to make a the subject.

[2 marks]

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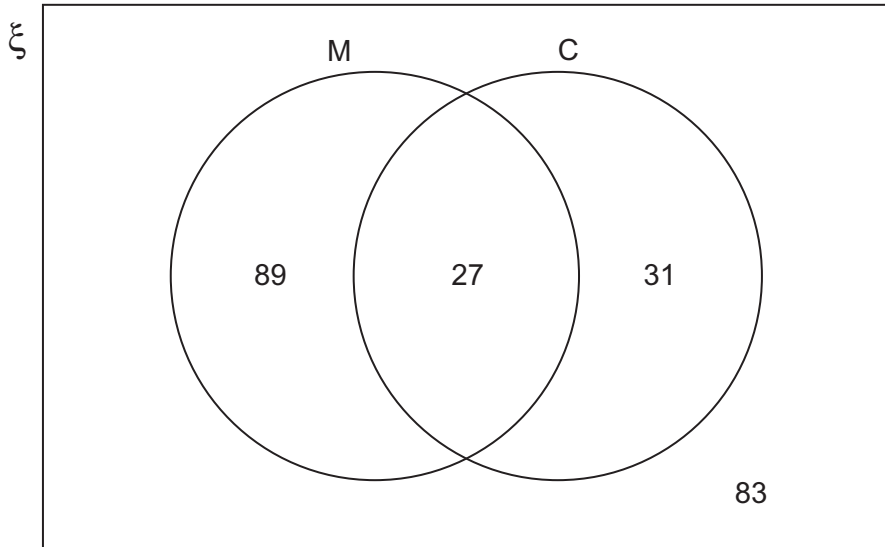
Answer

Turn over for the next question



15 The Venn diagram shows information about passengers on a flight.

- ξ = the 230 passengers on the flight
- M = male passengers
- C = child passengers



One of the passengers is chosen at random.

15 (a) Work out the probability that the passenger is male.

[1 mark]

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Answer

15 (b) Write down the probability that the passenger is a female child.

[1 mark]

Answer

15 (c) The passenger chosen is a child.
Work out the probability that the child is female.

[1 mark]

Answer



*16

$A = 5x + 1$

$B = 7x - 9$

$C = 3x + 12$

The value of C is 28.5

Josh says,

“ A and C have the same value, but B has a different value.”

Is Josh correct?

You **must** show your working.

[4 marks]

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Turn over ►



17 A, B, C and D are the four possible results of a game.
The table gives the probabilities for B and C.

Result	A	B	C	D
Probability		0.12	0.28	

*17 (a) $P(A) = 2P(B)$

Show that $P(D) = 3P(B)$

[3 marks]

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17 (b) The game was played 200 times.
Result C occurred 6 **more** times than expected.

How many times was C the result?

[3 marks]

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Answer



18 Work out $(4 \times 10^7) \times (9 \times 10^5)$

Write your answer in standard form.

[2 marks]

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Answer

*19 Write $\frac{1}{11}$ as a recurring decimal.

[2 marks]

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Answer

Turn over for the next question



20 Here is a rule for numbers.

Rule	Example
Start with x	6
Multiply x by the number which is 3 greater than x	$6 \times 9 = 54$
Add the number which is 4 greater than x	$54 + 10 = 64$
The answer is the square of the number which is two greater than x	$64 = 8^2$ and $8 = 6 + 2$

Using x for the starting number, prove that this rule works for **any** number.

[4 marks]

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21 $0.4a = 0.75b$

Work out the ratio $a : b$

Give your answer in its simplest form.

[3 marks]

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Answer :

22 $16^{-\frac{1}{4}} = n^{\frac{1}{3}}$

Work out the value of n .

[2 marks]

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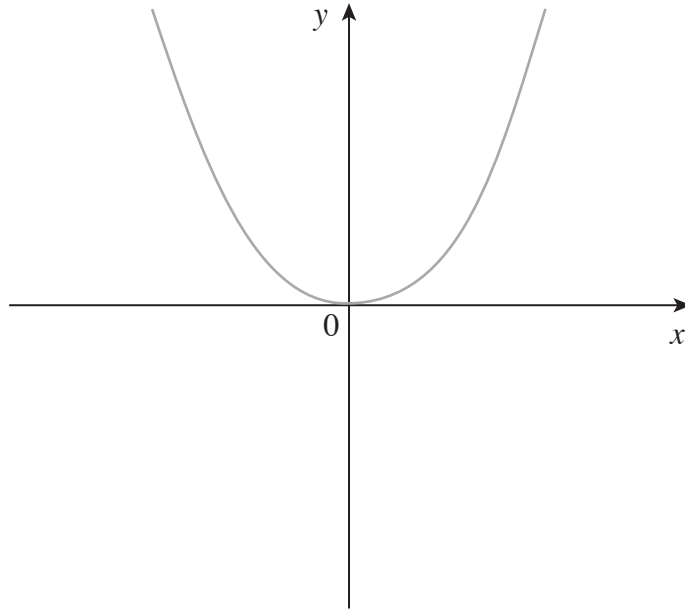
Answer



- 23** Each diagram below shows a sketch of the graph with equation $y = x^2$
On each diagram, draw a sketch of the graph with the equation given.

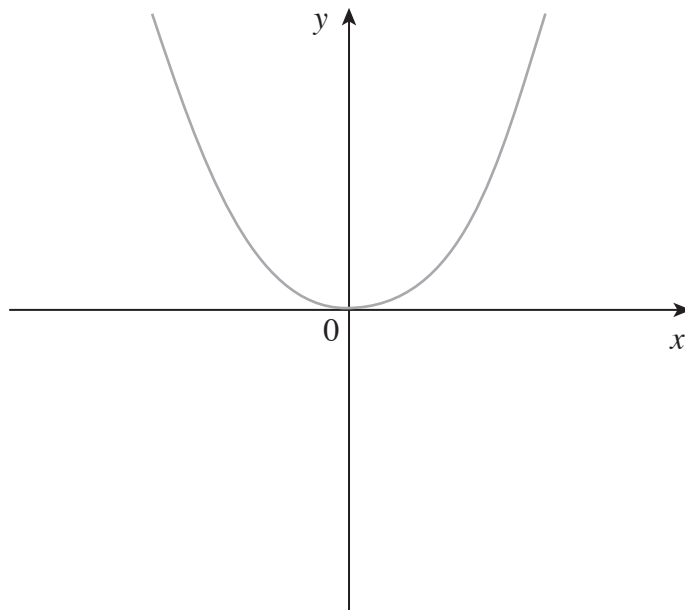
23 (a) $y = x^2 + 2$

[1 mark]



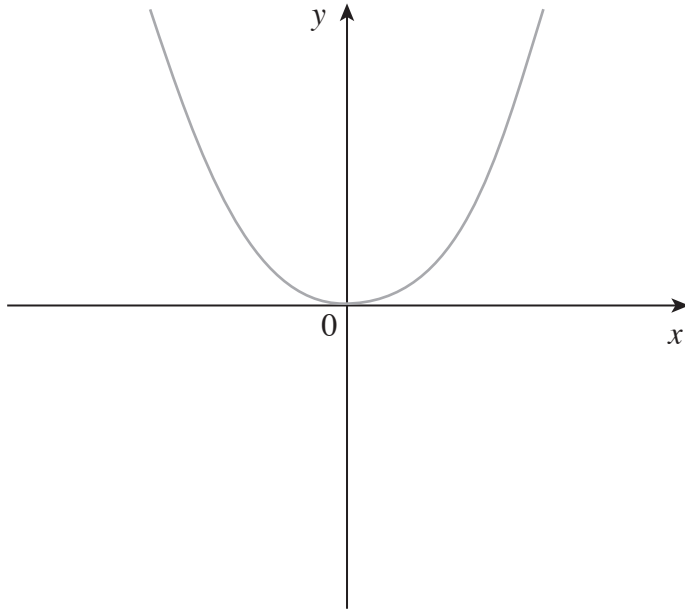
23 (b) $y = 2x^2$

[1 mark]



23 (c) $y = -x^2$

[1 mark]



Turn over for the next question

Turn over ►



24 Use the formula $v^2 = w^2 + 2xy$
to work out the **exact** value of v when

$$w = \sqrt{6}$$

$$x = \sqrt{12}$$

$$y = \sqrt{3}$$

Give your answer in the form $a\sqrt{2}$, where a is an integer.
You **must** show your working.

[4 marks]

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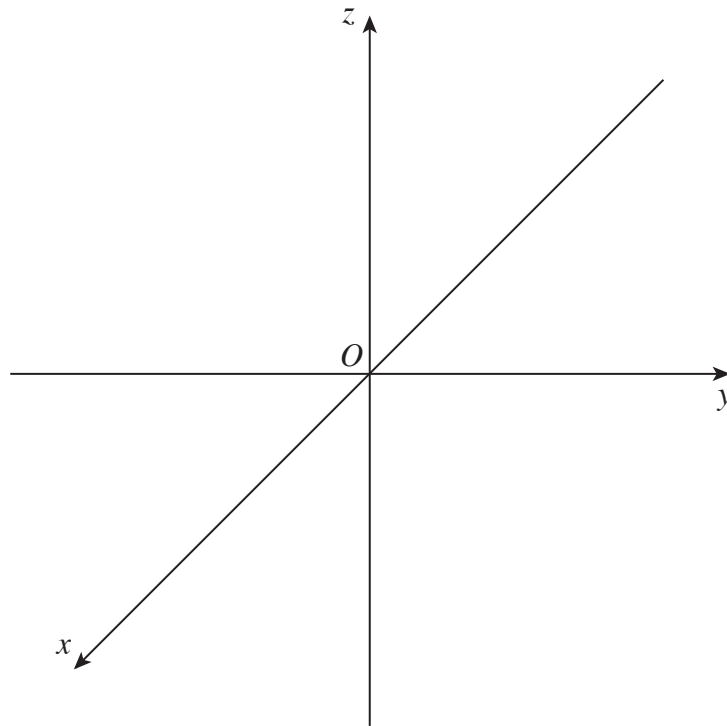
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Answer



25 The diagram shows a 3D coordinate system.

On each axis 1 cm = 1 unit



Point W is the same distance from each axis.
The **coordinates** of W add up to 6

List the coordinates of the **four** possible positions of W.

[3 marks]

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END OF QUESTIONS



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