AQA

GCSE
METHODS IN MATHEMATICS (LINKED PAIR)

H

Higher Tier   Unit 1   Algebra and Probability (Section A)

Thursday 26 May 2016   Morning   Time allowed: 45 minutes

Materials
For this paper you must have:
- a calculator
- mathematical instruments.

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.
- This paper is divided into two sections: Section A and Section B.
- After the 45 minutes allowed for Section A, you must put your calculator on the floor under your seat. You will then be given Section B.
- 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 1, 2 and 9. 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.
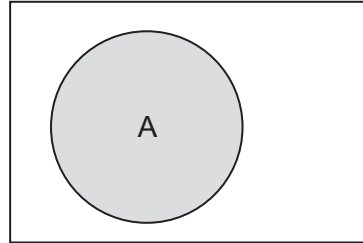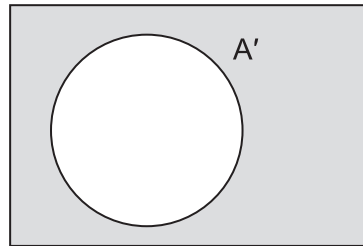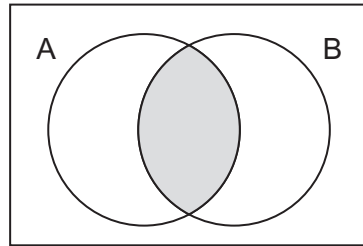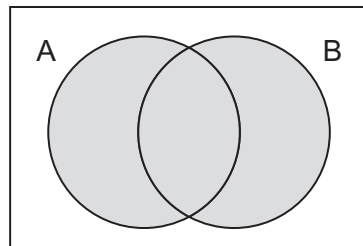- You are expected to use a calculator where appropriate.

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

Formulae Sheet: Higher Tier

Set notation

A

A′

A ∩ B

A ∪ B

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

*1   There are 140 counters in box A.
      There are 220 counters in box B.

      The number of counters in A is **increased** by 20%

      The number of counters in B is **decreased** by $\frac{1}{4}$

      Which box now has more counters?
      You **must** show your working.

      [4 marks]

      Answer _____

2 (a) Circle the cube number.

[1 mark]

24   33   64   81

2 (b) Work out $\sqrt[3]{9261}$

[1 mark]

_____

          Answer _____

*2 (c) 10 648 is the first cube number with five digits.

Show that there are 25 cube numbers with five digits.

[3 marks]

_____

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3 Solve $3(5x + 12) = 4x - 8$

[3 marks]

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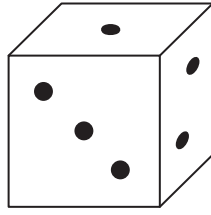
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$x = $ _____

Turn over for the next question

8

4   Here is a six-sided dice numbered 1 to 6

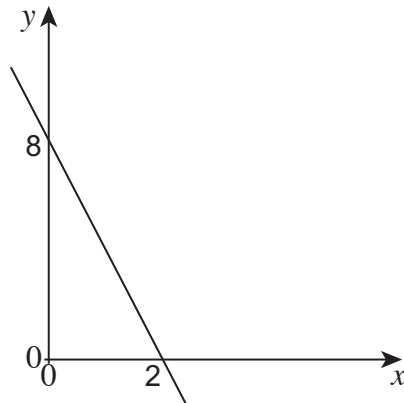Describe how the dice can be tested to see if the dice is fair.

[2 marks]

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_____

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_____

5 List the **integer** values of x that satisfy the inequality $-1 < 2x - 1 \leqslant 8$

[3 marks]

Answer _____

Turn over for the next question

Turn over ▶

6 (a)   Here is a sketch of a straight line.

Work out the gradient of the line.
Circle your answer.

[1 mark]

−4   −0.25   0.25   4

6 (b)   A different line passes through the points (2, 1) and (6, 9)
The line also passes through the point (20, a)

Work out the value of a.

[3 marks]

_____

_____

_____

_____

_____

_____

Answer _____

4

Turn over ▶

7 Joe, Saj and Abi each do some trials of the same experiment.
The table shows information about the results of the trials.

	Number of trials	**Relative frequency of success**
Joe	200	0.680
Saj	400	0.740
Abi	600	0.755

Work out the relative frequency of success for all 1200 trials.
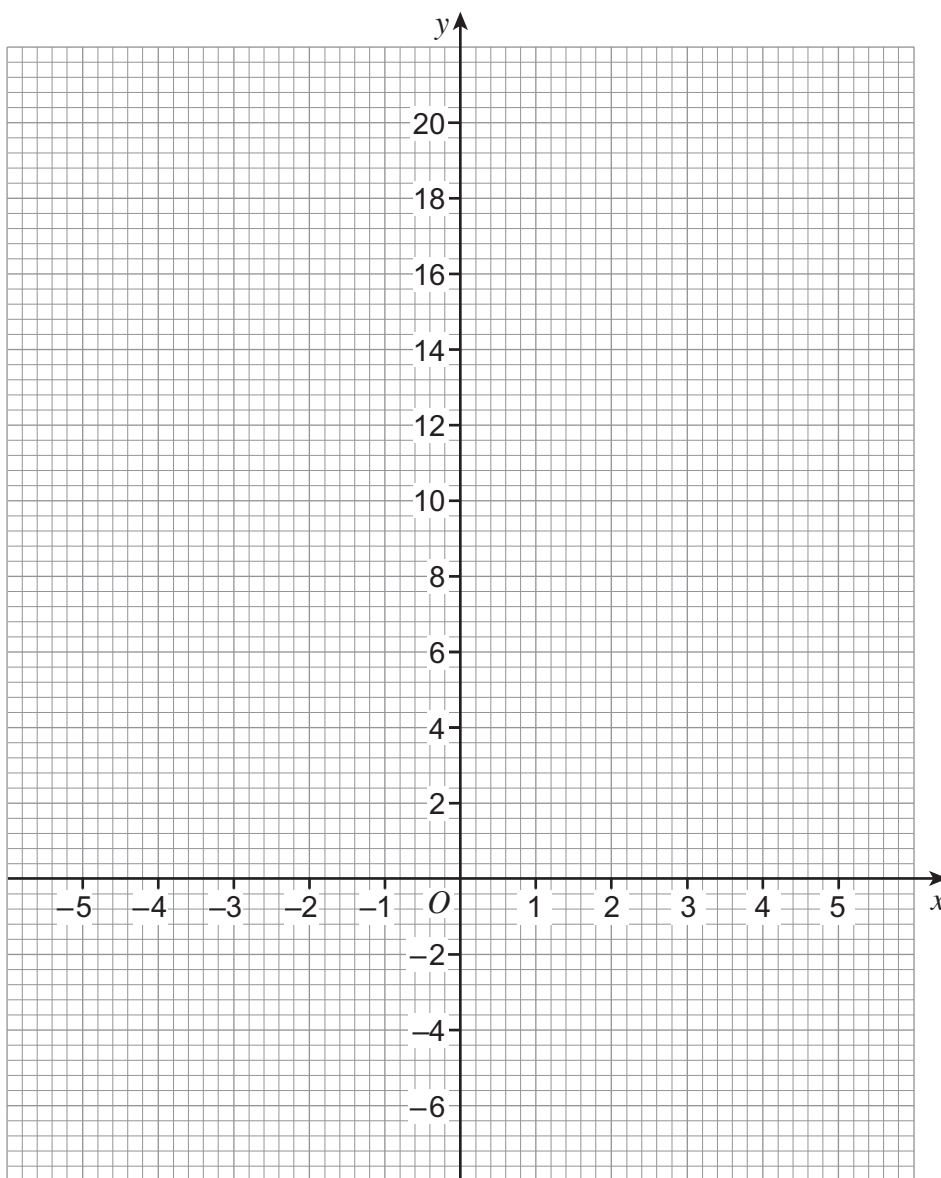Give your answer as a decimal.

[3 marks]

Answer _____

8 By drawing the graphs of $y = x^2 - 5$ and $y = 4 - x$ for $-5 \leqslant x \leqslant 5$

find the solutions of the equation $x^2 - 5 = 4 - x$

[5 marks]

Answer _____

*9   Any odd number can be expressed in the form $2n + 1$ where n is an integer.

Prove that the sum of any four consecutive odd numbers is a multiple of 8

[4 marks]

10 Here are seven coins.

Two coins are chosen at random.

Work out the probability that the **total** value of the two coins is **at least** £1

[4 marks]

_____

_____

_____

_____

_____

_____

_____

Answer _____

Turn over for the next question

8

Turn over ▶

11 Express as a single, simplified, algebraic fraction

$$\frac{10x + 3}{5} + \frac{1}{x - 4} - 2x$$

[3 marks]

Answer _____

END OF SECTION A

3

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