

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
2 - 3	
4 - 5	
6 - 7	
8 - 9	
10 - 11	
12 - 13	
TOTAL	



General Certificate of Secondary Education
Higher Tier


Mathematics

43602H

Past Paper Type Questions by Topic

Algebra

H

<p>For this paper you must have:</p> <ul style="list-style-type: none"> • a calculator • mathematical instruments. 	
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Time allowed

- 1 hour

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.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is.
- The quality of your written communication is specifically assessed in some questions. These questions are indicated with an asterisk (*)
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer booklet.

Advice

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

1 Solve this equation

$$\frac{x+3}{2} - \frac{x-2}{3} = 3$$

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Answer $x =$ (4 marks)



2 Solve the equation $x^2 - 2x - 6 = 0$
Give your answers to three significant figures.

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Answer (3 marks)

3 (a) Solve $7x = 15 - 3x$

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Answer $x =$ (2 marks)

3 (b) $2(x + 16) + 4(x - 5)$ simplifies to $p(x + q)$

Work out the values of p and q .

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Answer $p =$, $q =$ (3 marks)



4 Solve the simultaneous equations

$$x = 3 + 2y$$

$$x^2 + 2y^2 = 27$$

Do **not** use trial and improvement.
You **must** show your working.

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Answer (6 marks)



5 (a) Expand $3(2a - 4)$

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Answer (1 mark)

5 (b) Factorise $b^2 - 3b$

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Answer (1 mark)

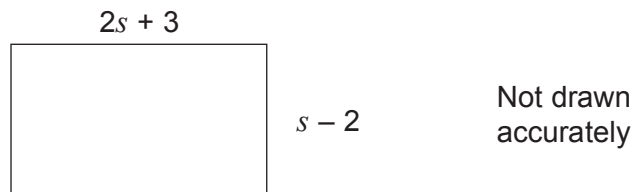
5 (c) Expand and simplify $3(c - 1) - 2(c + 4)$

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Answer (2 marks)

5 (d) Solve the equation $3(4d + 1) = 21$

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Answer $d =$ (3 marks)

6 A rectangle has sides of $(2s + 3)$ cm and $(s - 2)$ cm.
The perimeter is 32 cm.



Work out the value of s .

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Answer $s =$ (3 marks)



7 Simplify fully $\frac{6y^2 + y - 1}{4y^2 - 1}$

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Answer (4 marks)

8 Show that $7 + \frac{10}{y+2} = \frac{9}{y}$
simplifies to $y^2 + 15y - 18 = 0$

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(3 marks)



9 (a) Simplify $a^3b^2 \times 4ab^5$

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Answer (2 marks)

9 (b) Factorise fully $b^2 - 8ab$

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Answer (2 marks)

9 (c) Make x the subject of $s = y + \frac{x}{r}$

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Answer (2 marks)

9 (d) Work out the least common multiple (LCM) of $6ab^2$ and $3a^2b$

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Answer (2 marks)



10 Solve the equations

10 (a) $3y - 8 = 7 - y$

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Answer $y =$ (2 marks)

10 (b) $\frac{y+4}{5} + \frac{y-2}{3} = 4$

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Answer $y =$ (4 marks)



11 (a) Show that the algebraic expression

$$\frac{2y-3}{y-3} - \frac{2y-1}{2y+1}$$

Can be written as

$$\frac{2y^2 + 3y - 6}{(y-3)(2y+1)}$$

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(4 marks)

11 (b) Hence, or otherwise, solve the equation

$$\frac{2y-3}{y-3} - \frac{2y-1}{2y+1} = 1$$

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Answer (3 marks)



12 Solve the following equations.

12 (a) $3x - 7 = x + 5$

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Answer $x =$ (2 marks)

12 (b) $5(y - 3) = 3(y + 1)$

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Answer $y =$ (3 marks)

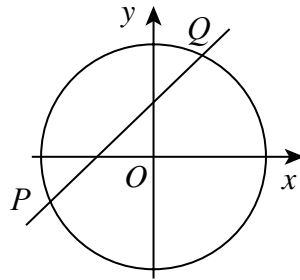
12 (c) $\frac{y+1}{2} - \frac{y-3}{5} = 2$

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Answer $y =$ (4 marks)



13 The circle $x^2 + y^2 = 16$ and the line $y = x + 2$ intersect at the points P and Q .



Not drawn accurately

13 (a) Show algebraically that the x -coordinates of points P and Q satisfy the equation

$$x^2 + 2x - 6 = 0$$

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(3 marks)

13 (b) Write the equation $x^2 + 2x - 6 = 0$ in the form $(x + a)^2 - b = 0$

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Answer (2 marks)

13 (c) Hence, or otherwise, solve the equation $x^2 + 2x - 6 = 0$
Give your answers in surd form.

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Answer (2 marks)



14 (a) Factorise $y^2 + 7y$

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Answer (1 mark)

14 (b) Expand $5(3b + 8)$

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Answer (1 mark)

14 (c) Expand and simplify $3(2b + 1) - 2(b - 3)$

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Answer (2 marks)

15 Rearrange the formula $z = \frac{3x - 1}{2x + 5}$ to make x the subject.

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Answer (4 marks)



***16**

Solve the equation $\frac{2y-3}{4} + \frac{y-1}{3} = 2$

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Answer $y =$ (5 marks)

17 (a)

Factorise $x^2 + 7x + 6$

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Answer (2 marks)

17 (b)

Hence, or otherwise, write 176 as the product of its prime factors.
Give your answer in index form.

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Answer (3 marks)



18

Solve the simultaneous equations

$$z^2 = 2x + 29$$

$$z = x - 3$$

You **must** show your working.

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Answer (5 marks)



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Solve

$$\frac{10}{2y-1} - \frac{3}{y} = 3$$

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Answer (6 marks)



There are no questions printed on this page

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**