AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

H

Higher Tier Unit 2 Number and Algebra

Friday 4 November 2016 Morning Time allowed: 1 hour 15 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.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 66.
- The quality of your written communication is specifically assessed in Questions 4 and 19. 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 book.

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

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

1 Use approximations to estimate the value of $\dfrac{37 \times 304}{58}$

[2 marks]

Answer _____

2 (a) Multiply out $3(2x - 7)$

[1 mark]

Answer _____

2 (b) Factorise $x^2 + 8x$

[1 mark]

Answer _____

3 Work out the value of $2a^2 + b^3$ when $a = 5$ and $b = -3$

[3 marks]

Answer _____

Turn over for the next question

7

***4** Lisa wants to hire a car.

Company A	**Company B**
No charge for mileage	No daily charge
Normal price £66 each day	Normal price 75p each mile
Offer Now $\frac{1}{3}$ off	**Offer** Now 20% off

Which company is cheaper

to hire a car for 15 days

and

drive 1000 miles?

You **must** show your working.

[5 marks]

Answer _____

5 Write 56 as a product of prime factors.

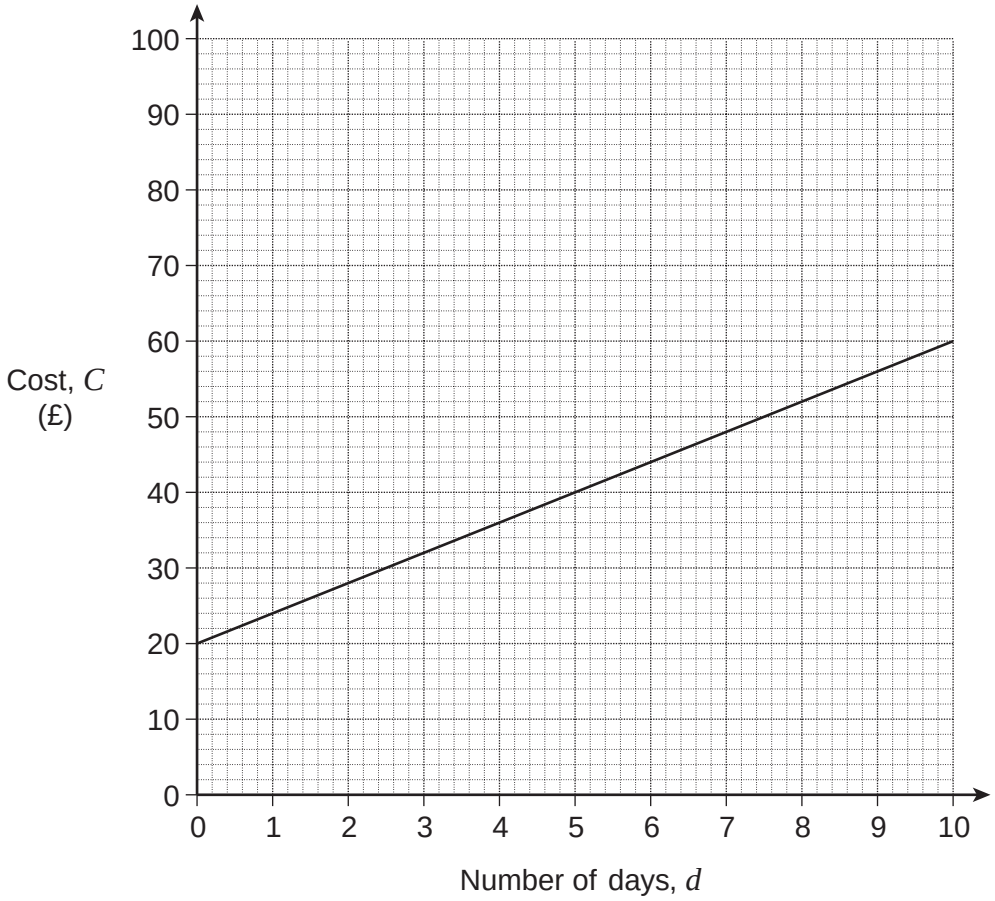
[2 marks]

Answer _____

Turn over for the next question

7

6 This graph is used to work out the cost, C (£), to hire a drill for a number of days, d.



6 (a) Circle the correct formula for the cost, C, to hire a drill.

[1 mark]

$C = 20d + 4$ $C = 4d + 24$ $C = 4d + 20$ $C = 24d - 4$

6 (b) The cost of hiring a sander is given by the formula

$$C = 6d + 10$$

Dev hires a drill and a sander for the **same** number of days.
The **total** cost is £90

Work out the number of days that he hires the drill and sander.

[3 marks]

Answer _____ days

7 Solve $4(x - 5) = x + 7$

[3 marks]

$x =$ _____

7

8 A shop makes juice by mixing cranberry and orange in the ratio

cranberry : orange = 1 : 3

1 litre of cranberry costs 60p

1 litre of orange costs 40p

8 (a) Show that the cost of 20 litres of juice is £9

[2 marks]

8 (b) The shop sells 1 litre of juice for 80p

Work out the profit for selling 60 litres of juice.

[3 marks]

Answer £ _____

9 (a) x is an integer

$$-7 \leqslant x < 9$$

Work out the **largest** possible value of x^2

[1 mark]

Answer _____

9 (b) y is an integer

$$-4 < y < 3$$

Work out the **smallest** possible value of y^3

[1 mark]

Answer _____

Turn over for the next question

7

10 (a) A sequence starts 5 13 21 29

Circle the expression for the nth term.

[1 mark]

$8 - 3n$ $8n + 5$ $8n - 3$ $5n + 8$

10 (b) The term-to-term rule for a different sequence is

Multiply the previous term by 2 then subtract 5

The second term in this sequence is $2x + 7$

The sum of the first three terms is 57

Work out the value of x.

[4 marks]

Answer _____

11 (a) Circle the answer to $9.6 \times 10^8 \div 4$

[1 mark]

9.6×10^2 2.4×10^2 2.4×10^8 9.6×10^4

11 (b) Work out $(4 \times 10^{-3}) \times (9 \times 10^{14})$

Give your answer in standard form.

[2 marks]

Answer _____

Turn over for the next question

8

12 Solve the simultaneous equations

$$5x + 6y = 3$$

$$2x - 3y = 12$$

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

[3 marks]

Answer _____

13 (a) Simplify fully $(5x^2y^4)^3$

[2 marks]

Answer _____

13 (b) Simplify fully $\dfrac{32x^{12}y^2}{24x^3y^6}$

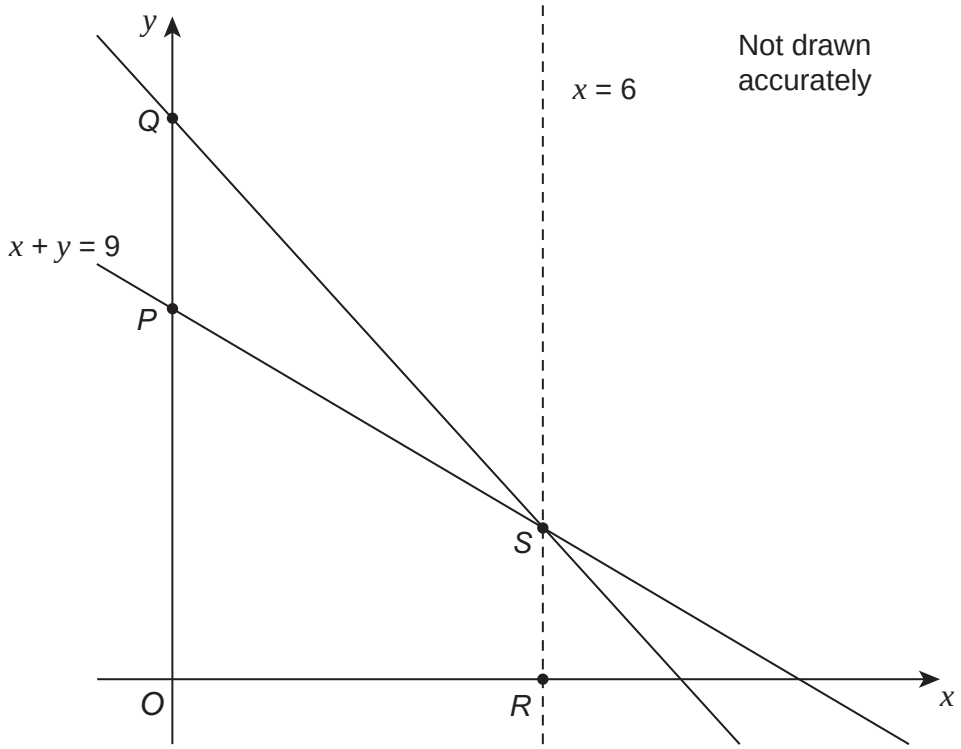
[2 marks]

Answer _____

Turn over for the next question

7

14 On the diagram, line *PS* is $x + y = 9$ and line *RS* is $x = 6$



The gradient of line *QS* is twice the gradient of line *PS*.

Work out the ratio of lengths *OQ* : *RS*

[3 marks]

Answer _____ : _____

15 Make x the subject of $y = \dfrac{8 - 3x}{4x + 9}$

[4 marks]

Answer _____

Turn over for the next question

7

16 (a) Circle the value of 3^{-2}

[1 mark]

-6 $\frac{1}{6}$ $\frac{1}{9}$ -9

16 (b) Work out the value of $(-8)^0 + 8^{-\frac{2}{3}}$

[3 marks]

Answer _____

17 (a) Show clearly that $(2x - 3y)(2x + 3y) \equiv 4x^2 - 9y^2$

[1 mark]

17 (b) Show clearly that $\frac{3}{\sqrt{2}} \equiv \frac{3\sqrt{2}}{2}$

[1 mark]

17 (c) Work out the value of $\left(2\sqrt{3} - \frac{3}{\sqrt{2}}\right)\left(2\sqrt{3} + \frac{3}{\sqrt{2}}\right)$

[3 marks]

Answer _____

9

18 Simplify $\dfrac{5x^2 + 11x - 12}{x^2 + 3x}$

[3 marks]

Answer _____

***19** Prove that $(4x - 5)^2 - 5x(3x - 8)$ is positive for all values of x.

[4 marks]

END OF QUESTIONS

7

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED