

For **AQA**

Name

Class

GCSE
Mathematics
Specification
Paper 1 Higher Tier

H

Churchill Paper 1A

1 hour 30 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.
- Write your name and class in the box at the top of the 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.
- In all calculations, show clearly how you work out your answer.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.

*Churchill
Maths*



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However, this paper is available as a sample that can be used without licence.

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

1 What is the median of this set of data?

2 4 4 4 6 7 8 8 9

Circle your answer.

[1 mark]

4 5 6 6.5

2 Asad is paid £10.60 per hour.

How much does Asad get paid for $3\frac{1}{2}$ hours work?

Circle your answer.

[1 mark]

£31.80 £35.30 £36.80 £37.10

3 What is the next term in this geometric progression?

2 6 18 54 ...

Circle your answer.

[1 mark]

72 162 166 2916

4 Work out $\frac{3}{10} \div \frac{1}{2}$

Circle your answer.

[1 mark]

$\frac{3}{20}$ $\frac{3}{5}$ $\frac{5}{6}$ $1\frac{1}{5}$

- 5 Toby makes bracelets by putting 8 beads, 4 spacers and a heart charm on a silver chain. He buys the separate items in bulk at the following prices:

20 silver chains	£180
500 beads	£750
100 spacers	£90
30 heart charms	£120



- 5 (a) Work out the cost of the materials for one bracelet.

[3 marks]

Answer £ _____

At a market one day, Toby sells 15 bracelets for £39.90 each.

- 5 (b) How much profit does he make at the market?

[2 marks]

Answer £ _____

- 7 A model of bicycle is available in 5 frame sizes.
For each frame size there are 7 possible colours.

There are 3 sets of gears that can be fitted on the smallest 2 frame sizes and 6 sets that can be fitted on the 3 larger frame sizes.

- 7 (a) Noah is buying the largest frame size.

In how many different ways can he choose the colour and gears for his bike?

[1 mark]

Answer _____

- 7 (b) Here is part of a leaflet about this model of bike.



What number is missing from the leaflet?

[2 marks]

Answer _____

8 A bag contains only red beads and blue beads.

Faria picks out a bead at random, notes its colour and puts the bead back.
Faria does this 10 times and gets a red bead 7 times.

Faria says "There are more red beads than blue beads in the bag."

8 (a) Comment on Faria's statement.

[1 mark]

Rosa, Shamila and Tess each do the same experiment as Faria.
Here are all the results.

	Number of times a red bead is picked	Number of times a blue bead is picked
Faria	7	3
Rosa	6	4
Shamila	8	2
Tess	6	4

Faria is going to pick out another bead and put it back in the bag.

8 (b) Using the results in the table, work out the best estimate for the probability that she picks out a red bead.

[2 marks]

Answer _____

In another bag containing beads, 60% of the beads are green.
Faria is going to pick out two beads at random from the bag.
She says

“The probability of both beads being green is $\frac{1}{3}$ as you work out $\frac{6}{10} \times \frac{5}{9}$.”

8 (c) Is Faria correct?

Explain your answer.

[2 marks]

9 Given that

$$p = 4q - 7$$

circle the expression that gives q in terms of p .

[1 mark]

$$\frac{p+7}{4}$$

$$7p-4$$

$$\frac{p}{4} + 7$$

$$p + \frac{7}{4}$$

10 Jeremy, Kira and Liz are maths teachers.

Jeremy can mark 12 homeworks in an hour.

Kira can mark 30 homeworks in 2 hours.

Liz can mark 1 homework every 6 minutes.

10 (a) Show that Kira is the quickest of the three teachers at marking homework.

[2 marks]

One night, Jeremy and Kira work together to mark 36 homeworks.

They both start at 4.30 pm and work until all the homeworks are marked.

10 (b) At what time do Jeremy and Kira finish marking?

[3 marks]

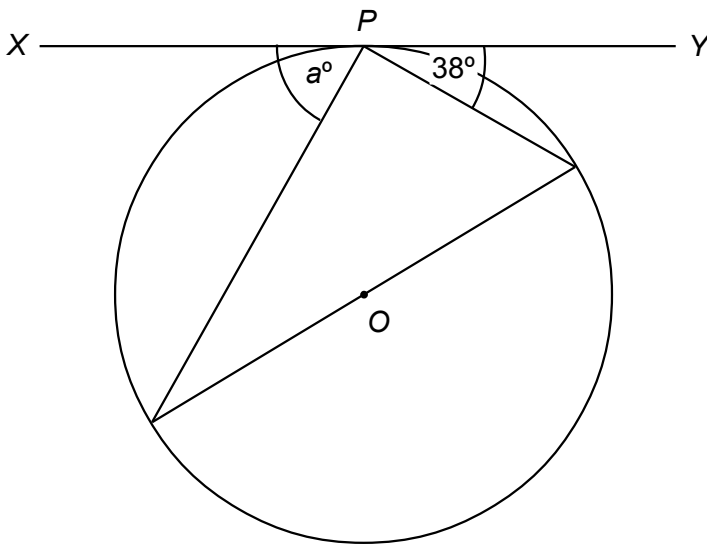
Answer _____

- 11 The number of emails Leanne sent this week is 20% more than last week.
This week Leanne sent 240 emails.
Work out how many emails Leanne sent last week.

[2 marks]

Answer _____

- 12 P is a point on a circle, centre O .
The straight line XY is a tangent to the circle at the point P .



Not drawn accurately

What is the value of a ?

Circle your answer.

[1 mark]

38

52

58

62

- 13 The ratio of men to women at a concert is 2 : 3

There are 600 people at the concert.

How many men are there at the concert?

Circle your answer.

[1 mark]

120

200

240

250

- 14 A company selling clothes online decided to check the productivity of its workers. The table summarises the number of orders, N , packaged by 120 employees on one afternoon.

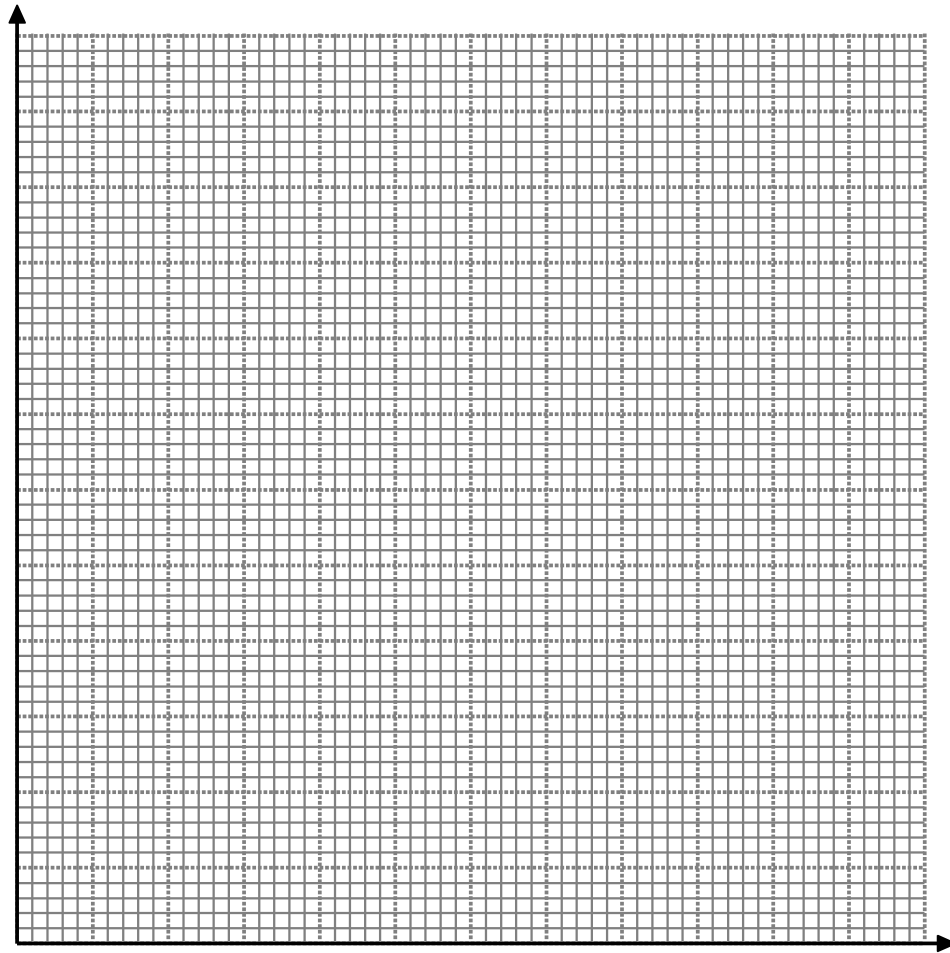
Number of orders (N)	Frequency
$40 < N \leq 45$	4
$45 < N \leq 50$	17
$50 < N \leq 55$	33
$55 < N \leq 60$	25
$60 < N \leq 65$	20
$65 < N \leq 70$	14
$70 < N \leq 75$	7

- 14 (a) Complete this cumulative frequency table.

Number of orders (N)	Cumulative Frequency
$40 < N \leq 45$	4
$40 < N \leq 50$	
$40 < N \leq 55$	
$40 < N \leq 60$	
$40 < N \leq 65$	
$40 < N \leq 70$	
$40 < N \leq 75$	

[2 marks]

14 (b) Draw a cumulative frequency graph for this data.



[3 marks]

14 (c) Employees who packed 53 or fewer orders will have their productivity checked again the next week.

How many employees will this affect?

[1 mark]

Answer _____

16 Henrik and Rob both work part-time in a shop.

In a normal week the ratio of what Henrik earns to what Rob earns is 3 : 2

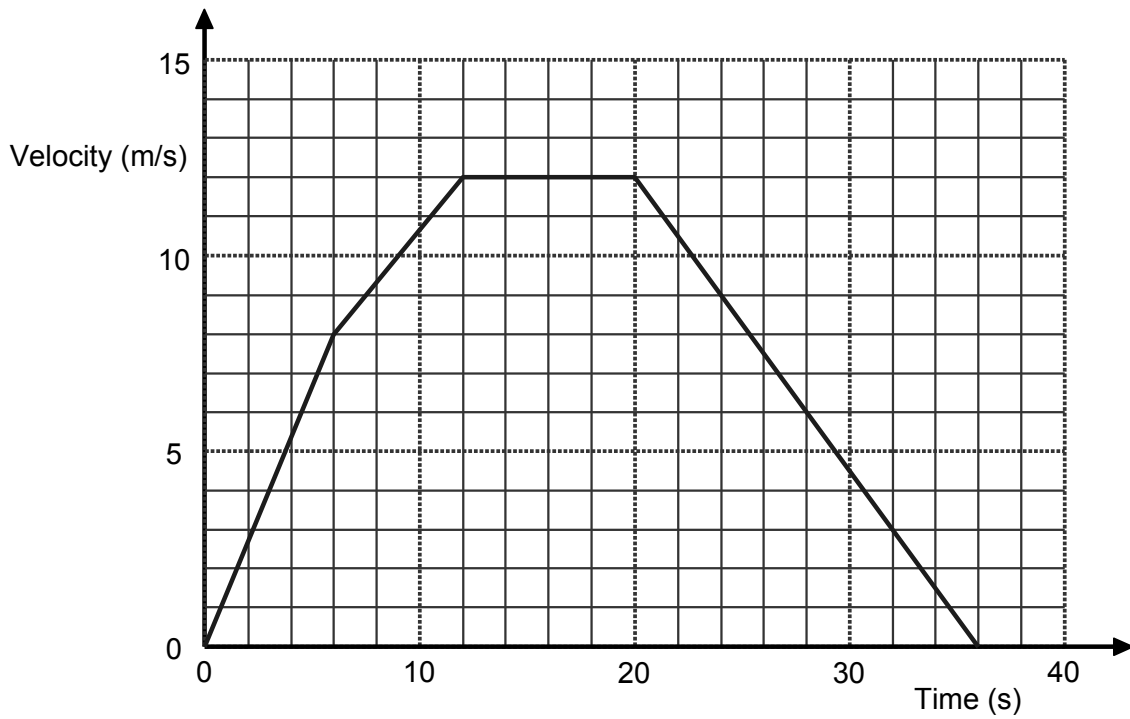
In the week before Christmas they each receive a £20 bonus. The bonus means that the ratio of what Henrik earns to what Rob earns becomes 4 : 3

How much does Henrik earn in the week before Christmas?

[4 marks]

Answer £ _____

17 Here is the velocity-time graph for a cyclist riding along a straight road.



17 (a) For how long during this ride did the cyclist travel at a constant velocity? [1 mark]

Answer _____ s

17 (b) Work out the acceleration of the cyclist 10 seconds after the start of the ride. [2 marks]

Answer _____ m/s^2

19 Solve the equation

$$5y - (2 \times 10^6) = 4 \times 10^7$$

Give your answer in standard form.

[3 marks]

Answer _____

20 David says

“The value of \sqrt{x} is greater than the value of $\sqrt[4]{x}$ for all positive values of x .”

Decide whether or not David is correct.
Show working to justify your answer.

[2 marks]

21 The functions f and g are defined as follows.

$$f(x) = 3x - 1 \qquad g(x) = \frac{x + 3}{2}$$

Evaluate

21 (a) $fg(5)$,

[2 marks]

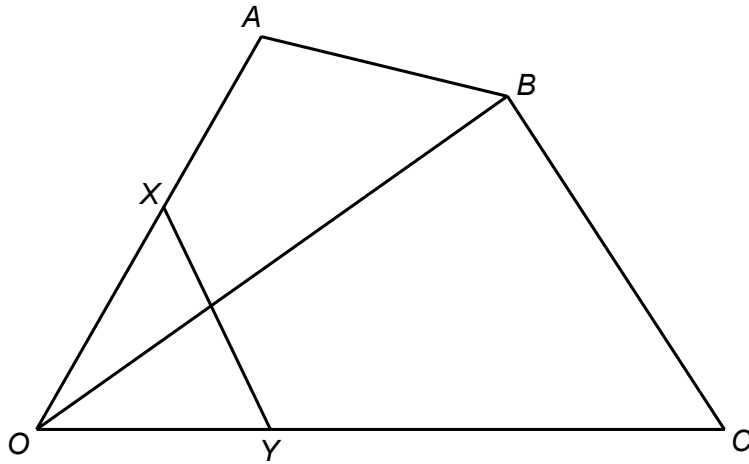
Answer _____

21 (b) $g^{-1}(-2)$.

[2 marks]

Answer _____

24



Not drawn accurately

Quadrilateral $OABC$ is shown above.

$$\vec{OA} = 4\mathbf{p}, \vec{OB} = 3\mathbf{p} + 3\mathbf{q} \text{ and } \vec{OC} = 6\mathbf{q}.$$

X is the midpoint of OA .

Y is the point on OC such that $YC = 2OY$.

24 (a) Express \vec{XY} in terms of \mathbf{p} and \mathbf{q} .

[2 marks]

Answer _____

24 (b) Show that BC is parallel to XY .

[2 marks]

25 (a) Express $x^2 + 4x - 3$ in the form $(x + p)^2 + q$.

[2 marks]

Answer _____

25 (b) Hence, solve the equation

$$x^2 + 4x - 3 = 0$$

[1 mark]

Answer _____

25 (c) The solutions of the equation $y^2 + ay + b = 0$ are

$$y = 1 + \sqrt{2} \text{ and } y = 1 - \sqrt{2}$$

Find the values of the integers a and b .

[3 marks]

$a =$ _____

$b =$ _____

END OF QUESTIONS