PRACTICE PAPER FOR

AQA Paper 1H (June 2023)

----------------------------- Disclaimer -----------------------------

In 2022 I wrote a series of predicted papers that in many cases reflected the real exam paper very well. This was due to the exam boards providing advance information on the topics that were going to be in each paper. This information is no longer provided so "predicting" a paper is not possible. Nobody can know what topics and types of questions will come up in each paper, apart from the few examiners that write them.

This paper has been created based on the **most common** paper 1 topics from previous years. Due to the nature of some topics they are better suited to paper 1 as if you had a calculator they would no longer be difficult to do. The paper should be excellent at helping students revise for exams, however should not be relied upon as the basis for revision. The topics from this paper may well appear in the real exams, however there is absolutely no guarantee of this for the reasons previously mentioned. Some topics may appear, some may not.

Ultimately the best way to prepare for the exams is to **revise all topics**.

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This paper been produced with careful analysis from previous papers.

The **Series** percentage below shows the percentage of times that this topic came up across a whole set of 3 papers. Some topics tend to appear almost every year in at least one paper.

The **Paper 1** percentage below shows the percentage of times that this topic came up specifically in the non calculator paper. As expected certain topics favour paper 1 over paper 2/3

I hope you find this data interesting/useful!

Topic	Series	Paper 1	Question(s)
Circle and Sectors	90%	70%	1, 7
Index Laws	100%	100%	2, 18
Fraction of Amount	50%	40%	3, 11
Percentage of Amount	70%	40%	3
Linear Inequality	80%	50%	4
Fraction Operations	60%	50%	5
Sequences	100%	80%	6
Standard Form	100%	70%	6
Form and Solve Equation	80%	60%	8, 20
Averages/Range	90%	30%	8
Approximations	40%	40%	9
Transformations	90%	50%	10
Gradients/Intercepts	100%	50%	10
Cumulative Frequency	90%	70%	11
Probability Tree Diagrams	60%	40%	12
Multiple Ratio Problem	60%	40%	13
Recurring Decimals to Fractions	80%	60%	14
Direct and Inverse Proportion	90%	40%	15
Surds	100%	90%	16, 18
Special Graphs (Cubic, Trig, Exponential, Reciprocal)	100%	90%	17, 18
Exact Trig Values	90%	90%	17, 21
Transformations of Graphs	60%	40%	17
Algebraic Fractions	90%	60%	19
Venn Diagrams	100%	60%	20
Volume of 3D shapes	100%	40%	21
Geometric Proof	60%	40%	22

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

1 A circle has a radius of 6 cm. **[1 mark]**

Write down the circumference of the circle in terms of π

Answer _____ cm

2 Simplify $\dfrac{2 \times (m^4)^3}{m^2}$ **[2 marks]**

Answer _____

3 Work out $\dfrac{3}{5}$ of 20% of £350 **[2 marks]**

Answer £ _____

Do not write outside the box

4   Solve $6x - 2 > 2x$ **[3 marks]**

Answer _____

5   Work out $\left(\dfrac{7}{8} - \dfrac{1}{4} \right) \div \left(2 + \dfrac{1}{4} \right)$ **[3 marks]**

Answer _____

11

Turn over ▶

Do not write outside the box

6 (a) The first 3 terms of a geometric progression are shown below **[2 marks]**

1×10^2 , 3×10^4 , 9×10^6 , …

Work out the fourth term of the sequence.
Give your answer in standard form.

Answer _____

6 (b) The first 3 terms of an arithmetic progression are shown below **[3 marks]**

1.5×10^2 , 5×10^2 , 8.5×10^2 , …

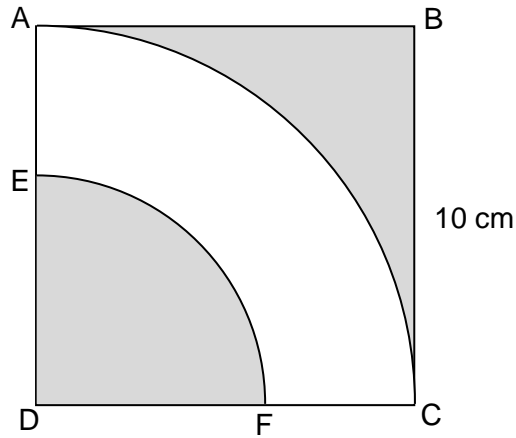Write   The first term : The fourth term   in the form $1 : n$

Answer   1 : _____

7 ABCD is a square with BC = 10 cm

DAC and DEF are sectors.

AE : ED = 2 : 3

Work out the shaded area giving your answer in terms of π **[4 marks]**

Answer _____ cm^2

9

Turn over ▶

8   The table below shows the ages in years of everyone in Martin's family.

Martin	Martin's Mother	Martin's Father
12	x	$x + 3$

The mean age of everyone in Martin's family is equal to the range of their ages.

Work out the age of Martin's mother.

[4 marks]

Answer _____

Do not write outside the box

9 Use approximations to estimate the answer to $\dfrac{\sqrt[3]{1013}}{0.21^2}$ **[3 marks]**

Answer _____

10 (a) Triangle *ABC* is translated to *A'B'C'* by the vector $\begin{pmatrix} \text{-}3 \\ 6 \end{pmatrix}$

Circle the gradient of the line *AA'*

[1 mark]

$$2 \qquad\qquad \text{-}2 \qquad\qquad \frac{1}{2} \qquad\qquad \text{-}\frac{1}{2}$$

10 (b) Triangle *DEF* is enlarged by scale factor $2\frac{1}{2}$ to give triangle *D'E'F'*

Circle the scale factor of enlargement from *D'E'F'* to *DEF*

[1 mark]

$$\frac{2}{5} \qquad\qquad \text{-}\frac{2}{5} \qquad\qquad 2\frac{1}{2} \qquad\qquad \text{-}2\frac{1}{2}$$

9

Turn over ▶

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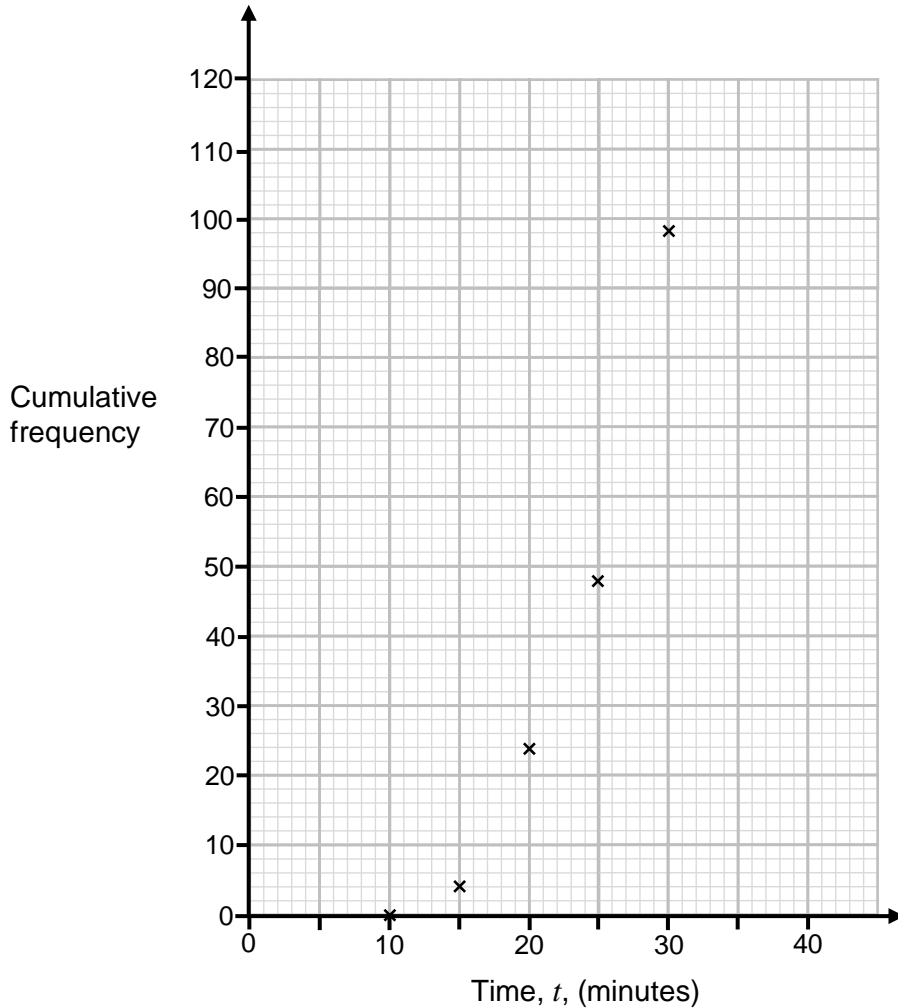**11**   Daria is one of 120 runners who run a 5 km race.

Daria draws a cumulative frequency graph of the race times.
Her incomplete diagram is shown below.

11 (a) $\frac{19}{20}$ of the runners finished in under 35 minutes.

The time of the last runner to finish was 40 minutes.

Complete Daria's cumulative frequency graph.   **[2 marks]**

11 (b)   Daria finished the race in 30th place.

Use the cumulative frequency graph to estimate Daria's race time.   **[1 mark]**

_____

_____

Answer _____ minutes

11 (c)   Runners who complete the race in 25 minutes or less win a medal.

Work out the percentage of the runners received a medal.   **[2 marks]**

_____

_____

_____

_____

Answer _____ %

5

Turn over ▶

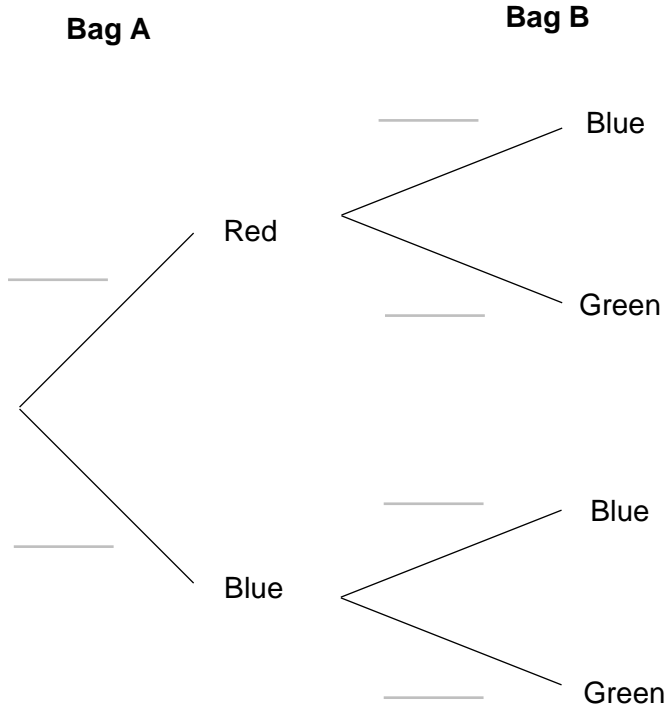**12**   Chloe has two bags of counters.

Bag A contains only red and blue counters in the ratio 3 : 5
Bag B contains only blue and green counters in the ratio 4 : 3

Chloe takes a counter from bag A and then a counter from bag B.

12 (a)   Complete the tree diagram   **[2 marks]**

Bag A   **Bag B**

                                                    _____   Blue

                        Red

                                                    _____   Green

    _____

                                                    _____   Blue

                        Blue

                                                    _____   Green

12 (b)   Work out the probability that **exactly one** of the counters selected is blue.

                                                                               [2 marks]

_____

_____

_____

_____

            Answer _____

13   Tom plays in a computer games tournament.
He keeps a record of his wins and losses.

Before a tournament Tom's wins : Tom's losses = 3 : 5

Tom plays 8 games in a tournament winning 6 and losing the rest.

After the tournament Tom's wins : Tom's losses = 3 : 4

Work out how many games had Tom won **before** the tournament.   **[4 marks]**

Answer _____

14   Convert $0.0\dot{1}\dot{7}$ to a fraction.   **[3 marks]**

Answer _____

Turn over ▶

11

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15 *M* is directly proportional to $\sqrt{X}$

$M = 20$ when $X = 4$

15 (a) Work out an equation connecting *M* and *X*. **[3 marks]**

Answer

15 (b) Work out the value of *X* when *M* = 2.5 **[2 marks]**

Answer

16 Simplify $\sqrt{1\frac{4}{5}} \times 5\sqrt{20}$ **[3 marks]**

Answer _____

Do not write outside the box

17   Here is a sketch of $y = \sin x$ and $y = \cos x$ for $0° \leqslant x \leqslant 360°$
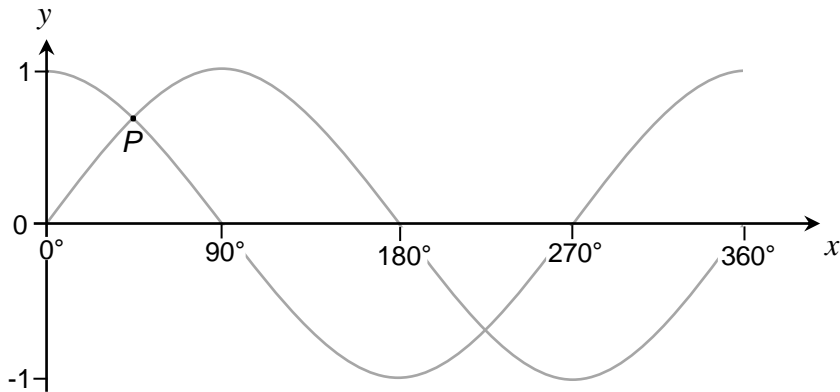
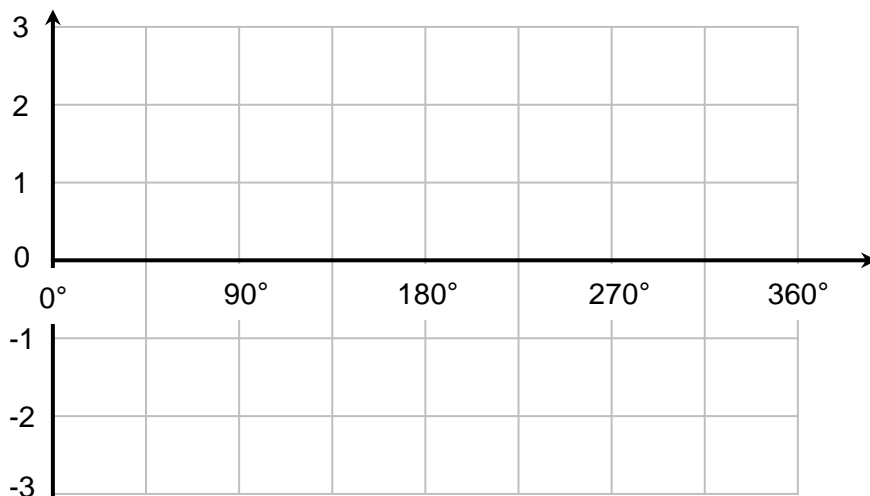**17 (a)**   The graphs intersect at the point *P*.

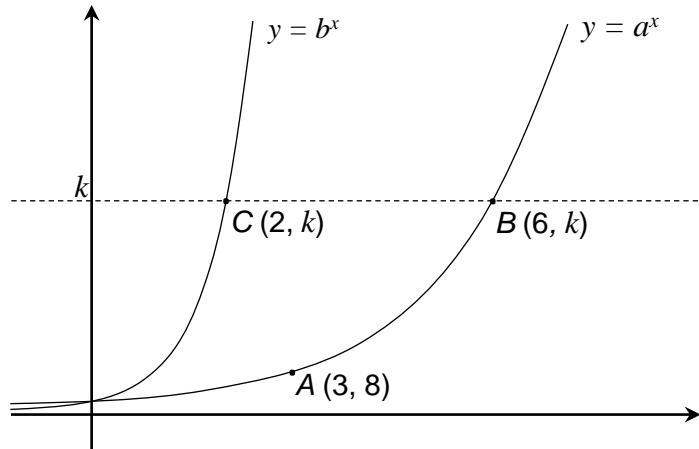Write down the coordinates of the point *P*.

[2 marks]

$P = ($ _____ , _____ $)$

17 (b)   On the grid below sketch the graph of $y = \sin(x + 90°)$ for $0° \leqslant x \leqslant 360°$

[1 mark]

Do not write outside the box

18   Sketches of the graphs of $y = a^x$ and $y = b^x$ graphs are shown below.

18 (a)   Points *B* and *C* lie on the same horizontal line with equation $y = k$

Work out the values of a, b and k.   **[3 marks]**

$a =$ _____ $b =$ _____ $k =$ _____

18 (b)   Another graph has the equation $y = 5^x$ **[2 marks]**

The point $D\,(3.5,\ p\sqrt{5})$ is on this graph.

Work out the value of p.

$p =$ _____

8

Turn over ▶

19   Solve $\dfrac{3}{y+2} + \dfrac{2}{2y-1} = 1$

[5 marks]

Answer _____

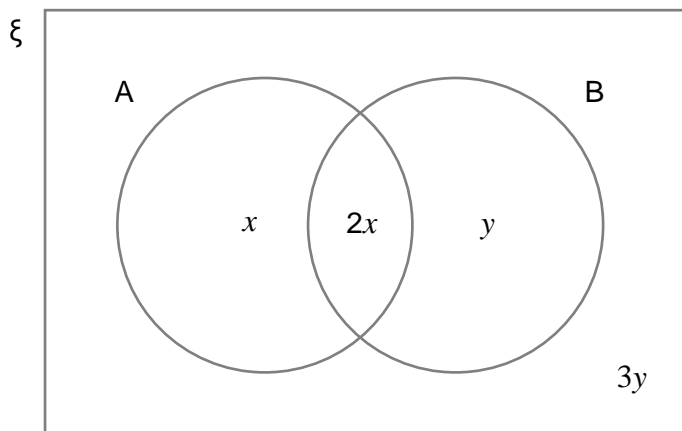**20**   A and B are two events.

Some probabilities are shown on the Venn Diagram.

ξ

A   B

x $2x$ y

$3y$

20   P(B) = $\frac{3}{8}$
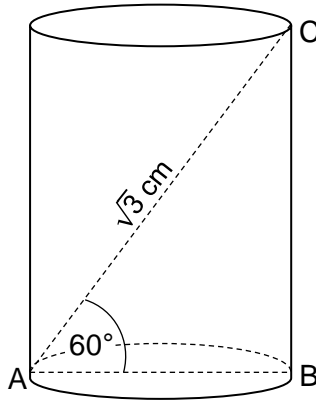
Work out P(A ∪ B)   **[5 marks]**

P(A ∪ B) = _____

10

Turn over ▶

21 Here is a cylinder.

AB is a diameter of the circular face and BC is the height of the cylinder.

Triangle ABC is a right-angled triangle with angle BAC = 60° and AC = $\sqrt{3}$ cm

Work out the volume of the cylinder giving your answer in terms of π **[5 marks]**

Answer _____ cm³

Do not write outside the box

22 *E*, *F*, *G* and *H* are points on a circle.
AB and *CD* are tangents to the circle at points *H* and *E*.
Line *AB* is parallel to line *EF*.
Angle *EFH* = x
Angle *EGF* = y
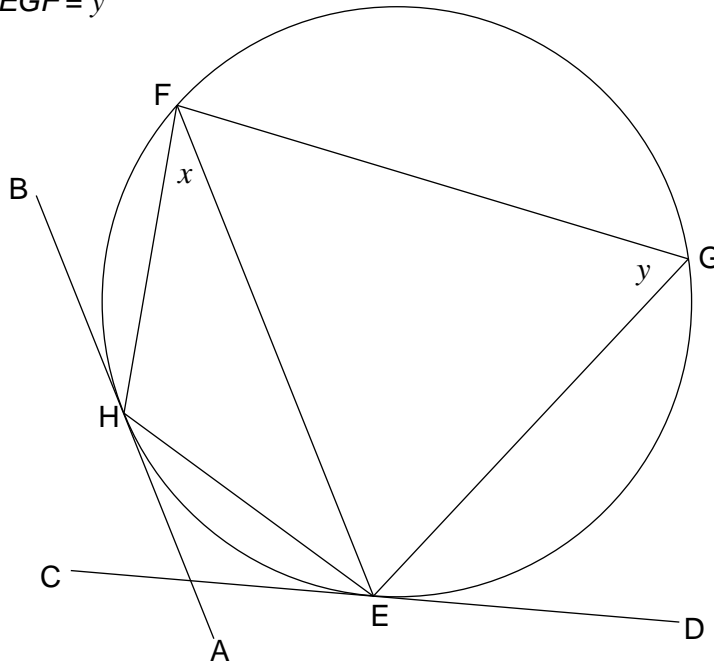
not drawn accurately

Prove that $y = 2x$ **[4 marks]**