AQA

2023 PRACTICE PAPER SET 2

Please write clearly, in block capitals.

Centre number | | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

Wednesday 22nd March 2023

AM Session

GCSE MATHEMATICS

H

Higher Tier Paper 1 Non-Calculator

Time allowed: 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.
- 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.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

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

For Examiner's Use	
Pages	Mark
2 - 3	
4 - 5	
6 - 7	
8 - 9	
10 - 11	
12 - 13	
14 - 15	
16	
TOTAL	

1 Multiply out $x(x + 3)$

[2 marks]

Answer _____

2 Write 61.6×10^3 in standard form.

[1 mark]

Answer _____

3 Write 0.04 as a fraction of 0.8 in its simplest form.

[1 mark]

Answer _____

4 The base of a pyramid has n sides.

Write down an expression in n for the number of **faces** of the pyramid.

[1 mark]

Answer _____

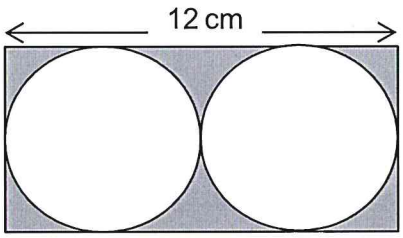
5 Use a ruler and a pair of compasses in this question.

Construct the perpendicular bisector of AB.

[2 marks]

7

6 Two identical circles just fit inside a rectangle as shown.



Not drawn accurately

Work out the area of the shaded section.

Give your answer in terms of π

[4 marks]

Answer _____ cm^2

7 Brass is made by mixing 7 parts copper to 3 parts zinc.

Fred has 35 kg of copper and 12 kg of zinc.

What is the greatest amount of brass he can make?

[3 marks]

Answer _____ kg

8 (a) Eve drove 180 miles from Cardiff to Leeds.

She drove the first 125 miles at 50 mph then the remaining distance at 60 mph.

Find the total time that Eve was driving.

[4 marks]

Answer _____

8 (b) If Eve drove the whole distance at 50 mph, how would this affect her journey time?

[1 mark]

12

9 Bag A contains 20 green balls and 12 yellow balls.

Bag B contains 15 green balls and 9 yellow balls.

John says,

"It's more likely that a green ball is chosen from Bag A than Bag B because there are more green balls in Bag A than Bag B."

Is he correct?

Yes ☐ No ☐

Give a reason for your answer.

[3 marks]

10 Adele works out the answer to $\frac{4.1-\sqrt{30}}{19.23}$

She says the answer is positive.

Is she correct?

Yes ☐ No ☐

You **must** show your working.

[2 marks]

11 House prices rise at a rate of 10% each year.

In January 2020, Greta bought a house for £200 000

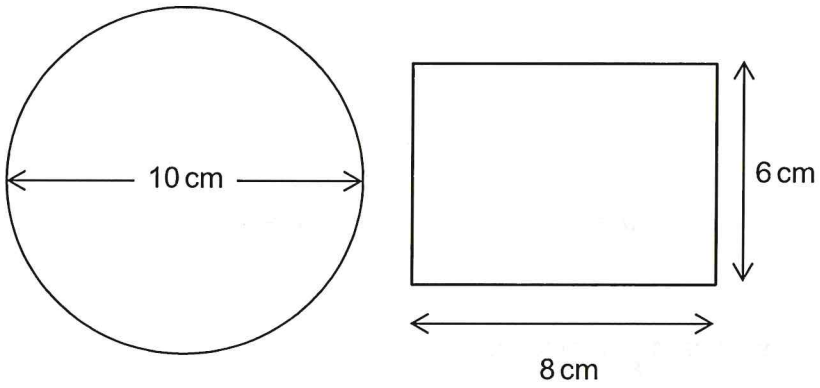
What is the value of the house in January 2022?

[2 marks]

Answer £ _____

12 Sarah has a circular piece of card with a diameter 10 cm.

She wants to cut a rectangle whose sides are length 8 cm and 6 cm.



Use Pythagoras' theorem to show that she can cut the rectangle from the circular card.

[3 marks]

10

13 Which of these values **cannot** be the sine of an angle?

Circle your answer.

[1 mark]

–0.5 0 1 4

14 $(5x + 2)(x - 3) + ax + b \equiv 5x^2 - 16x + 7$

Work out the values of a and b

[4 marks]

$a =$ _____ $b =$ _____

15 A piece of wood is $4\frac{1}{8}$ feet long.

Peter cuts a length of $1\frac{5}{6}$ feet off this piece of wood.

What fraction of the length of wood has Peter cut off?

Give your answer in its simplest form.

[3 marks]

Answer _____

21 Express $0.3\dot{6}$ as a fraction in its simplest form.

[3 marks]

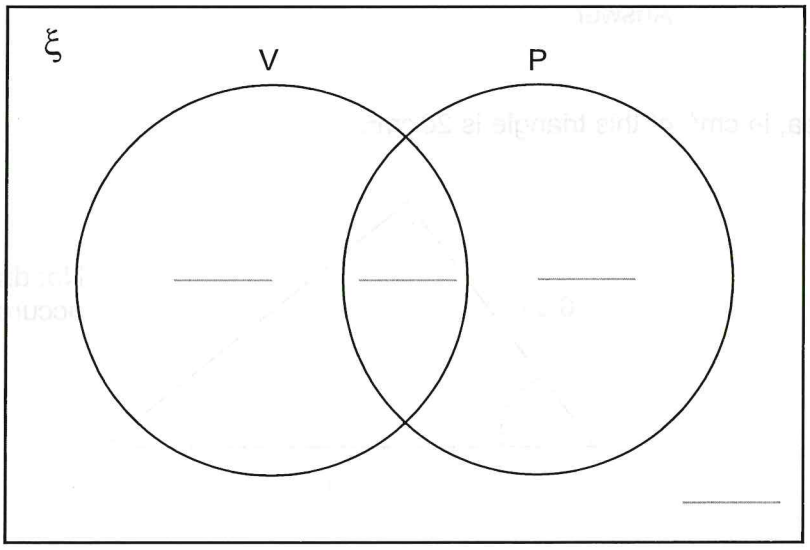
Answer _____

22 In the Venn diagram

ξ = 75 students in a Year Group

V = students that play the violin

P = students that play the piano



54 students play **only** the violin or **only** the piano.

$\frac{5}{6}$ of these 54 students play **only** the violin.

The number of students that play the violin is four times the number that play the piano.

Complete the Venn diagram.

[5 marks]

18 Show that $\frac{4x+3}{3}+\frac{2x-5}{4}$ simplifies to $\frac{22x-3}{12}$

[2 marks]

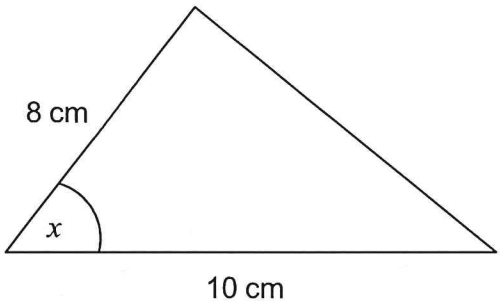
19 A circle has equation $x^2+y^2=100$

Work out the length of its radius

[1 mark]

Answer _____

20 The area, in cm², of this triangle is 20 cm².



Not drawn accurately

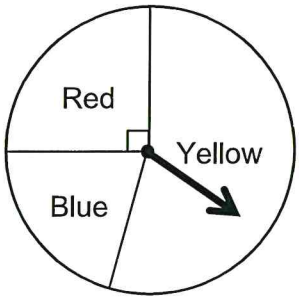
Work out the value of sin x

[1 mark]

Answer _____

9

17 In a game, a fair spinner has three sections.



17 (a) Joe uses this method to work out the probability of getting a red and a blue from two spins.

He writes,

"There are three colours, so the probability of the spinner landing on red is $\frac{1}{3}$ and landing on blue is $\frac{1}{3}$.

$\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$ so the probability is $\frac{1}{9}$"

Make **two** criticisms of Joe's method.

[2 marks]

Criticism 1 _____

_____

_____

Criticism 2 _____

_____

_____

17 (b) The probability of getting two yellows from 2 spins is $\frac{25}{81}$

Work out the angle of the yellow sector.

[3 marks]

_____

_____

_____

Answer _____ °

16 Work out $\sqrt[3]{27} \times 2^{-2}$

Give your answer as a decimal.

[3 marks]

Answer _____

Turn over for the next question

11

24 A sequence of numbers is formed by the iterative process $a_{n+1} = (a_n)^2 - a_n$

24 (a) Describe the sequence of numbers when $a_1 = 1$

Show working to justify your answer.

[1 mark]

24 (b) Describe the sequence of numbers when $a_1 = -1$

Show working to justify your answer.

[2 marks]

24 (c) Work out the value of a_2 when $a_1 = 1 - \sqrt{2}$

[2 marks]

Answer _____

23 Laura buys a bike and a safety helmet at Wiggins Bike Store.

The prices displayed **do not** include VAT, which is charged at 20%.

Laura works out that she will need to pay £600 for both items when VAT is added, but she will pay less than this because VAT is not charged for the helmet.

She paid £528 for the bike.

Work out the saving by not paying VAT on the helmet.

Give your answer as a percentage of the amount Laura thought she had to pay.

[5 marks]

Answer _____ %

Turn over for the next question

13

25 Write $\frac{10}{\sqrt{2}}+\sqrt{18}$ in the form $a\sqrt{b}$ where b is a prime number.

[3 marks]

Answer _____

26 Solve $2x = y + 5$

$x^2 - 2y = 31$

You **must** show your working.

Do **not** use trial and improvement.

[6 marks]

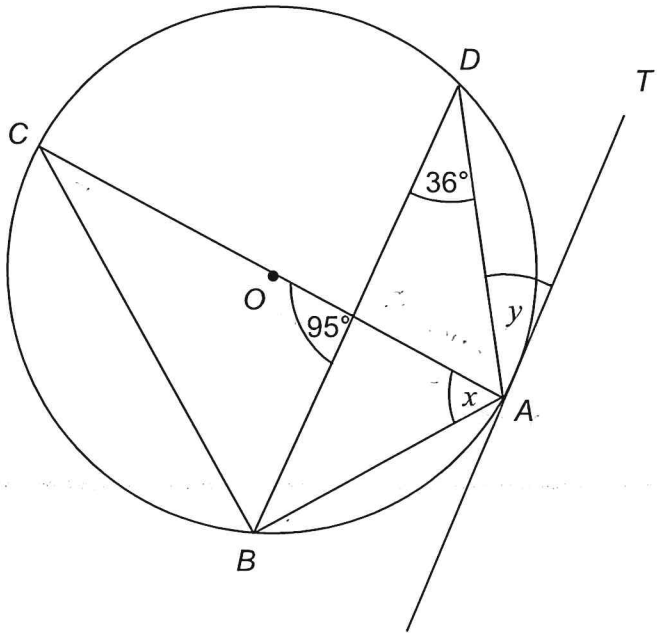
$x =$ _____ $y =$ _____

or $x =$ _____ $y =$ _____

14

27 *A*, *B*, *C* and *D* are points on a circle, centre *O*.

AC is a diameter of the circle.



AT is a tangent to the circle.

Work out the size of angle x and the size of angle y

[4 marks]

$x =$ _____ $y =$ _____

END OF QUESTIONS

4