

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

GCSE MATHEMATICS

Example-Problem Past Paper

F

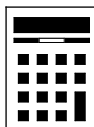
Foundation Tier Paper 3 Calculator

June 2023

Materials

For this paper you must have:

- a calculator
- mathematical instruments.



Second Half

Instructions

- Engage with the fully-worked solutions in full before attempting the shadow questions.
- Explain the fully-worked solutions to yourself, anticipating the next steps in the worked solutions, making links between the problems and the mathematics used to solve them.
- Apply the methods learnt from the fully-worked solutions to the shadow questions, writing down all workings in the spaces provided. Your thought process is important.
- Do all rough work in this book.

Information

- The marks for questions are shown in brackets.
- You may ask for more answer paper, graph paper and tracing paper.
- You should ask your teacher for help on a question if you don't understand a part of the fully-worked solution. Remember to be specific, understanding why the step was completed, rather than simply getting the correct answer.

Advice

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

Where a calculator has been used, show clearly what you entered into the calculator.

- 17 Match the name to the correct sequence.
One has been done for you.

[2 marks]

Name	Sequence
Quadratic sequence	4, 5, 9, 14, 23... <i>(Handwritten: +4, +5, +9)</i>
Linear sequence	-3, 1, 5, 9, 13... <i>(Handwritten: +4, +4, +4, +4)</i>
Fibonacci-type sequence	-4, -1, 1, 5, 12...
	8, 11, 16, 23, 32...

(Handwritten: A line connects 'Quadratic sequence' to '8, 11, 16, 23, 32...' and another line connects 'Linear sequence' to '-3, 1, 5, 9, 13...')

- 18 The number of hedgehogs in England is expected to **reduce** by 4% each year.
Assume there are now 1 000 000 hedgehogs in England.
Work out the expected number of hedgehogs in England after **five** years.
You **must** show your working.

[3 marks]

$$1000\,000 \times 0.96^5 = 815,372.6976$$

Answer 815,372

- 17** Match the name to the correct sequence.
One has been done for you.

[2 marks]

Name	Sequence
Quadratic sequence	10, 7, 4, 1, -2...
Linear sequence	7, 16, 27, 40, 55
Fibonacci-type sequence	1, 5, 9, 11, 13
	2, 5, 7, 12, 19, 31

- 18** The number of foxes in England is expected to **increase** by 2% each year.
Assume there are now 357 000 foxes in England.

Work out the expected number of foxes in England after **six** years.

You **must** show your working.

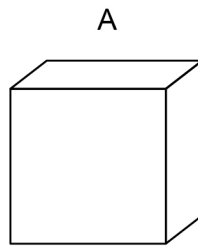
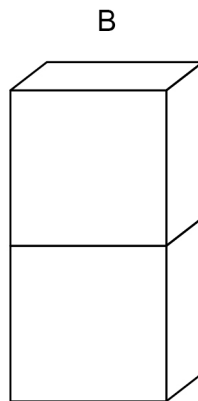
[3 marks]

Answer _____

Turn over ►

19

Here is cuboid A.

Cuboid B is made from **two** of cuboid A.

volume of A : volume of B = 1 : 2

Matthew says,

“surface area of A : surface area of B must be 1 : 2 because B is made of 2 of A.”

Is Matthew correct?

Tick **one** box.
☐

Yes

☒

No

☐

Cannot tell

Give a reason for your answer.

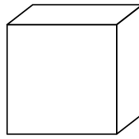
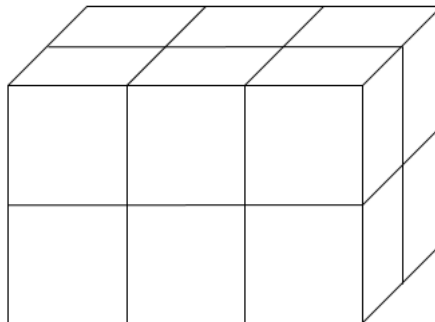
[2 marks]

A's surface area is formed from 6 faces.

B's is formed of 10 faces, without the two that meet.

19

Here is a cube A.

ANot drawn
accuratelyCuboid B is made from **twelve** of cube A.**B**

volume of A : volume of B = 1 : 12

Henry says,

“surface area of A : surface area of B must be 1 : 12 because cuboid B is made of 12 of A.”

Is Henry correct?

Tick **one** box.
☐

Yes

☐

No

☐

Cannot tell

Give a reason for your answer.

[2 marks]

Turn over ►

- 20 (a) Complete the table of values for $y = x^2 + 2x$

[2 marks]

x	-3	-2	-1	0	1
y	3	0	-1	0	3

$$(-2)^2 + 2(-2)$$

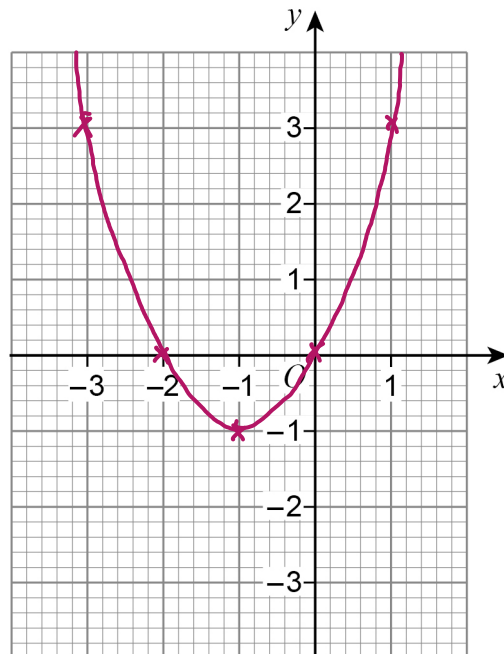
$$4 + -4 = 0$$

$$(1)^2 + 2(1)$$

$$1 + 2 = 3$$

- 20 (b) Draw the graph of $y = x^2 + 2x$ for values of x from -3 to 1

[2 marks]



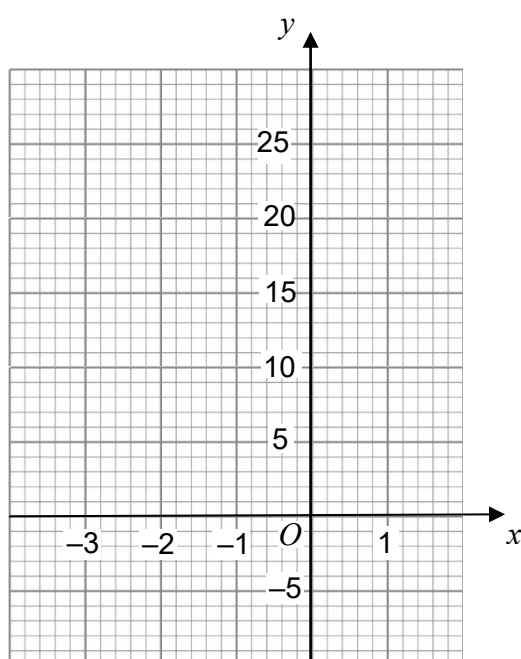
- 20 (a)** Complete the table of values for $y = x^2 - 4x$

[2 marks]

x	-3	-2	-1	0	1
y	21		5	0	

- 20 (b)** Draw the graph of $y = x^2 - 4x$ for values of x from -3 to 1

[2 marks]



Turn over ►

21

Jing has £2450

She saves some and gives the rest to her four brothers.

money saved : money given to brothers = 2 : 5

She gives each of her **four** brothers the **same** amount.

Does each brother receive more than £430 ?

You **must** show your working.

[4 marks]

saved ○○ $350 \times 2 = £700$ saved
 given ○○○○○ $350 \times 5 = £1750$ given

$£2450 \div 7 = £350$ $\frac{£1750}{4} = £437.50$

Yes.

21

Shirley has £5625

She saves some and donates the rest to charity.

$$\text{money saved} : \text{money given to charity} = 2 : 7$$
She gives each of **five** charities the **same** amount.

Does each charity receive more than £870 ?

You **must** show your working.**[4 marks]**

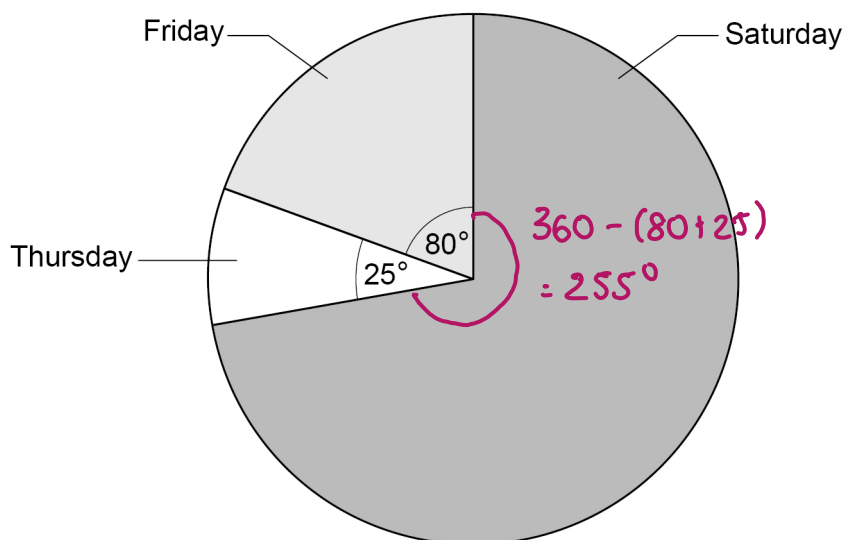
Turn over ►

22

The pie chart shows information about people at a fair during three days.

Do not write
outside the
box

Not drawn
accurately



There were 132 **more** people on Friday than on Thursday.

Work out the number of people on Saturday.

[3 marks]

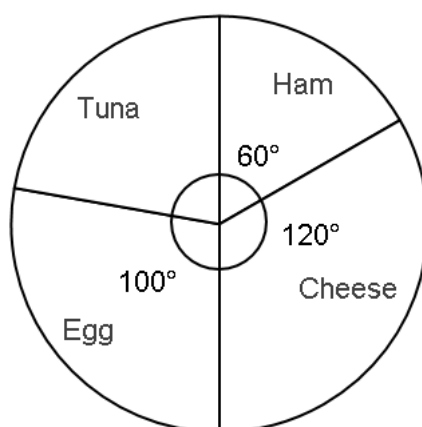
$$80 - 25 = 55 \quad \div 11 \quad \begin{array}{r|l} 55^\circ & 132 \\ \hline 5^\circ & 12 \\ \hline \times 51 & 612 \end{array} \quad \begin{array}{l} \downarrow \div 11 \\ \downarrow \times 51 \end{array}$$

Answer 612

22

The pie chart shows information about customers choice of sandwich filling.

Do not write
outside the
box



Not drawn
accurately

12 **more** customers chose egg than chose ham.

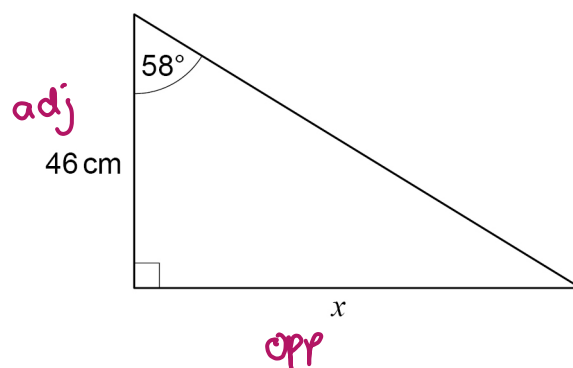
Work out the number of customers who chose tuna.

[3 marks]

Answer _____

Turn over ►

23

Use trigonometry to work out the value of x .Not drawn
accurately

[3 marks]

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

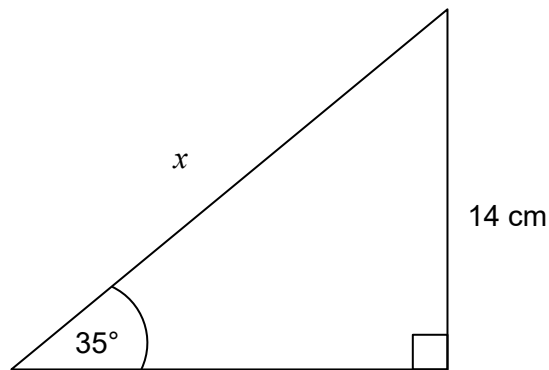
$$\tan 58^\circ = \frac{x}{46}$$

$$\times 6 \quad \times 6$$

$$(\tan 58) \times 46 = x = 9.602007174$$

$$x = 9.6 \text{ cm}$$

23

Use trigonometry to work out the value of x .Not drawn
accurately**[3 marks]**

 $x =$ _____ cm

24 Millie is estimating the value of $\frac{1}{(\sqrt[3]{8.34})^2 \times 10.21}$

She rounds each decimal number to 1 significant figure.

24 (a) Work out Millie's estimate.

You **must** show your working.

[2 marks]

$$\frac{1}{(\sqrt[3]{8})^2 \times 10} = \frac{1}{2^2 \times 10} = \frac{1}{40}$$

Answer $\frac{1}{40}$

24 (b) Millie says,

"My estimate must be more than the exact value."

Without working out the exact value, give a reason how she can know this.

[1 mark]

She rounded down in the denominator, so she is dividing by a larger value when working out the exact value.

24 Aiza is estimating the value of $\frac{2}{(\sqrt{4.36})^3 \times 5.49}$

She rounds each decimal number to 1 significant figure.

24 (a) Work out Aiza's estimate.
You **must** show your working.

[2 marks]

Answer _____

24 (b) Aiza says,
"My estimate must be larger than the exact value."
Without working out the exact value, give a reason how she can know this.

[1 mark]

25 (a) Factorise $x^2 + 8x + 15$

[2 marks]

15 1×15 $1 + 15 = 16 \times$ 3×5 $3 + 5 = 8 \checkmark$ Answer $(x + 3)(x + 5)$ 25 (b) Write down the **two** solutions of $(y + 2)(y - 4) = 0$

[1 mark]

Answer $y = -2, y = 4$

$$\begin{array}{rcl} y + 2 & = & 0 \\ -2 & -2 & \\ \hline y & = & -2 \end{array}$$

$$\begin{array}{rcl} y - 4 & = & 0 \\ +4 & +4 & \\ \hline y & = & 4 \end{array}$$

25 (a) Factorise $x^2 + 4x - 21$

[2 marks]

Answer _____

25 (b) Write down the **two** solutions of $(y - 9)(y - 2) = 0$

[1 mark]

Answer _____

END OF QUESTIONS

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