



Please write clearly in block capitals.

Centre number






Candidate number





Surname

Forename(s)

Candidate signature

I declare this is my own work.

# GCSE MATHEMATICS

F

Foundation Tier Paper 2 Calculator

Friday 10 November 2023 Morning Time allowed: 1 hour 30 minutes

## Materials

For this paper you must have:

- a calculator
- mathematical instruments
- the Formulae Sheet (enclosed).



## Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this 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.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- 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.



N 0 V 2 3 8 3 0 0 2 F 0 1

IB/M/Nov23/E12

8300/2F



0 2

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

Do not write outside the box

1

Convert 800 centimetres to metres.

[1 mark]



$\div 100$

8

Answer \_\_\_\_\_ m

2

The temperature was  $-11^{\circ}\text{C}$  and **increases** by  $5^{\circ}\text{C}$

[1 mark]

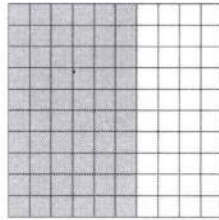
Work out the new temperature.

-6

Answer \_\_\_\_\_  $^{\circ}\text{C}$

For Examiner's Use	
Pages	Mark
2-3	
4-5	
6-7	
8-9	
10-11	
12-13	
14-15	
16-17	
18-19	
20-21	
22-23	
24-25	
<b>TOTAL</b>	

- 3 (a) Here is a grid.



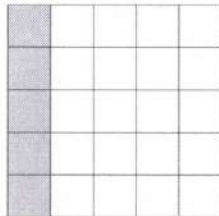
$$\frac{60}{100}$$

What percentage of the grid is shaded?

[1 mark]

Answer 60 %

- 3 (b) Here is a different grid.



$$\frac{5}{25} / \frac{1}{5}$$

What percentage of the grid is shaded?

[1 mark]

Answer 20 %

Do not write  
outside the  
box

Turn over ►



- 4 (a) Solve  $\frac{x}{3} = 6$

$$6 \times 3$$

[1 mark]

$$x = \underline{18}$$

- 4 (b) Solve  $2x + 3 = 27$

$$2x = 24$$

[2 marks]

$$24 \div 2$$

$$x = \underline{12}$$

- 5 Work out  $\frac{9}{4}$  as a decimal.

$$\begin{array}{r} 2.25 \\ 4 \overline{) 9.00} \end{array}$$

[1 mark]

Answer 2.25

Do not write  
outside the  
box



6

Complete the bank statement.

[3 marks]

Date	Description	Credit (£)	Debit (£)	Balance (£)
01/11/2021	Starting balance			736.28
05/11/2021	Rent		450.00	286.28
14/11/2021	Refund	25.00		311.28
27/11/2021	Wages	1830.29		2141.57

7

Put all the numbers 4, 5, 6, 10 and 20 into the grid  
so that the numbers in each row and each column **multiply** to 120

[3 marks]

$120 \div 24 \rightarrow$   
etc

4	3	10	120
5	2	12	120
6	20	1	120
120	120	120	

10

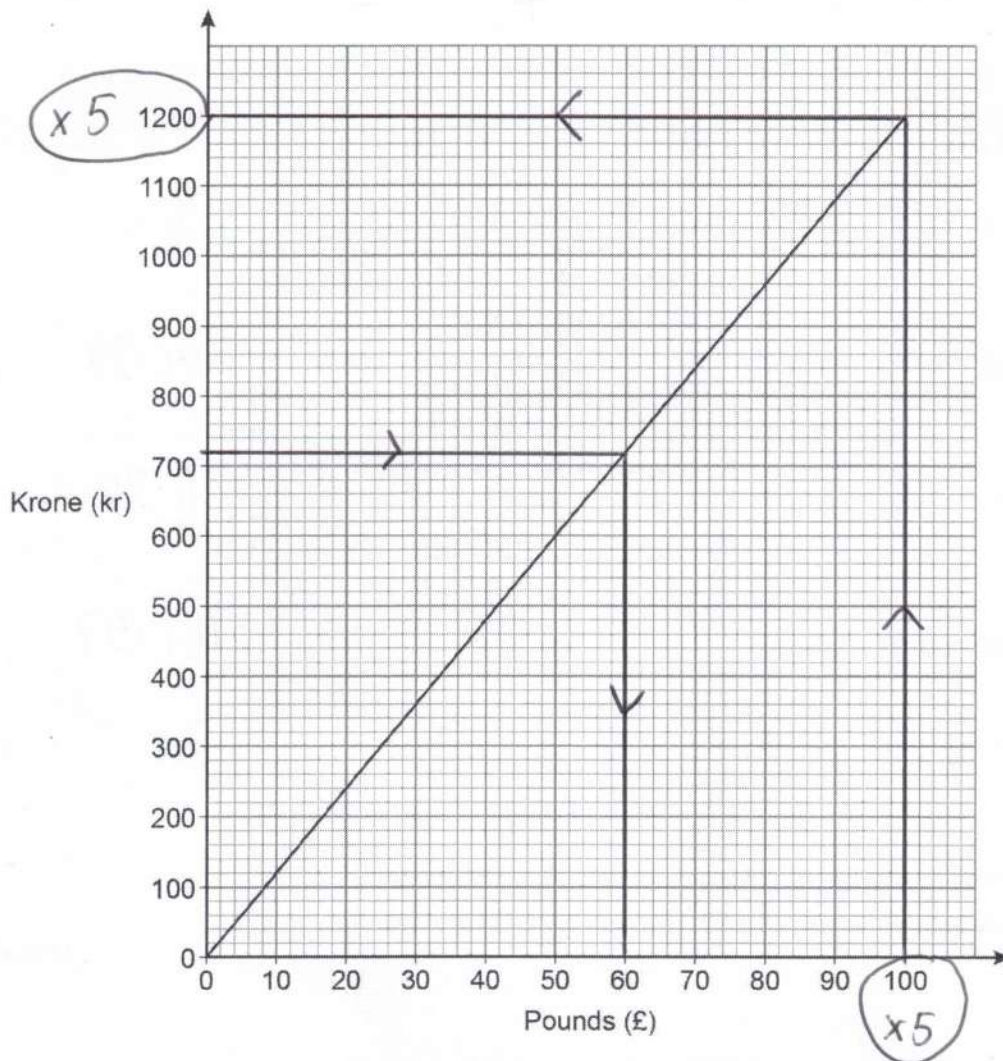
Turn over ►



0 5

8

The graph below is used to convert between pounds (£) and Norwegian krone (kr).



- 8 (a) Convert 720 krone into pounds.

[1 mark]

Answer £

60

- 8 (b) Convert £500 into krone.

[2 marks]

1200 x 5

Answer

6000

kr



9 Connor is estimating the answer to  $385 + 1479$

9 (a) He rounds each number to the nearest 10

Work out his estimate.

[2 marks]

$$390 + 1480$$

Answer

1870

9 (b) Connor says,

"My estimate will be more than the exact answer."

How does he know this **without working out the exact answer**?

[1 mark]

Both were rounded up

Turn over for the next question

Turn over ►





- 10 Here are the salaries, in £, of the 6 workers in a company.

18 300    20 700    21 500    21 500    21 500    99 000  
+        +        +        +        +

- 10 (a) Work out the mean salary.

= 202 500

[2 marks]

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Answer £ 33 750

- 10 (b) Why is the mean **not** the best average to represent the salaries?

[1 mark]

99000 is much higher than  
the other 5

\_\_\_\_\_

\_\_\_\_\_



11

Zoe's mass is 55 kilograms.

Work out her mass in stones and pounds.

Use 1 kilogram = 2.2 pounds

14 pounds = 1 stone

[3 marks]

$$55 \times 2.2 = 121 \text{ lbs}$$

$$121 \div 14 = 8.6...$$

$$8 \times 14 = 112$$

$$121 - 112$$

Answer 8 stones 9 pounds

Turn over for the next question

Turn over ►



- 12 (a) A sauce is made from cream and stock in the ratio

cream : stock = 1 : 6

How much **sauce** can be made using 80 millilitres of cream?

[2 marks]

$$\begin{array}{rcl} \overline{C} : S & & \\ \hline 1 : 6 & & \\ \times 80 \swarrow \quad \searrow \times 80 & & \\ 80 : 480 & & 80 + 480 \end{array}$$

Answer 560 ml

- 12 (b) A different sauce is made from olive oil and tomato juice in the ratio

olive oil : tomato juice = 1 : 14

What fraction of this sauce is olive oil?

[1 mark]

Answer  $\frac{1}{15}$





- 13 Multiplying  $y$  by 6 gives the same result as adding 15 to  $y$

 $6y$  $y+15$ 

- 13 (a) Write this as an equation.

[2 marks]

Answer

$$6y = y + 15$$

- 13 (b) Show that the value of  $y$  is **not** 4

[1 mark]

$$5y = 15$$

$$y = 3$$

Turn over for the next question

Turn over ►



14

A golf club is organising a trip for 42 people.

The costs are shown in the table.

Minibus hire	£450 per minibus
Fuel	£26 per minibus
1 game of golf	£18.50 per person

$$18.50 \times 2 = 37$$

Each minibus can hold 15 people.

= 3 needed

Each person will play 2 games of golf.

The cost of the trip will be shared equally by the 42 people.

Work out the cost per person.

[5 marks]

$$\begin{array}{r} 450 \times 3 = 1350 \\ 26 \times 3 = 78 \end{array} \quad \left. \vphantom{\begin{array}{r} 450 \times 3 = 1350 \\ 26 \times 3 = 78 \end{array}} \right\} 1428$$

$$1428 \div 42 = 34$$

$$34 + 37$$

Answer £

71



- 15 An ordinary fair dice is rolled ten times.  
Here are the first nine results.

6 1 3 2 1 5 5 5 5

Write down the probability of getting a 5 on the tenth roll.

[1 mark]

Answer

$\frac{1}{6}$

- 16  $r : w = 1 : 4$

Write down the ratio  $r^2 : w^2$

[1 mark]

Answer

1 : 16

Turn over for the next question

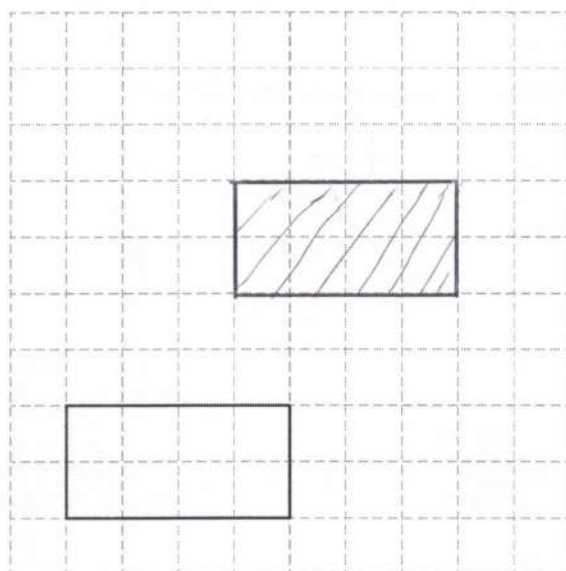
Turn over ►



- 17 (a) A rectangle is drawn on a square grid.

On the grid, draw a **congruent** rectangle.

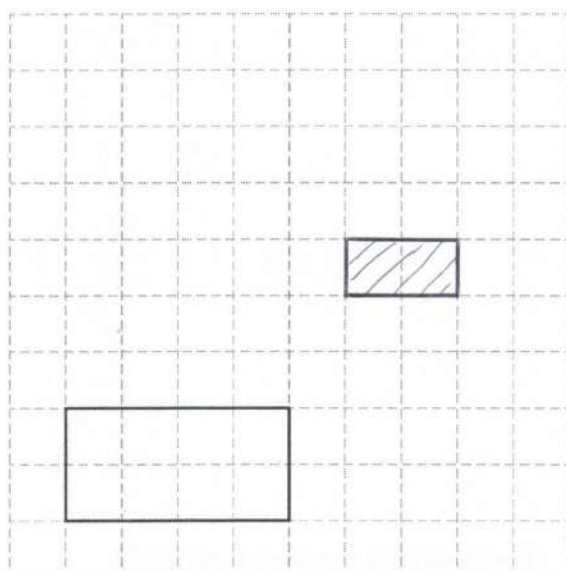
[1 mark]



- 17 (b) Here is the rectangle on a different square grid.

On this grid, draw a **similar** rectangle which is **not** congruent.

[1 mark]



18

A box contains 36 chocolates.

The chocolates are milk or dark and have hard or soft centres.

 $\frac{4}{9}$  of the chocolates have soft centres.

$$\frac{4}{9} \times 36 = 16$$

There are twice as many milk chocolates as dark.

5 of the dark chocolates have soft centres.

18 (a) Complete the two-way table.

[4 marks]

	Hard centre	Soft centre
Milk	13	11
Dark	7	5

24

12

20

16

One chocolate is chosen at random.

18 (b) What is the probability that it is a dark chocolate with a soft centre?

[1 mark]

$$\frac{5}{36}$$

Answer \_\_\_\_\_

18 (c) What is the probability that it has a hard centre?

[1 mark]

$$\frac{20}{36}$$

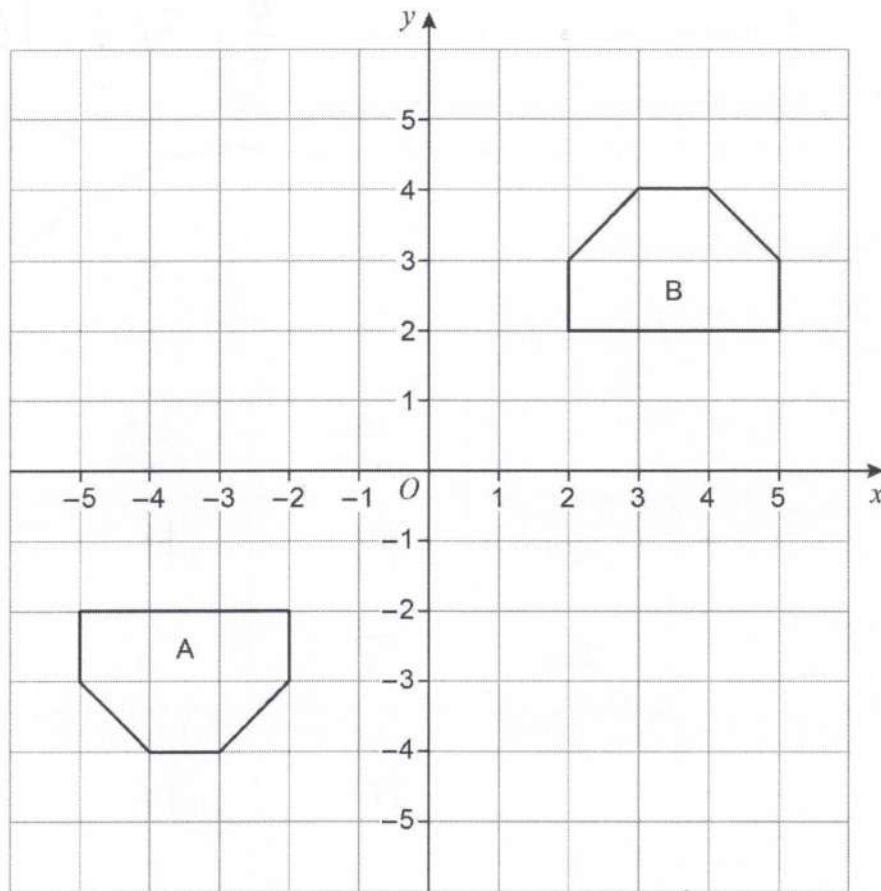
Answer \_\_\_\_\_



19

Describe fully the **single** transformation that maps shape A to shape B.

[3 marks]



Rotation,  $180^\circ$ , centre  $(0, 0)$

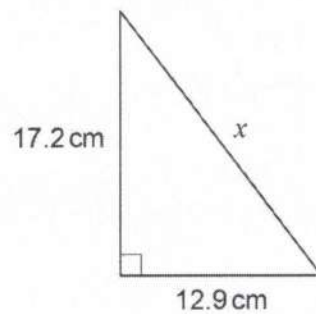




20

Use Pythagoras' theorem to work out the value of  $x$ .

[3 marks]

Not drawn  
accurately

$$17.2^2 + 12.9^2 = 462.25$$

$$\sqrt{462.25}$$

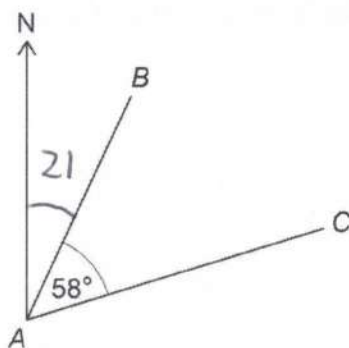
$$x = 21.5 \text{ cm}$$

Turn over for the next question

Turn over ►



21

Not drawn  
accurately

The 3-figure bearing of  $B$  from  $A$  is  $021^\circ$

Work out the 3-figure bearing of  $C$  from  $A$ .

[2 marks]

---



---



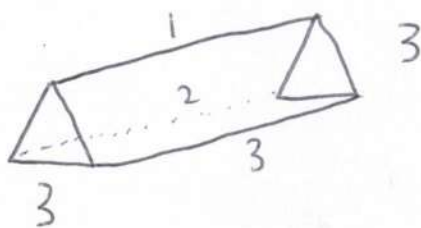
---

Answer 079°

22

How many edges does a triangular prism have?

[1 mark]



Answer 9



23


Three shops sell the same type and size of lip balm stick.

**Shop A**



£2.39 each

**Shop B**




£3.08 each

Buy one,  
get one half price

£1.53

**Shop C**



Pack of 4

Was £11.40

Now  $\frac{1}{6}$  off

Which shop is the best value for 8 sticks and what is the total cost in that shop?

Show working to support your answer.

[5 marks]

①  $£2.39 \times 8 = £19.12$

②  $(£3.08 \times 4) + (£1.54 \times 4) = £18.48$

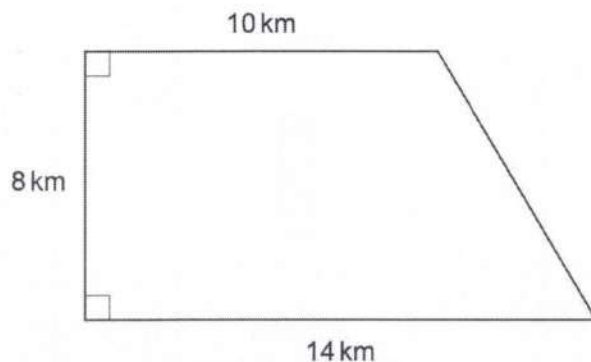
③  $2 \times 11.40 \times \frac{5}{6} = £19$

Shop B Total cost £ 18.48



24

The boundaries of a city form a trapezium.

Not drawn  
accurately

$$\text{Population density} = \frac{\text{number of people}}{\text{area}}$$

The population density of the city is 9450 people per square kilometre.

Work out the number of people who live in the city.

[4 marks]

$$\text{Area} = \frac{1}{2} (10 + 14) \times 8 = 96$$

$$\text{Pd} \times \text{area} = \text{num. of people}$$

$$9450 \times 96$$

$$\text{Answer } 907200$$



25 Round 1 of voting for Head Student is taking place in a school.

25 (a) To reach round 2, a student must receive **at least**  $\frac{4}{15}$  of the votes.

What is the largest possible number of students that can reach round 2?

Circle your answer.

[1 mark]

15

11

3

4

25 (b) There are 900 votes in round 1

Sean receives 180 votes.

Amy draws a pie chart to represent the results.

Here is her method to work out the angle needed for Sean.

$$180 \div 900 \times 100 = 20$$

The angle should be  $20^\circ$

Is Amy's method correct?

Tick a box.

Yes

☐

No

☒

Give a reason for your answer.

[1 mark]

Amy has worked out the %

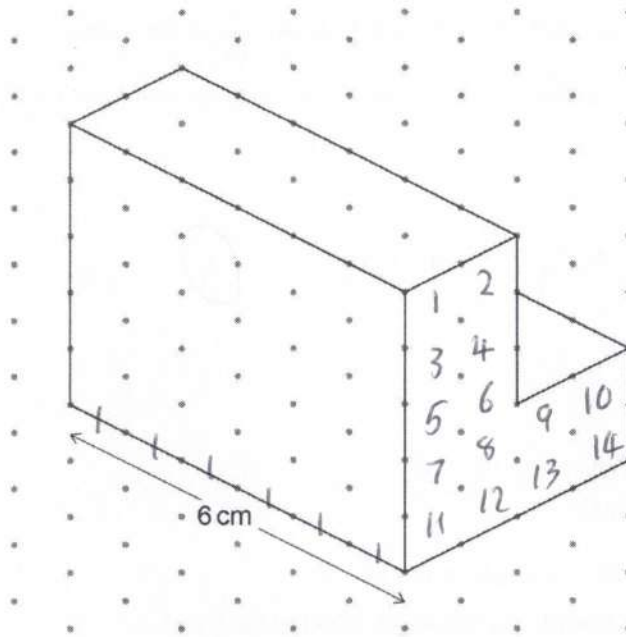
or  $\frac{180}{900} \times 360 = 72^\circ$

etc



26

Here is a prism drawn on an isometric grid.



Work out the volume of the prism.

[3 marks]

$$14 \times 6$$

Answer 84 cm<sup>3</sup>





27

Tasha drove 198 miles.

Her average speed for the first 3 hours was 45 miles per hour.

Her average speed for the rest of the journey was 31.5 miles per hour.

Work out her average speed for the whole journey.

[4 marks]

$$3 \times 45 = 135 \text{ miles}$$

B



$$\frac{198 - 135}{31.5} = 2 \text{ hrs}$$

$$\text{Speed} = \frac{\text{Total D}}{\text{Total T}} = \frac{198}{5}$$

Answer 39.6 miles per hour

Turn over for the next question

Turn over ►



28

Here is the term-to-term rule for a sequence.

Double the previous term and add 3

The first three terms of the sequence are  $a+1$   $2a+5$   $4a+13$ Show that the sum of the first **four** terms is a multiple of 3**[3 marks]**

$$4^{\text{th}} = 8a + 26 + 3 = 8a + 29$$

$$\text{Total} = 15a + 48$$

$$= 3(5a + 16)$$

so it will be divisible by 3



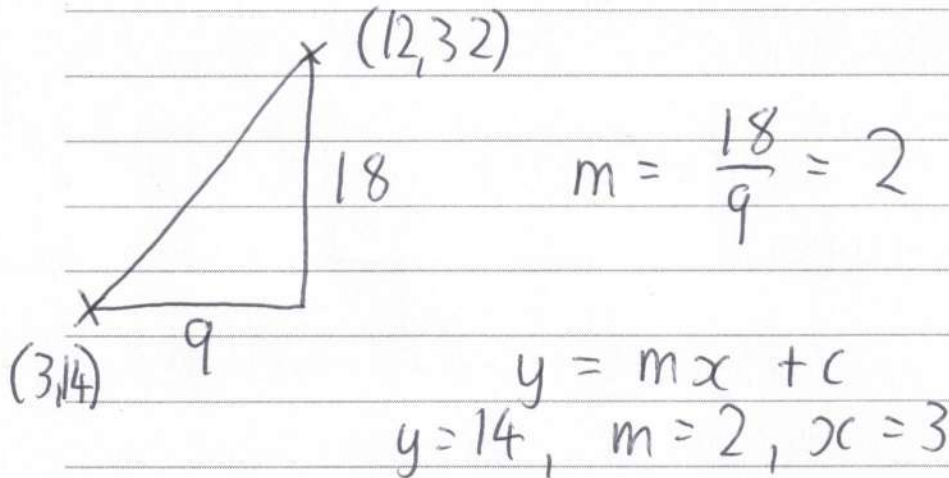
29

A straight line passes through (3, 14) and (12, 32)

Work out the equation of the line.

Give your answer in the form  $y = mx + c$ 

[3 marks]



$$14 = 6 + c$$

$$\text{so } c = 8$$

Answer  $y = 2x + 8$

END OF QUESTIONS

