

Level 1 / Level 2 GCSE (9 – 1)

MATHEMATICS

Paper 1 (Non- calculator)

Foundation Tier

Time : 1 hour 30 minutes

Paper : 1 MA1 / 1F

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**



Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Write the following numbers in order of size.

Start with the largest number.

$$\frac{7}{10} \quad \frac{4}{5} \quad 0.6 \quad \frac{3}{4}$$

$$\frac{7}{10} = 0.7, \frac{4}{5} = 0.8, 0.6, \frac{3}{4} = 0.75$$

$$\frac{4}{5}, \frac{3}{4}, \frac{7}{10}, 0.6 \quad (1)$$

.....

(Total for Question 1 is 1 mark)

2. Here is a list of numbers.

$$51 \quad 53 \quad 55 \quad 56 \quad 57$$

From the list, write down a prime number.

$$53 \quad (1)$$

.....

(Total for Question 2 is 1 mark)

3. Write 5.085 correct to one decimal place.

$$5.1 \quad (1)$$

.....

(Total for Question 3 is 1 mark)

4. Write 0.07 as a fraction.

$$\frac{7}{100} \quad (1)$$

.....

(Total for Question 4 is 1 mark)

5. Write down the value of the 9 in the number 3092.

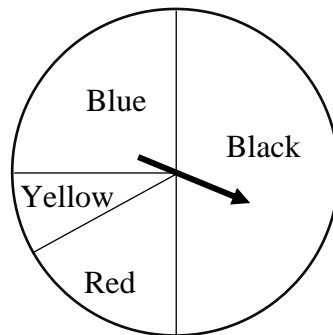
$$90 \text{ OR } 9 \text{ tens} \quad (1)$$

.....

(Total for Question 5 is 1 mark)



6. The diagram shows a pointer which spins about the centre of a circle.



When the pointer is spun, it stops on one of the colours.

The colours are black, red, yellow and blue.

Emily spins the pointer once.

a. Write down a word from the box that best describes each outcome.

Certain	Likely	Unlikely	Impossible
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i. The pointer stops on yellow.

unlikely (1)

.....

ii. The pointer stops on a colour beginning with the letter B.

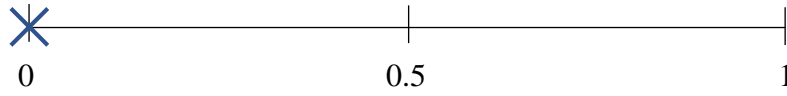
likely (1)

.....

(2)

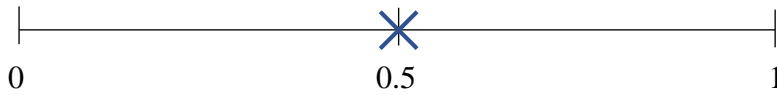


- b. On the probability scale, mark with a cross (\times), the probability that
- the pointer stops on grey.



cross at 0 (1)

- the pointer stops on black.



cross at 0.5 (1)

(2)


(Total for Question 6 is 4 marks)



7. The pictogram shows information about the number of goals scored by each of four countries in the 2020 UEFA European football Championship.

Holland	
Italy	
Belgium	
Denmark	
France	
England	

a. Italy scored 13 goals.

i. How many goals does  represent?

Correct answer only 4 (1)

.....
(1)

ii. Write down the number of goals scored by England.

Correct answer only 11 (1)

.....
(1)

b. Belgium scored 9 goals.

Show this information on the pictogram.

$2\frac{1}{4}$ balls for Belgium (1)

(1)

c. Find the ratio of the number of goals scored by Holland to the number of goals scored by Denmark.

Give your ratio in its simplest form.

Goals scored by Holland: 8

Goals scored by Denmark: 16

Holland : Denmark = 8:16 = 1:2

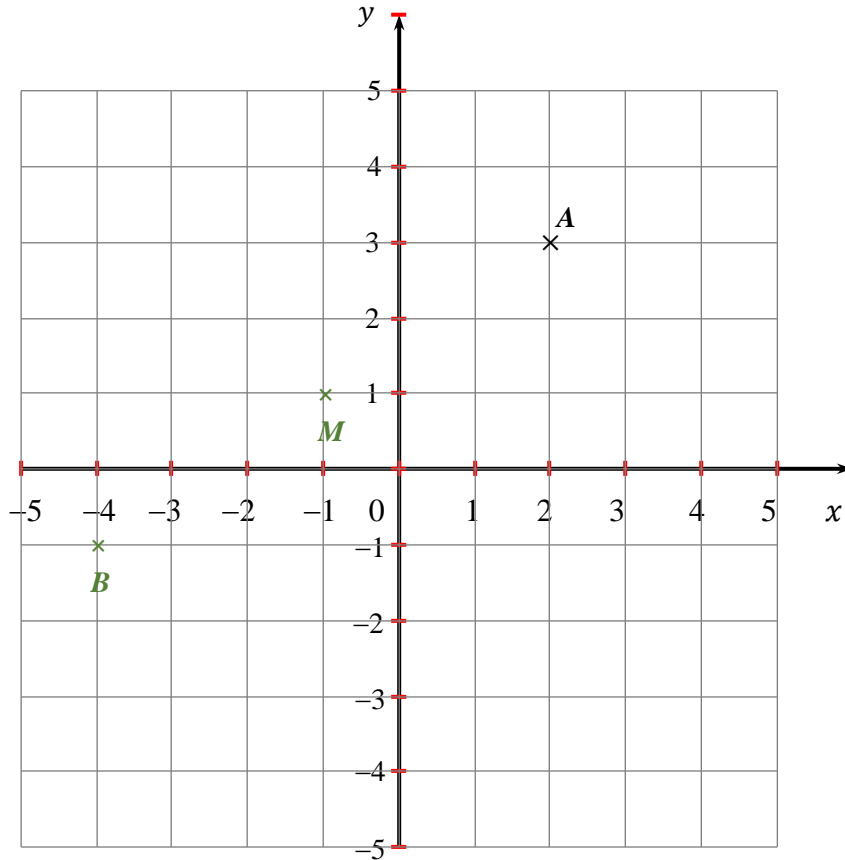
(1) (1)

.....
(2)

(Total for Question 7 is 5 marks)



8.



a. Write down the coordinates of the point A.

Correct answer only (2,3) (1)

.....,

(1)

b. On the grid, mark with a cross (×) the point B(-4, -1).

B marked correctly at (-4, -1). (1)

(1)

M is the midpoint of the line AB.

c. On the grid, mark with a cross (×) the point M.

Write down the coordinates of the point M.

Horizontal distance $AB = 2 - (-4) = 6$

Horizontal distance $AM = \frac{6}{2} = 3$

Vertical distance $AB = 3 - (-1) = 4$

Vertical distance $AM = \frac{4}{2} = 2$

$$M = (-4, -1) + (3, 2) = (-1, 1)$$

M at (-1, 1) (1)

.....,

(1)

(Total for Question 8 is 3 marks)



9. Write the ratio 18 : 27 in the ratio 1 : n

$$\frac{27}{18} = 1.5$$

$$18:27 = 1:1.5$$

for appropriate method shown (1)

$$\text{for } 1 : 1.5 \text{ or } 1 : \frac{3}{2} \quad (1)$$

.....
(2)

(Total for Question 9 is 2 marks)

10. Kate has 30 coins in a money box.

$\frac{2}{5}$ of these 30 coins are 10 p coins.

The rest of these 30 coins are 20 p coins.

Work out the total value of 10 p coins and 20 p coins in her money box.

Number of 10p coins:

$$\frac{2}{5} \times 30 = 12$$

Number of 20p coins:

$$30 - 12 = 18$$

Total value of the coins:

$$12 \times 10p + 18 \times 20p = 480p = \text{£}4.80$$

Number of 10 p coins or number of 20 p coins (1)

Attempt to work out the total value of the coins (1)

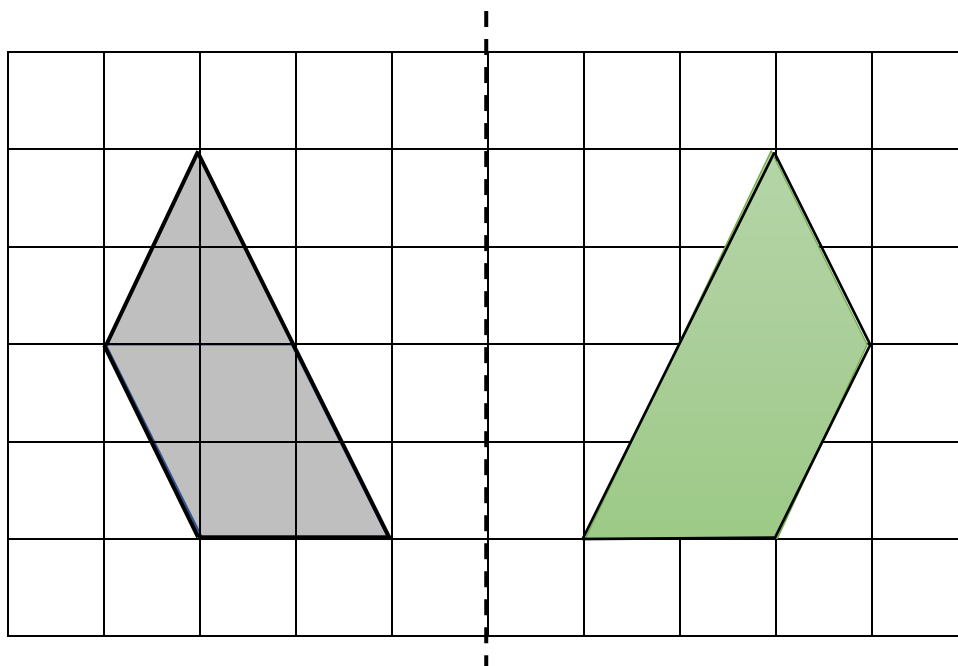
correct answer only (1)

.....
(3)

(Total for Question 10 is 3 marks)



11.



Here is a shaded quadrilateral drawn on a grid of centimetre squares

- i. Write down the mathematical name of the shaded quadrilateral.

trapezium (1)

.....
(1)

- ii. Reflect the shaded shape in the mirror line.

for a correct reflection of the shape in any line

for a correct reflection of at least 3 vertices (1)

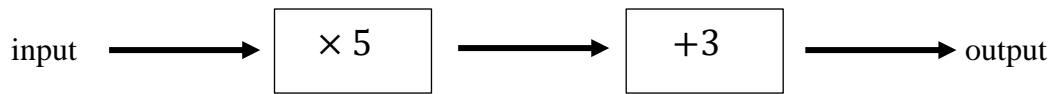
correct answer only (1)

(2)

(Total for Question 11 is 3 marks)



12. Here is a number machine.



a. Complete this table for the number machine.

Input	Output
2
5	28
... ..	43

correct answer only input 2, output 13 (1)

Input 8, output 43 (1)

(2)

b. The input number is x .
 The output number is y .
 Write down a formula for y in terms of x .

$5x + 3$ (1)

for writing correct formula $y = 5x + 3$ (1)

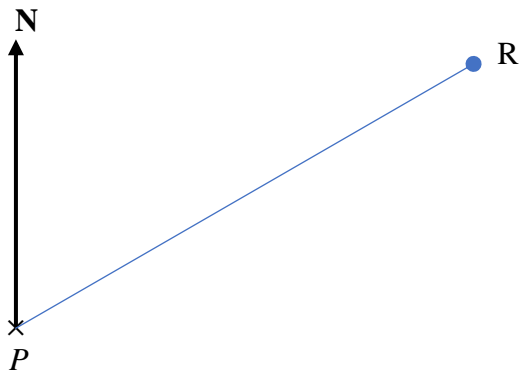
.....

(2)

(Total for Question 12 is 4 marks)



13. The diagram shows the position of two petrol stations P and Q on a motorway.



Scale : 1 : 5 000 000

a. Find the bearing of Q from P.

for angle in the range 118 to 122 e.g. 120° (1)

.....

(1)

b. Work out the real distance between petrol station P and petrol station Q.
Give your answer in kilometres.

for measurement of PQ in the range 9.8 to 10.2 cm e.g. 10 cm (1)

$10 \text{ cm} \times 5\,000\,000 = 50\,000\,000 \text{ cm} = 500 \text{ km}$ (1)

.....

(2)

Petrol station R is 350 km on a bearing of 060° from petrol station P.

c. On the diagram, mark petrol station R with a cross (\times). Label it R.

for marking R at a bearing of 60° from P with $PR = 7 \text{ cm}$ (1)

(1)

(Total for Question 13 is 4 marks)



14. 50 workers of the factory were asked which forms of transport they use regularly from car, bus or bicycle.

21 of the workers were female.

6 of the 8 workers who used bicycle were male.

18 of the workers used bus.

9 males used car.

a. Complete the two-way table.

	Male workers	Female workers	Total
Car	9	15	24
Bus	14	4	18
Bicycle	6	2	8
Total	29	21	50

(2)

for correctly entering four of 15, 24, 14, 4, 2, 29 (1)

for complete correct table (1)

b. Use the table to find the number of females who used buses.

correct answer only 4 (1)

.....

(1)

(Total for Question 14 is 3 marks)

15. Liam makes lemon squash by mixing 80 ml squash with 640 ml of water.

Jon makes lemon squash by mixing 45 ml squash with 405 ml of water.

Whose squash is the stronger?

Explain your answer.

Liam's squash has $\frac{80}{720}$ ml squash, and Jon's has $\frac{45}{450}$ ml (1). Liam's squash is $\frac{1}{9}$ squash and Jon's is $\frac{1}{10}$ squash. $\frac{1}{10} < \frac{1}{9}$ (1), so Liam's squash is stronger (1).

.....

(Total for Question 15 is 3 marks)



16. The table shows the number of goals scored in Premier league football matches.

Goals Scored	Number of matches
0	3
1	5
2	9
3	6
4	2

Jamil said that the mode is 4.

Jamil is wrong.

a. Explain why.

for explanation the corresponding highest frequency is 2 and not 4 (1)

.....

.....

.....

(1)

Jamil also worked out the mean goals scored in 25 matches.

Here is his working.

$$\text{Mean} = \frac{(0 \times 3) + (1 \times 5) + (2 \times 9) + (3 \times 6) + (4 \times 2)}{5} = 9.8$$

Jamil made a mistake in his working to find the mean goals scored.

b. Describe the mistake that Jamil made.

for explanation identifying the error in the working

e.g. $\frac{49}{5}$ should be $\frac{49}{25}$ i.e. number of matches they played is 25 (1)

.....

.....

.....

(1)

(Total for Question 16 is 2 marks)



17. Chris makes pillar candles.

He has 8.8 kilograms of wax and uses it all to make candles.

Each pillar candle Chris makes uses 160 grams of wax.

Chris sells $\frac{3}{5}$ of the pillar candles for £15.

He then reduces this price by $\frac{1}{5}$ and sells the rest of the pillar candles.

Work out the total amount of money Chris gets by selling all the candles he made.

Number of candles made:

$$8800\text{g} \div 160\text{g} = 55 \quad (1)$$

Money made selling candles at £15:
 $55 \times 35 = 33$ candles sold

$$33 \times £15 = £495 \quad (1)$$

Money made selling candles at reduced price:

$$\text{New price: } 4/5 \times £15 = £12$$

$$(55 - 33) \times £12 = £264 \quad (1)$$

Total money made:

$$£495 + £264 = £759 \quad (1)$$

.....
(Total for Question 17 is 4 marks)

18. Given that $\frac{35 \times 5.4}{4.2} = 4.5$

Work out the value of $\frac{350 \times 54}{4.2}$

$$350 = 35 \times 10, \quad 54 = 5.4 \times 100, \quad 4.2 = 4.2 \div 10 \quad (1)$$

$$\frac{350 \times 54}{4.2} = \frac{35 \times 5.4}{4.2} \times 1000 = 4500 \quad (1)$$

.....
(Total for Question 18 is 2 marks)



19. a. Expand $2x(x + 3)$

correct answer only $2x^2 + 6x$ (1)

.....
(1)

b. Factorise $12q - 18p$

correct answer only $6(2q - 3p)$ (1)

.....
(1)

c. Solve $9(y + 3) = 18$

$$9(y + 3) = 18 \Rightarrow y + 3 = 2 \Rightarrow y = -1$$

Correct first stage e.g. expanding brackets/ division of both sides by 9 (1)

Correct answer only (1)

$y =$
(2)

(Total for Question 19 is 4 marks)

20. Work out the value of

$$2\frac{2}{9} \div \frac{2}{3}$$

Give your fraction in its simplest form.

$$2\frac{2}{9} = \frac{20}{9} \text{ (1)}$$

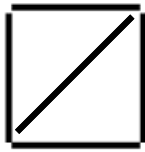
$$\frac{20}{9} \times \frac{3}{2} = \frac{10}{3} \text{ (1)}$$

$$= 3\frac{1}{3} \text{ (1)}$$

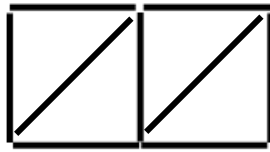
.....
(Total for Question 20 is 3 marks)



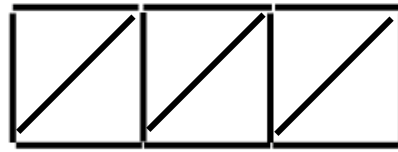
21. Here is a sequence of patterns made from sticks.



Pattern number 1



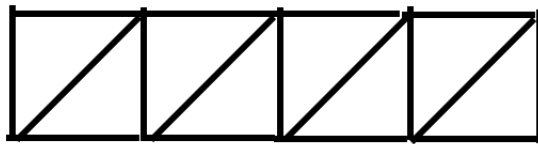
Pattern number 2



Pattern number 3

a. In the space below, draw pattern number 4

correct diagram for pattern number 4




(1)

(1)

b. How many sticks are needed for pattern number 10?

Number of sticks needed: 5, 9, 13, 17



n^{th} term: $4n + x$

1^{st} term: $4(1) + x = 5 \Rightarrow x = 1$

n^{th} term: $4n + 1$ (1)

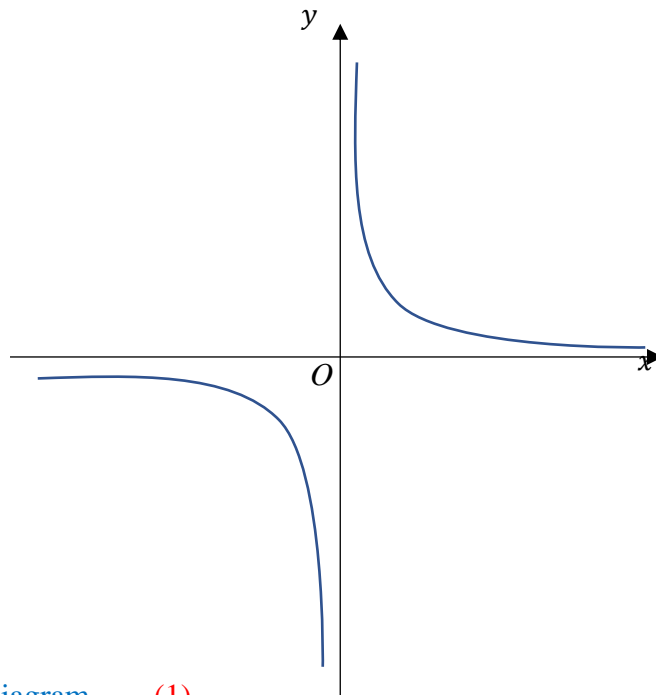
10^{th} term: $4(10) + 1 = 41$ (1)

.....
(2)

(Total for Question 20 is 3 marks)



22. a. Sketch the graph of $y = \frac{1}{x}$



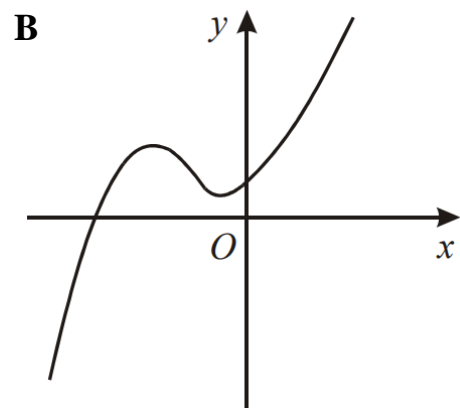
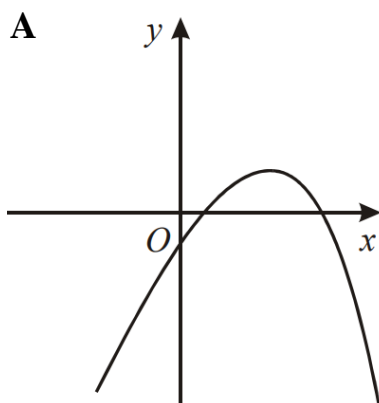
correct diagram (1)

(1)

b. Match each of the equations with its graph.

Equation	Letter of graph
$y = -x^2 + 4x - 3$	A
$y = \frac{1}{3}x^3 + 2x^2 + 3x + 4$	B

correct matching (1)

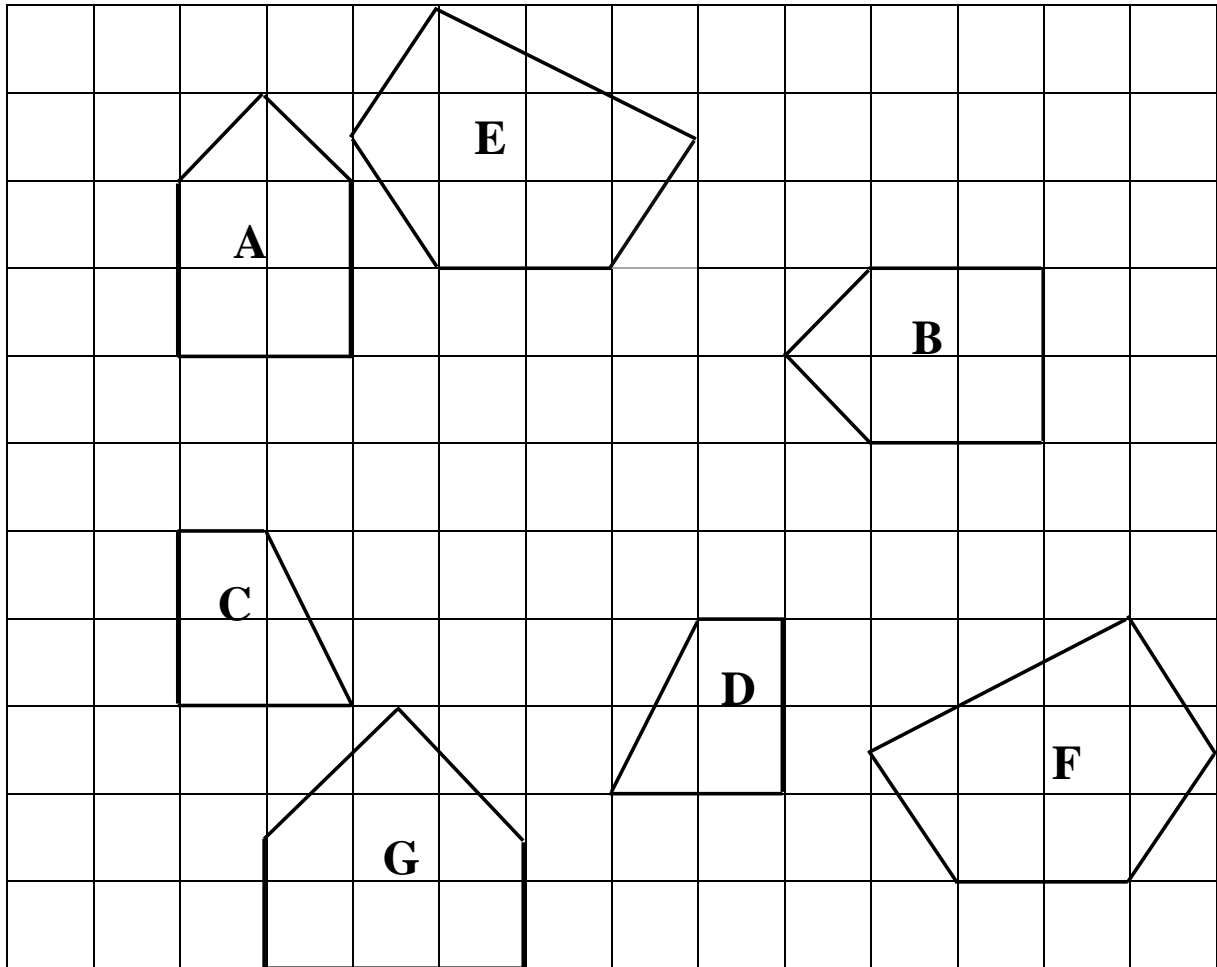


(1)

(Total for Question 22 is 2 marks)



23. Identify the only shape which is not congruent to any other shape in the grid below.



correct answer only e.g. G

(1)

.....

(Total for Question 23 is 1 mark)



24. Kaan's weekly pay is £180 each week.

Kaan asks his boss for an increase of £20 a week.

Kaan's boss offers him a 10% increase.

Is the offer from Kaan's boss more than Kaan asked for?

You must show your working.

Boss offered increase of $£180 \times 0.1 = £18$

(1) (1)

Kaan wanted an increase of £20

No, because $£18 < £20$ (1)

.....
(Total for Question 24 is 3 marks)

25. 14 students took a Maths test.

The test was marked out of 100.

The table below shows the scores of 7 female students.

Lowest score	25
Median	55
Highest score	95

Here are the scores of 7 male students.

22 42 42 45 50 65 70

Use the information to compare the scores of females with the males.

Write down two comparisons.

for identification of the range of the girls (70) (1)

for a correct comparison of median or a correct comparison of ranges (1)

for a correct comparison of median and a correct comparison of ranges

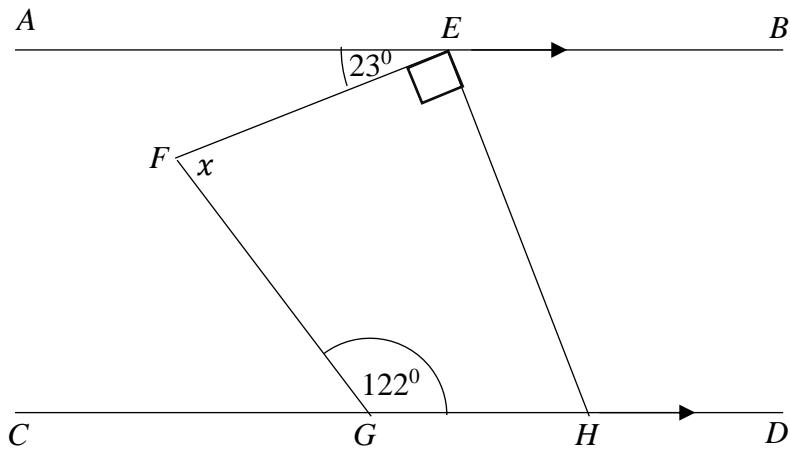
e.g. the median score for girls (55) is greater than the median score for boys (45)

and the range for girls (70) is greater than the range for boys (55) (1)

(Total for Question 25 is 3 marks)



26.



AEB is parallel to $CGHD$.

$EFGH$ is quadrilateral.

Work out the size of the angle marked x .

You must give a reason for each stage of your working.

for correct use of co-interior angles e.g. $\angle EHG = 180 - (23 + 90) = 67$

or for correct use of alternate angle e.g. $\angle EHD = 90 + 23$ and

angle on a straight line add up to 180 e.g. $\angle EHG = 180 - 113 = 67$

or for correct use of angle on straight line add up to 180 e.g. $180 - (90 + 23) = 67$

and alternate angle e.g. $\angle EHG = 67$ (1)

for a correct method to find the value of x using angles of quadrilateral add to

360 e.g. $360 - (122 + 67 + 90)$ (1)

correct value of $x = 81$ (1)

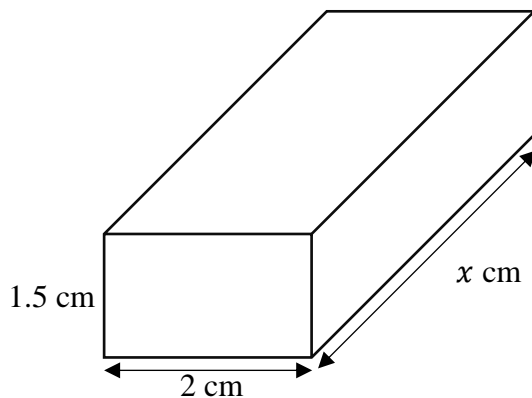
.....
(Total for Question 26 is 3 marks)



27. The mass of a solid gold bar is 216 g.

The density of copper is $\approx 9 \text{ g/cm}^3$.

The gold is in the shape of a cuboid as shown below.



Work out the value of x .

for using correct formula of $V = \frac{M}{D}$ e.g. $V = \frac{216}{9} = 24$ (1)

for $1.5 \times 2 \times x = 24 \Rightarrow x = 8$ (1)

correct answer only (1)

.....
(Total for Question 27 is 3 marks)

28. a. Write 2.8×10^{-3} as an ordinary number.

correct answer only 0.0028 (1)

.....
(1)

b. Write 2000000 in standard form.

correct answer only 2×10^6 (1)

.....
(1)

(Total for Question 28 is 2 marks)



29. Given that $p:q = 2:3$ and $q:r = 4:5$, find $p:r$

$$p:q = 2:3 = \frac{2}{3}:1 \quad (1)$$

$$q:r = 4:5 = 1:\frac{5}{4} \quad (1)$$

$$p:r = \frac{2}{3}:\frac{5}{4} = 8:15 \quad (1)$$

.....

(Total for Question 29 is 3 marks)

30. a. Simplify $k^9 \div k^3$

correct answer only k^6 (1)

.....

(1)

b. Make q the subject $p = 2q - 7$

for using a correct method, first addition of 7 to both sides or division of all terms by 2

e.g. $p + 7 = 2q - 7 + 7$ or $\frac{p}{2} = \frac{2q}{2} - \frac{7}{2}$ (1)

correct answer only e.g. $\frac{p+7}{2} = q$ or $\frac{p}{2} + \frac{7}{2} = q$ (1)

.....

(2)

(Total for Question 30 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

