OCR
Oxford Cambridge and RSA

Thursday 16 May 2024 – Morning

GCSE (9–1) Mathematics

J560/01 Paper 1 (Foundation Tier)

Time allowed: 1 hour 30 minutes

You must have:
- the Formulae Sheet for Foundation Tier (inside this document)

You can use:
- a scientific or graphical calculator
- geometrical instruments
- tracing paper

F

Please write clearly in black ink. **Do not write in the barcodes.**

Centre number | | | | | | Candidate number | | | | |

First name(s) _____

Last name _____

INSTRUCTIONS
- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided. If you need extra space use the lined page at the end of this booklet. The question numbers must be clearly shown.
- Answer **all** the questions.
- Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.
- Use the π button on your calculator or take π to be 3.142 unless the question says something different.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- This document has **20** pages.

ADVICE
- Read each question carefully before you start your answer.

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1 Write down an example of each of the following.

(a) An even number.

(a) 2, 4 etc [1]

(b) A multiple of 7.

(b) 7, 14 etc [1]

(c) A cube number between 20 and 220.

(c) 27, 64, 125, 216 [1]

(d) A prime number less than 10.

(d) 2, 3, 5, 7 [1]

2 Here is a list of five numbers.

10 12 4 3 6

(a) Write down the median.

3 4 (6) 10 12

(a) 6 [1]

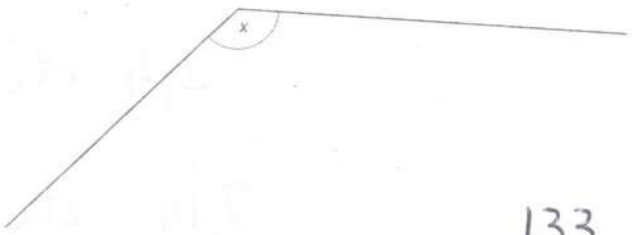
(b) A sixth number is added to the list.
The range of the six numbers is 15.

Work out a possible value for the sixth number.

3 + 15

(b) 18 (or -3) [2]

3 (a) Measure angle x.



133 (±2)

(a) $x =$ ..... ° [1]

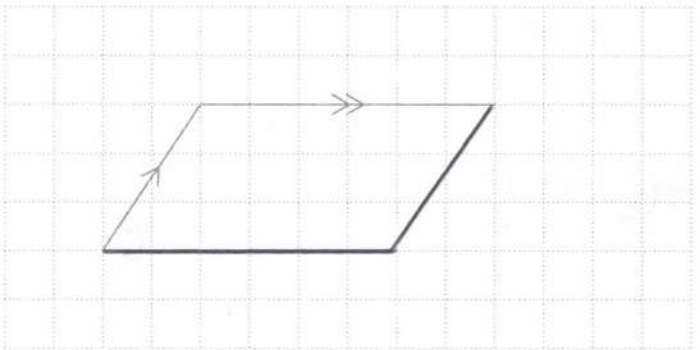
(b) The angles of a triangle are 27°, 126° and 27°.

Explain how you know the triangle is isosceles.

It has 2 equal angles

..... [1]

(c) The diagram shows two sides of a parallelogram drawn on a one-centimetre grid.



(i) Complete the drawing of the parallelogram.
Include notation to show that the drawing is a parallelogram. [2]

(ii) Work out the area of the parallelogram.

6 x 3

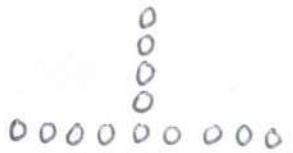
18

(c)(ii) ..... cm^2 [2]

4 Here are the first three dot patterns in a sequence.

Pattern 1 Pattern 2 Pattern 3

(a) Draw Pattern 4 in the sequence. [1]



(b) Without drawing, work out how many dots are in Pattern 10 of the sequence.
Explain how you worked out your answer.

3n + 1 etc 31

..... [2]

5 A teacher writes down a number.
They subtract 6 from the number and then divide by 8.
Their answer is 81.

What number did the teacher write down?

$$\frac{x-6}{8} = 81$$

$$x - 6 = 648$$

$$x = 648 + 6 = 654$$

..... [2]

6 A play group offers four activities to their children.

Baking (B) Drawing (D) Exercise (E) Reading (R)

(a) Complete the list below to show all the possible combinations of two **different** activities. You may not need all the answer lines.

B ..... and ..... D .....

B ..... and ..... E .....

B ..... and ..... R .....

D ..... and ..... E .....

D ..... and ..... R .....

E ..... and ..... R .....

..... and .....

..... and .....

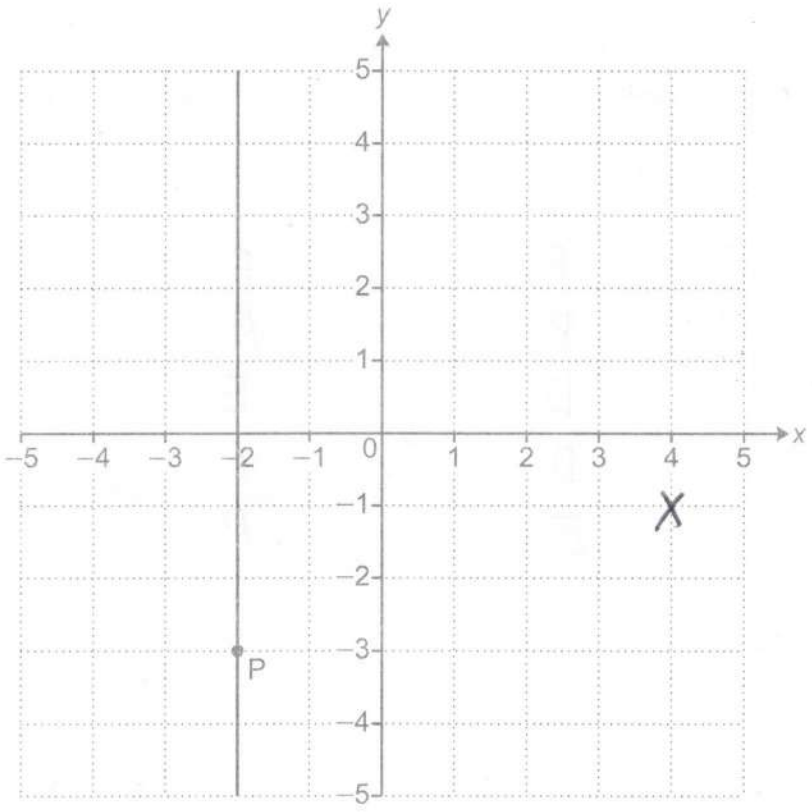
..... and .....

[2]

(b) Write down the fraction of the combinations that include Reading (R).

(b) 3/6 or 1/2 [1]

7 This grid shows a vertical line going through the point P.



(a) **(i)** Write down the coordinates of point P.

(a)(i) (-2 , -3) **[1]**

(ii) Plot the point (4, −1). **[1]**

(b) Write down the equation of the vertical line going through point P.

(b) $x = -2$ **[1]**

8 Here is a formula.

$a = b(c + d)$

(a) Find the value of a when $b = 3$, $c = 7$ and $d = 5$.

$3(7+5)$

$= 3 \times 12$

(a) $a =$ 36 [1]

(b) Find the value of c when $a = 30$, $b = 4$ and $d = 6$.

$30 = 4(c + 6)$

$30 = 4c + 24$

$6 = 4c$

(b) $c =$ $\frac{6}{4} = \frac{3}{2} = 1\frac{1}{2} = 1.5$ any [3]

9 A bag only contains red counters and blue counters.

$\frac{3}{7}$ of the counters are red.

There are 20 blue counters.

Complete the table to show the fraction of the counters that are blue and the number of red counters.

	red	blue
fraction	$\frac{3}{7}$	$\frac{4}{7}$
number	15	20

[3]

$\frac{1}{7} = 5$ counters

10 (a) Write the ratio 14 : 35 in its simplest form.

÷7 ÷7

2 : 5

(a) ..... : ..... [1]

(b) The scale of a map is 1 : 25 000.

Two castles are 6 kilometres apart on the ground.

= 6000m

= 600,000

Work out how far apart the two castles are on the map.
Give your answer in centimetres.

$\frac{600000}{25000} = \frac{120}{5} = \frac{24}{1}$

24

(b) ..... cm [3]

11 Sam eats 30% of a 600 g pack of cereal every day.

10% = 60

30% = 180g

Sam has no cereal left.
The cereal is no longer sold in 600 g packs.
Instead, the cereal is now sold in 400 g packs.

Sam wants to continue to eat the same amount of cereal every day.

Work out the **minimum** number of 400 g packs of cereal that Sam must buy to have enough for 7 days.
You must show your working.

180
x 7
1260

400	1
800	2
1200	3
1600	4

4

..... 400 g packs [5]

12 Increase £95 by 16%.

10% = 9·5
1% = 0·95

6% = 0·95 × 6 = 5·70

95·0 + 9·5 + 15·7 = 110·20

£ ..... [3]

13 50 students are asked how many books they have read this month.
The table shows the results.

Number of books	Frequency		
0	×	11	0
1	×	8	8
2	×	10	20
3	×	8	24
4	×	7	28
5	×	6	30
Total		50	

28
52
30

Work out the mean number of books read this month by the 50 students.

28 + 52 + 30 = 110

110/50 = 11/5 = 11·0 ÷ 5 = 2·2

2·2 ..... [3]

14 A machine makes 15 boxes in 12 minutes.
The machine works continuously.

Work out how many boxes are made by this machine in 7 hours.

15
x 5
75 per hr

75
x 7
525

525

..... [4]

15 The population of an island is 47 000 people.
The area of the island is 560 km^2.

Calculate the population density of the island in people per km^2.

47000 ÷ 560

= 83.928...

83.9

..... people per km^2 [2]

16 A sports team scored 400 points.

The defenders scored $\frac{1}{10}$ of the points. $= 40$

The midfielders and the forwards scored the remainder of the points in the ratio 1 : 5.

Find the percentage of the 400 points that were scored by the forwards.
You must show your working.

360 pts

M F

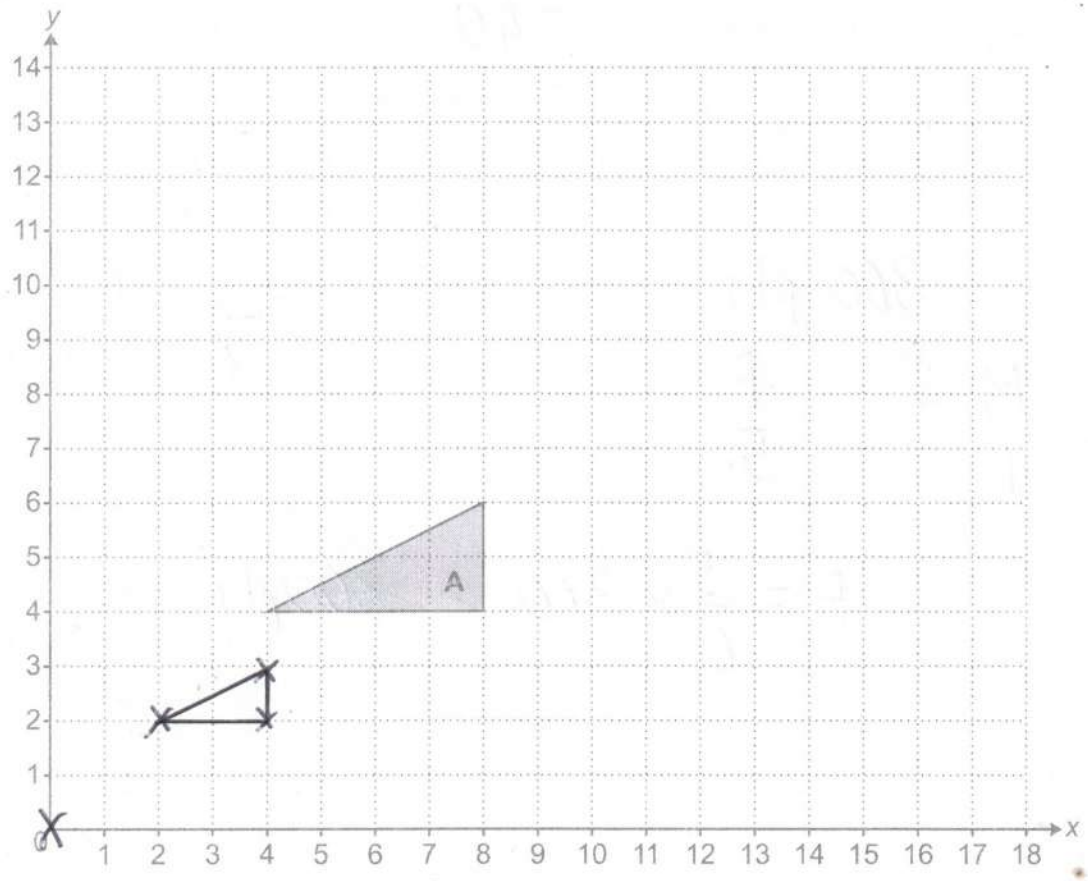
1 5

$F = \frac{5}{6} \times 360 = 300\text{pts}$

$\frac{300}{400} \times 100 = 75$

75 ..... % **[5]**

17 Triangle **A** is drawn on the grid below.



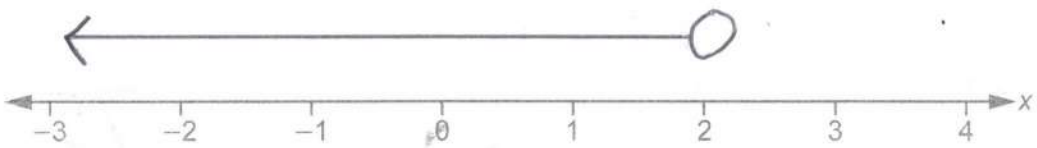
Enlarge triangle **A** with scale factor $\frac{1}{2}$ and centre of enlargement (0, 0). **[3]**

18 Solve $7x - 3 < 11$.

Show your solution on the number line.

$7x < 14$

$x < 2$



[4]

19 Work out.

$$\sqrt[3]{\frac{19.5^4 - 18^2}{1.45}}$$

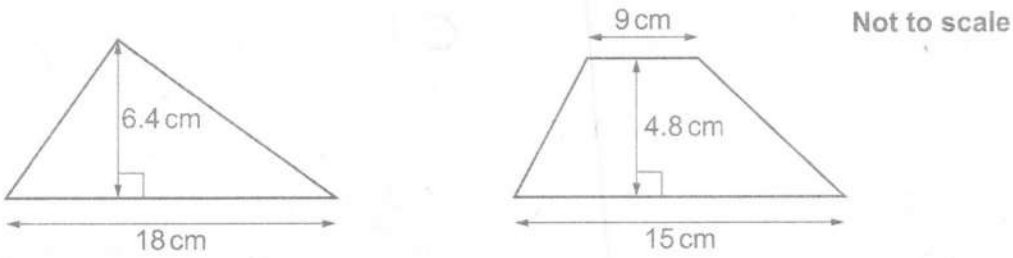
$= 46.337744236$

Write your answer correct to **4** significant figures.

46.34

..... [3]

20 The diagram shows a triangle and a trapezium.



Not to scale

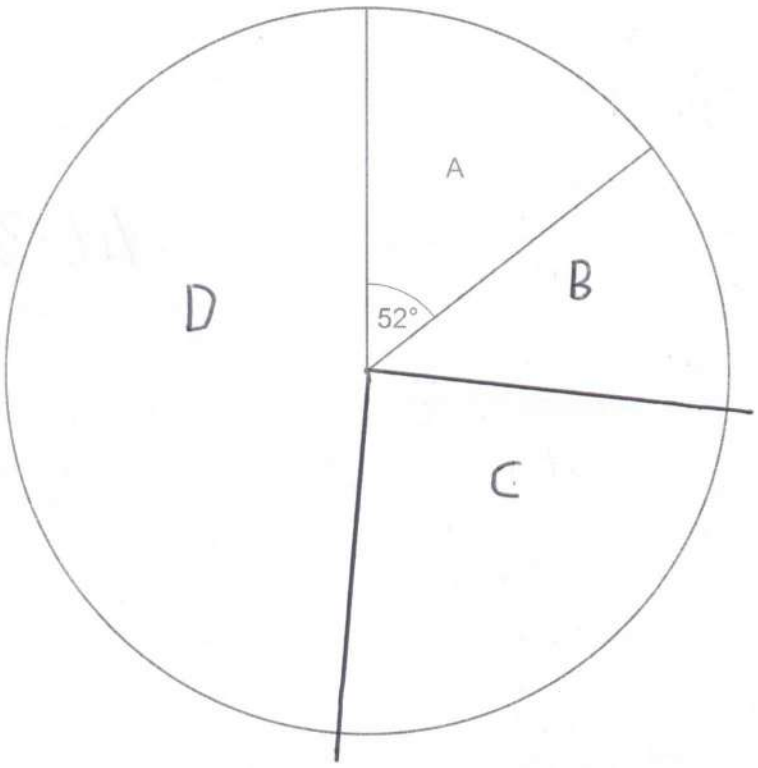
Show that they have the same area. [3]

Triangle $= \frac{1}{2} \times 18 \times 6.4 = 57.6\ cm^2$

Trap $= \frac{1}{2}(15 + 9) \times 4.8 = 57.6\ cm^2$

21 A school is deciding on a charity to support.
Each student at the school votes for one of four charities, A, B, C or D.
The results are to be shown in a pie chart.

This pie chart shows the sector for charity A.
Twice as many students voted for charity C than charity B.
Twice as many students voted for charity D than charity C.



(a) (i) Show that the sector for charity B will have an angle of 44°. [2]

A	B	C	D
52	x	$2x$	$4x$

$7x + 52 = 360$

$7x = 308$

$x = \frac{308}{7} = 44$

(ii) Complete the pie chart. [3]

$B = 44°$ $C = 88°$ $D = 176°$

(b) 39 students voted for charity A.

Calculate the total number of students at the school.

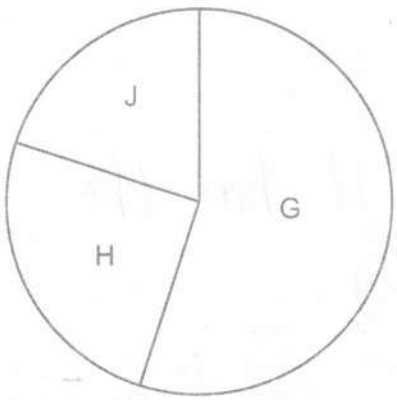
$52° = 39$

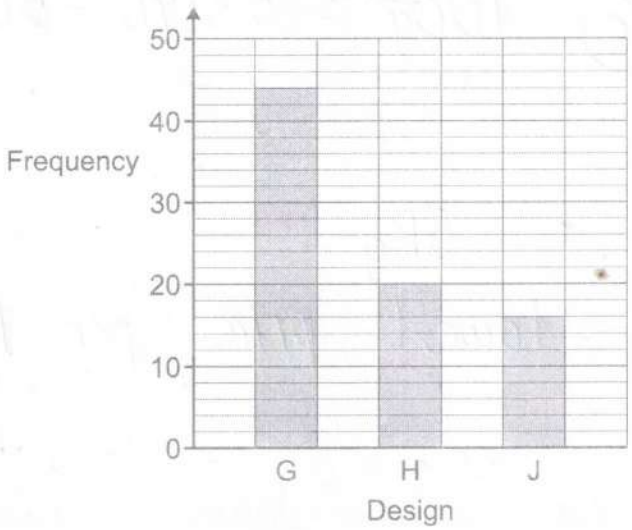
$\times \frac{90}{13}$ $\times \frac{90}{13}$

$360 =$

(b) 270 [2]

(c) The school asks 80 of the students to choose a new logo from three designs G, H and J.
The same results are shown in a pie chart and in a bar chart.





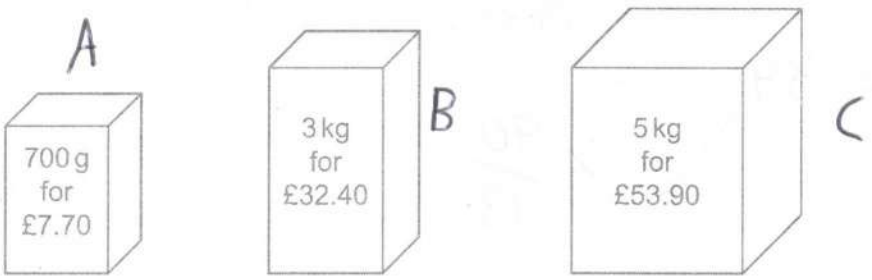
(i) Give one **advantage** of using the pie chart rather than the bar chart.

Easy to see proportions of choices [1]

(ii) Give one **disadvantage** of using the pie chart rather than the bar chart.

You can't tell any frequencies [1]

22 The same dog food is sold in three different sized packs.
The diagram shows the price of each pack.



Which pack is the best value for money?
Show how you decide.

(A) 100g = 7·70 ÷ 7 = £1·10
(B) 100g = 32·40 ÷ 30 = £1·08
(C) 100g = 53·90 ÷ 50 = £1·078

The 5kg pack because it has the lowest price per 100g

[3]

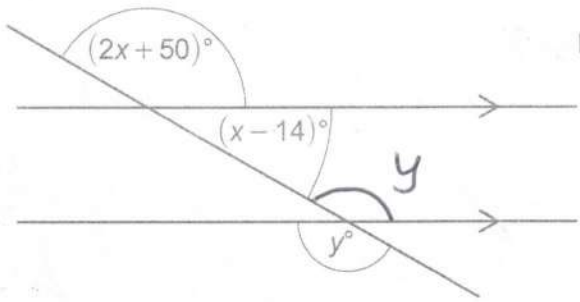
23 A garage is 5 metres long, correct to the nearest metre.
A car is 4.5 metres long, correct to 1 decimal place.

Show that the car may **not** fit in the garage. [3]

(4·5) ≤ garage < 5·5
4·45 ≤ car < (4·55)

Maximum possible length of the car exceeds the minimum garage length

24 The diagram shows a straight line crossing two parallel lines.



Not to scale

Find the value of y.
You must show your working.

$2x + 50 + x - 14 = 180$

$3x = 144$

$x = 48$

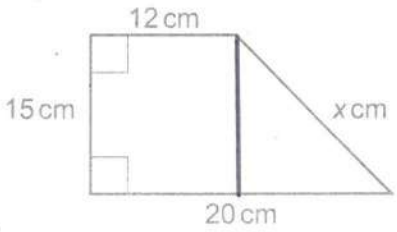
$y + (x - 14) = 180$

$y + 34 = 180$

$y = 180 - 34$

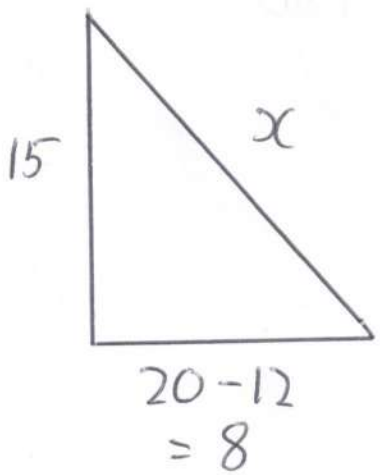
$y =$ 146 [5]

25 The diagram shows a trapezium.



Not to scale

Calculate the value of x.



$$x = \sqrt{15^2 + 8^2}$$

$$= \sqrt{289}$$

$x =$ 17 **[4]**

26 Solve the simultaneous equations.

$4x - y = 24$ ①
$2x + 3y = 26$ ②

① $-$ $4x - y = 24$
② $\times 2$ $4x + 6y = 52$
$7y = 28$ $y = 4$

① $\Rightarrow$ $4x - 4 = 24$
$4x = 28$
$x = 7$

$x =$ 7
$y =$ 4 [3]

27 Write the following in order of size, smallest first.

0.2 2^{-2} 2×10^{-2}

Show how you decide.

0.20

$2^{-2} = \frac{1}{2^2} = \frac{1}{4} = 0.25$

$2 \times 10^{-2} = 0.02$

2×10^{-2} , 0.2 , 2^{-2} [3]
smallest

END OF QUESTION PAPER