Cambridge Assessment International Education

# Cambridge IGCSE™

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*9927811861*

**MATHEMATICS** **0580/22**

Paper 2 (Extended) **May/June 2024**

**1 hour 30 minutes**

You must answer on the question paper.

You will need: Geometrical instruments

**INSTRUCTIONS**

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For $\pi$, use either your calculator value or 3.142.

**INFORMATION**

- The total mark for this paper is 70.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **12** pages.


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**1** The temperature at midnight is −4 °C.
The temperature at noon is 25 °C.

Work out the difference between these two temperatures.

..... °C [1]

**2** A gardener charges $6.55 for each hour he works plus a fixed charge of $15.50 .

Calculate the total amount he charges when he works for 4 hours.

$ ..... [2]

**3** A delivery driver records the number of pizzas she delivers each month for one year.

| | | | | | |
|---|---|---|---|---|---|
| 48 | 44 | 39 | 28 | 57 | 22 |
| 36 | 41 | 54 | 57 | 49 | 52 |

**(a)** Complete the stem-and-leaf diagram.

| | |
|---|---|
| 2 | |
| 3 | |
| 4 | |
| 5 | |

Key: 4 | 8 represents 48 pizzas

[2]

**(b)** Find the median.

..... [1]

**4** Jonah has \$750.
He spends $\frac{1}{4}$ of this money on travel and some of this money on food.
He now has \$437.50 .

Work out the fraction of the \$750 he spends on food.

..... [3]

**5** The table shows part of a tram timetable.

| Newpoint | Westhill |
|---|---|
| 10 30 | 11 17 |
| 12 18 | |
| 13 30 | 14 17 |

All the trams take the same number of minutes to complete the journey from Newpoint to Westhill.

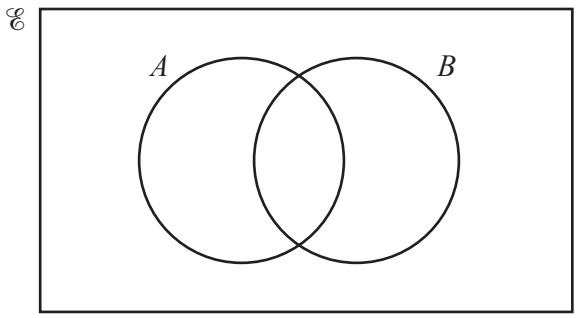
Complete the table.

[2]

**6** Write 0.04628 correct to 2 significant figures.

..... [1]

**7**



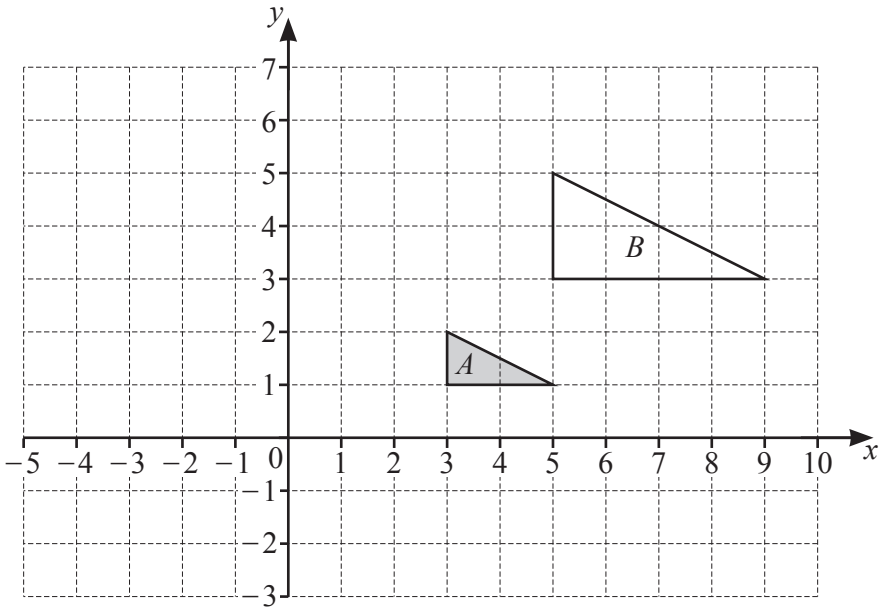

On the Venn diagram, shade the region $A \cup B$. [1]

**8** Kai invests \$5000 in an account paying simple interest at a rate of $r$% per year.
At the end of 8 years, the value of his investment is \$5700.

Find the value of $r$.

$r =$ ..... [3]

**9**




**(a)** Describe fully the **single** transformation that maps triangle $A$ onto triangle $B$.

.....

..... [3]

**(b)** On the grid, draw the image of triangle $A$ after a translation by the vector $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$. [2]

**10** Write 174 000 in standard form.

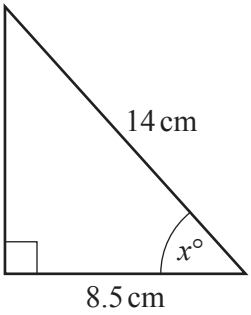
..... [1]

**11** A company surveys 40 of its employees.
In the survey, 3 employees say they walk to work.
The company has a total of 1240 employees.

Find the expected number of employees in the company who walk to work.

..... [2]

**12**




NOT TO SCALE

The diagram shows a right-angled triangle.

Calculate the value of $x$.

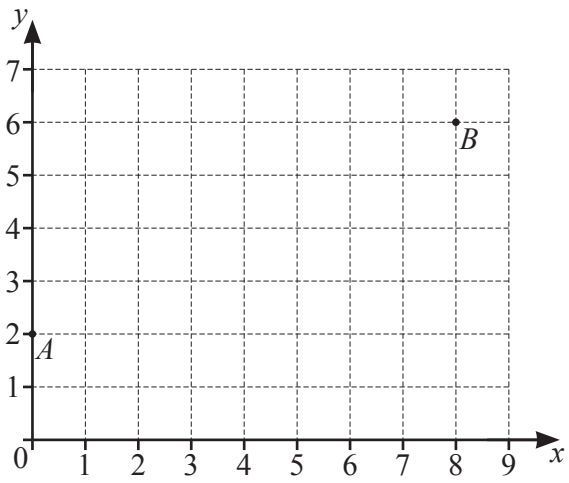
$x =$ ..... [2]

**13** **Without using a calculator**, work out $2\frac{1}{4} \div 1\frac{7}{8}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

**14**



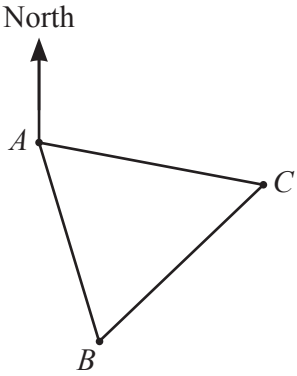

$A$ is the point (0, 2) and $B$ is the point (8, 6).

Find the equation of line $AB$.

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

$y =$ ..... [2]

**15**




NOT TO SCALE

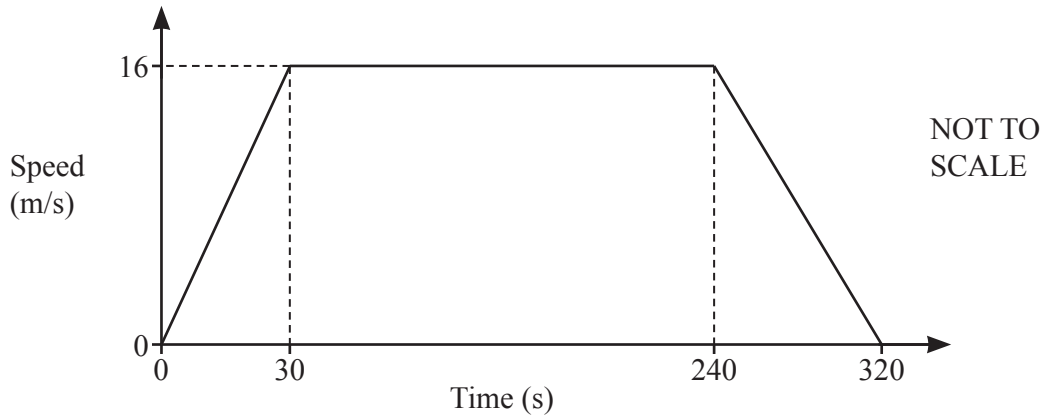
Three towns, $A$, $B$ and $C$, are equidistant from each other.
The bearing of $C$ from $A$ is 104°.

Calculate the bearing of $B$ from $C$.

..... [3]

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**16** The speed–time graph shows information about a car journey.




**(a)** Find the deceleration of the car between 240 and 320 seconds.

..... m/s$^2$ [1]

**(b)** Calculate the total distance the car travels during the 320 seconds.

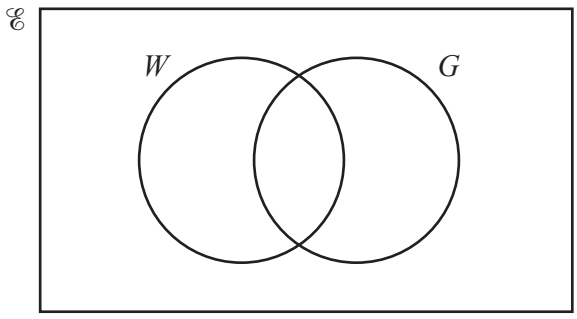
..... m [3]

**17** $W$ = {students who walk to school}
$G$ = {students who wear glasses}

There are 20 students in a class.

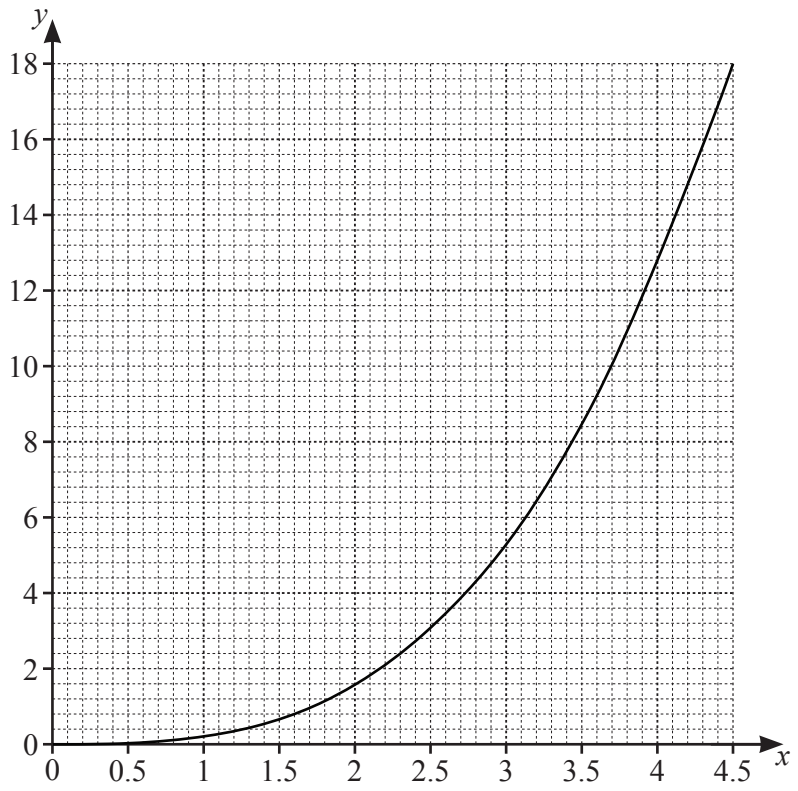
- 8 walk to school
- 3 wear glasses and walk to school
- 2 do not wear glasses and do not walk to school.

Complete the Venn diagram.




[2]

**18**




The graph of $y = f(x)$ is drawn on the grid.

**(a)** Draw the tangent to the graph at the point $x = 3$. [1]

**(b)** Use your tangent to find an estimate for the gradient of the curve at the point $x = 3$.

..... [2]

**19** **(a)** $y$ is directly proportional to $(x-1)^2$.
When $x = 4$, $y = 3$.

Find $y$ when $x = 7$.

$y =$ ..... [3]

**(b)** $m$ is inversely proportional to the square root of $p$.

Explain what happens to the value of $m$ when the value of $p$ is multiplied by 9.

..... [1]

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**20** Two parcels are mathematically similar.
The larger parcel has volume $80\,\text{cm}^3$ and height $5.2\,\text{cm}$.
The smaller parcel has volume $33.75\,\text{cm}^3$.

Calculate the height of the smaller parcel.

..... cm [3]

**21** Solve the simultaneous equations.
You must show all your working.

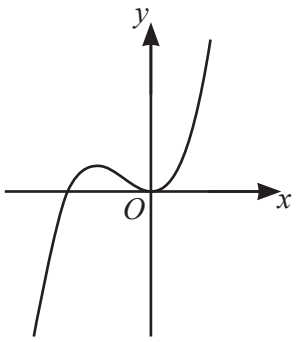
$$4y + 3x = 13$$
$$y = x^2 - 18$$

$x =$ ..... $y =$ .....

or $x =$ ..... $y =$ ..... [5]

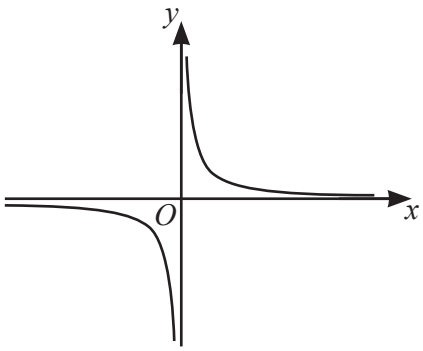
**22** **(a)** For each sketch, put a ring around the correct type of function shown.

**(i)**



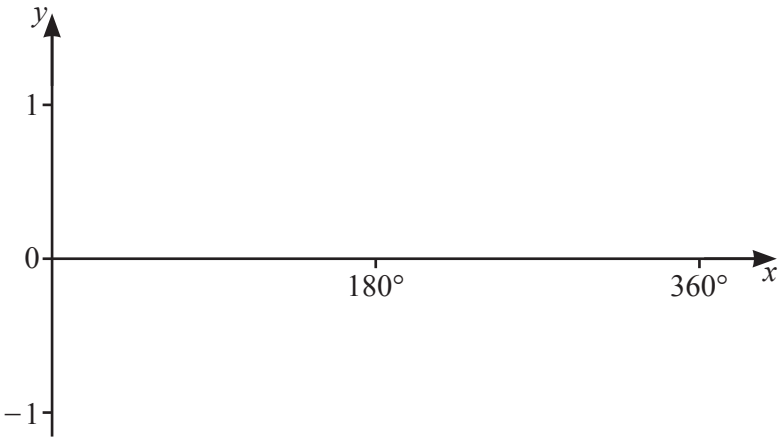

linear cubic quadratic reciprocal exponential [1]

**(ii)**




linear cubic quadratic reciprocal exponential [1]

**(b)** **(i)** On the grid, sketch the curve $y = \sin x$ for $0° \leqslant x \leqslant 360°$.

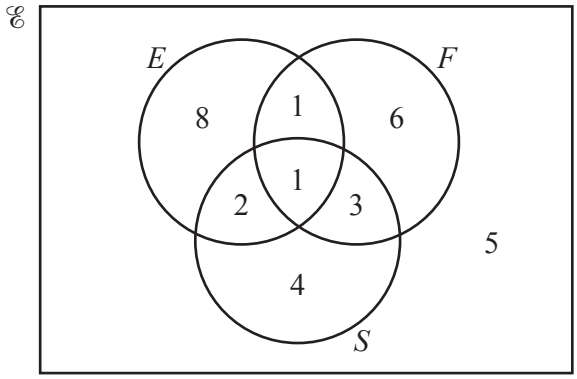



[2]

**(ii)** Solve the equation $\sin x + 0.4 = 0$ for $0° \leqslant x \leqslant 360°$.

$x =$ ..... or $x =$ ..... [3]

**23**




The Venn diagram shows information about the number of students in a class.
Some study English ($E$), some study French ($F$), some study Spanish ($S$) and some do not study any of these languages.

**(a)** Find $\mathrm{n}\left((E \cup F)' \cup S\right)$.

..... [1]

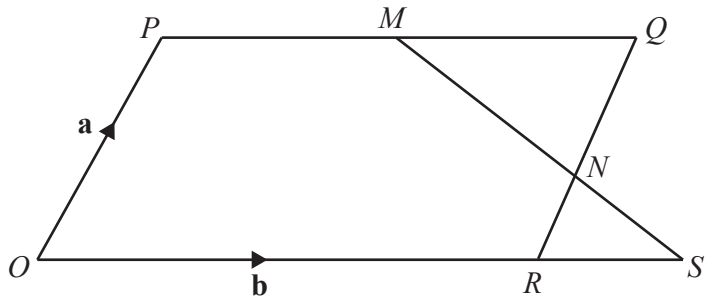
**(b)** One student is picked at random from those who study Spanish.

Find the probability that this student studies exactly two languages.

..... [2]

**Question 24 is printed on the next page.**

**24**




NOT TO SCALE

$O$ is the origin and $OPQR$ is a parallelogram.
$M$ is the midpoint of $PQ$ and $N$ divides $QR$ in the ratio 2 : 1.
$\overrightarrow{OP} = \mathbf{a}$ and $\overrightarrow{OR} = \mathbf{b}$.

**(a)** Find $\overrightarrow{MN}$.
Give your answer in terms of **a** and/or **b** and in its simplest form.

$\overrightarrow{MN} =$ ..... [2]

**(b)** The lines $MN$ and $OR$ are extended to meet at $S$.

Find the position vector of $S$.
Give your answer in terms of **a** and/or **b** and in its simplest form.

..... [3]

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