Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTER NUMBER						CANDIDATE NUMBER				

9943272802

MATHEMATICS (US) **0444/23**

Paper 2 (Extended) **October/November 2023**

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, center 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.
- Calculators must **not** be used in this paper.
- You may use tracing paper.
- You must show all necessary work clearly.
- All answers should be given in their simplest form.

INFORMATION

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

This document has **12** pages. Any blank pages are indicated.

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Formula List

For the equation $ax^2 + bx + c = 0$ $\quad x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Lateral surface area, A, of cylinder of radius r, height h. $\quad A = 2\pi rh$

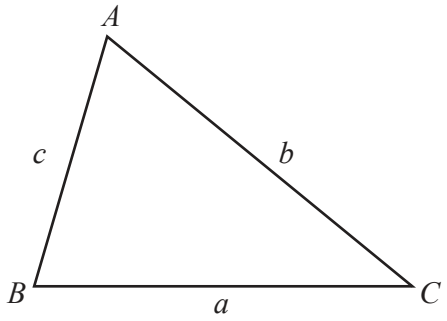
Lateral surface area, A, of cone of radius r, sloping edge l. $\quad A = \pi rl$

Surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

Volume, V, of pyramid, base area A, height h. $\quad V = \frac{1}{3}Ah$

Volume, V, of cone of radius r, height h. $\quad V = \frac{1}{3}\pi r^2 h$

Volume, V, of sphere of radius r. $\quad V = \frac{4}{3}\pi r^3$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$\text{Area} = \frac{1}{2}bc\sin A$$

1 Tara goes on a journey by train.
The train leaves at 06 48.
The journey takes 12 hours and 35 minutes.

Find the time when Tara arrives.

..... [1]

2

61	63	64	66	68	69

From this list, write down

(a) a square number

..... [1]

(b) a prime number.

..... [1]

3 A builder charges a fixed amount of \$40 plus \$25 per hour.

(a) Find the number of hours the builder works when the total charge is \$165.

..... hours [1]

(b) Write down a formula for the total charge, \$$C$, when the builder works for h hours.

$C =$ ..... [1]

4 The table shows the homework marks of a group of students.

Homework mark	5	6	7	8
Frequency	1	3	1	5

Find

(a) the range

..... [1]

(b) the mode

..... [1]

(c) the median

..... [1]

(d) the mean.

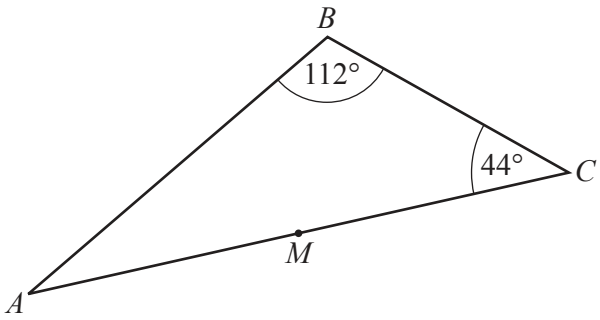
..... [3]

5 Shubhu invests $750 in a savings account for 5 years.
The account pays simple interest at a rate of 2% per year.

Work out the total interest she earns during the 5 years.

$ ..... [2]

6



NOT TO SCALE

The diagram shows triangle ABC.
M is the midpoint of AC.

Triangle ABC is rotated 180° about center M.
The image and the original triangle together form a quadrilateral $ABCD$.

(a) Write down the mathematical name of the quadrilateral $ABCD$.

..... [1]

(b) Find angle BAD.

Angle BAD = ... [2]

7 Work out $1\frac{5}{6} \div \frac{11}{15}$.

Give your answer as a mixed number in its simplest form.

..... [3]

8 Rama asks a group of students how they travel to school.
The table shows the probability of how a student, chosen at random, travels to school.

	Bus	Walk	Car	Other
Probability	0.4	0.2	0.1	

(a) Complete the table.

[2]

(b) There are 1000 students at the school.

Find the expected number of students that walk to school.

..... [1]

9 Find the greatest common factor (GCF) of 48 and 80.

..... [2]

10 $P = \dfrac{2wy^2}{3}$

Find the positive value of y when $P = 108$ and $w = 2$.

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

11 $\overrightarrow{AB} = \begin{pmatrix} 7 \\ -3 \end{pmatrix}$

(a) Find $3\overrightarrow{AB}$.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(b) Find $\left|\overrightarrow{AB}\right|$, leaving your answer in radical form.

$\left|\overrightarrow{AB}\right| =$ ..... [2]

12 A solid cube of side 20 cm is made of pine.
The density of pine is 0.5 g/cm^3.

Work out the mass of the cube.
Give your answer **in kilograms**.
[Density = mass ÷ volume]

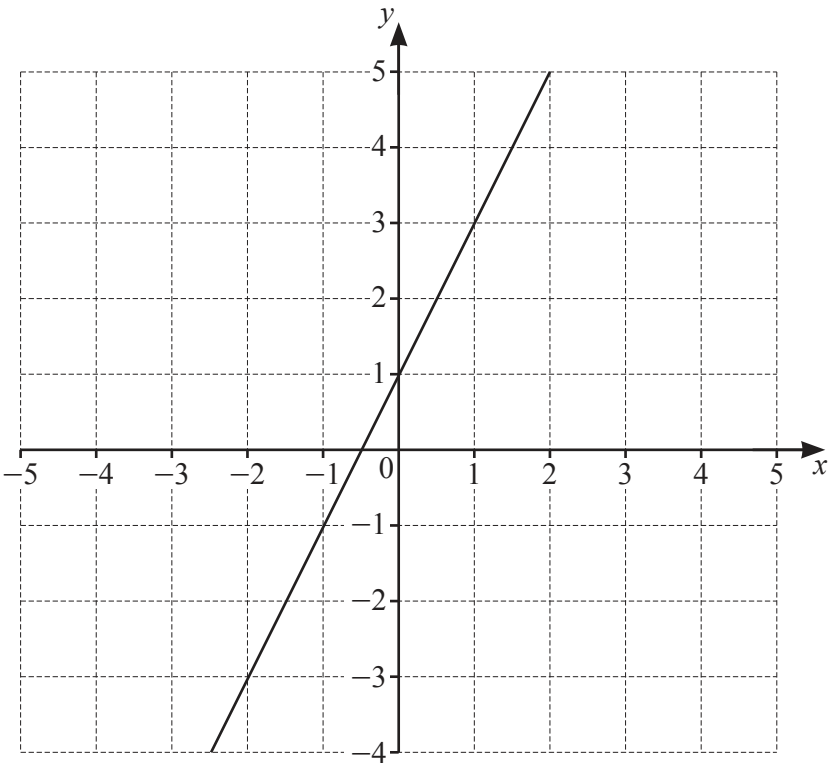
..... kg [3]

13 Oliver sent 40% more messages in June than in May.
He sent 280 messages in June.

Find how many more messages he sent in June than in May.

..... [3]

14 The graph of $y = 2x + 1$ is drawn on the grid.



By shading the **unwanted** regions of the grid, find and label the region R which satisfies these inequalities.

$y \geqslant 2x + 1$ $y \geqslant 1$ $4x + 3y < 12$ [4]

15 $T = \sqrt{3d - e}$

Solve for d.

$d =$ ..... [3]

16 A cylinder with height 20 cm has a curved surface area of 120π cm^2.

Work out the volume of the cylinder.
Give your answer in terms of π.

..... cm^3 [4]

17 **(a)** Simplify.

$$\left(64y^{27}\right)^{\frac{2}{3}}$$

..... [2]

(b) Simplify.

$$\frac{x-5}{x^2-25}$$

..... [2]

18 F varies as the product of m and a.

Work out the percentage change in F when m is increased by 20% and a is decreased by 10%.

..... % [3]

19 **(a)** $\sqrt{300} + \sqrt{k} = 13\sqrt{3}$

Find the value of k.

$k =$ ..... [2]

(b) $\left(\sqrt{7} + \sqrt{3}\right)^2 = a + 2\sqrt{b}$

Find the value of a and the value of b.

$a =$ .....

$b =$ ..... [2]

20 The following probabilities are given for events A and B.

$\mathrm{P}(A) = 0.2$ $\mathrm{P}(B) = 0.1$ $\mathrm{P}(A \text{ and } B) = 0.05$

(a) Find $\mathrm{P}(A \text{ or } B)$.

..... [2]

(b) Show that A and B are not independent.

[1]

21 **(a)** Evaluate $64^{\frac{5}{6}}$.

..... [1]

(b) Solve the equation $2+\sqrt[3]{y}=7$.

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

22 $\mathrm{f}(x)=3x-4$

(a) When the domain of $\mathrm{f}(x)$ is $\{0, 5, 7\}$, find the range of $\mathrm{f}(x)$.

..... [2]

(b) $\mathrm{f}(x)\,\mathrm{f}(x)-\mathrm{f}(\mathrm{f}(x))=ax^2+bx+c$

Find the value of each of a, b, and c.

$a =$ .....

$b =$ .....

$c =$ ..... [4]

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