Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTER NUMBER						CANDIDATE NUMBER				

4629072127

MATHEMATICS (US) **0444/23**

Paper 2 (Extended) **October/November 2021**

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.

[Turn over

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. $\quad A = 2\pi rh$

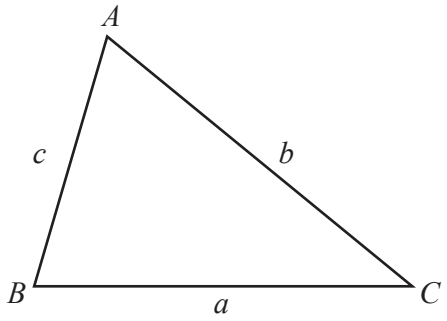
Lateral surface area, A, of cone of radius r, sloping edge l. $\quad A = \pi rl$

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. $\quad V = \frac{4}{3}\pi r^3$



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

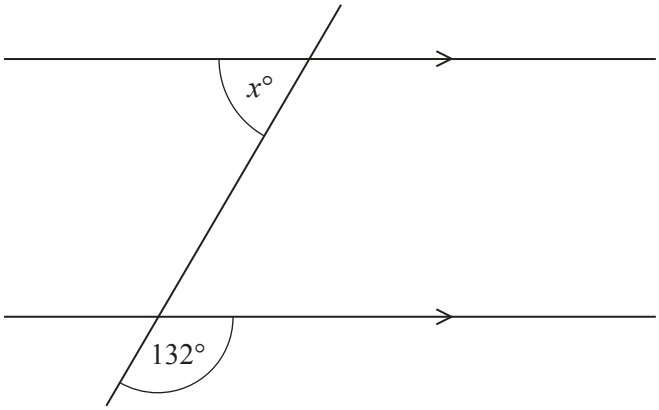
$$a^2 = b^2 + c^2 - 2bc\cos A$$

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

1 Write 25 g as a percentage of 125 g.

..... % [1]

2



NOT TO SCALE

The diagram shows two parallel lines intersecting a straight line.

Find the value of x.

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

3

11 13 15 17 19

From this list, write down the number that is both a prime number and a factor of 78.

..... [1]

4 **(a)** = ≠ > <

Put a ring around each of the symbols that make this statement correct.

0.5 ..... 5% [1]

(b) Insert one pair of parentheses to make this statement correct.

$7 - 3 - 1 + 2 = 7$ [1]

5 Nina changes 350 euros into dollars when the exchange rate is 1 euro = \$1.10 .

Work out the amount Nina receives.

\$ ..... [1]

6 Marek buys a computer for \$400.
He sells it at a loss of 15%.

Work out the selling price of this computer.

\$ ..... [2]

7 Simplify.

$$32g^{32} \div 4g^{4}$$

..... [2]

8 Beatrice walks 8 km at a speed of 4 km/h and then 9 km at a speed of 3 km/h.

Work out Beatrice's average speed for the whole journey.

..... km/h [3]

9 Simplify $\sqrt{50}$.

..... [1]

10 These are the first four terms of a sequence.

$$3 \quad -1 \quad -5 \quad -9$$

(a) Find the next term in this sequence.

..... [1]

(b) Find the nth term.

..... [2]

11 $P = M(g^2 + h^2)$

(a) Find the value of P when $M = 100$, $g = 3$, and $h = 2$.

$P =$ ..... [2]

(b) Rearrange the formula to write g in terms of P, M, and h.

$g =$ ..... [3]

12 Work out $\frac{11}{12} + \frac{3}{4}$.
Give your answer as a mixed number in its simplest form.

..... [3]

13 Work out 0.04^2.
Give your answer in scientific notation.

..... [2]

14 **(a)** Evaluate 3^4.

..... [1]

(b) $\left(4+\sqrt{5}\right)^2 = p+q\sqrt{5}$

Find the value of p and the value of q.

$p =$ .....

$q =$ ..... [2]

15 The cost of a train journey is increased by 20% to a new cost of \$84.

Work out the original cost of the train journey.

\$ ..... [2]

16 Jo and Mo share \$26.
Jo receives \$10 more than Mo.

Find the ratio Jo's money : Mo's money.
Give your answer in its simplest form.

..... : ..... [3]

17 Each interior angle of a regular polygon is 177°.

Calculate the number of sides of this polygon.

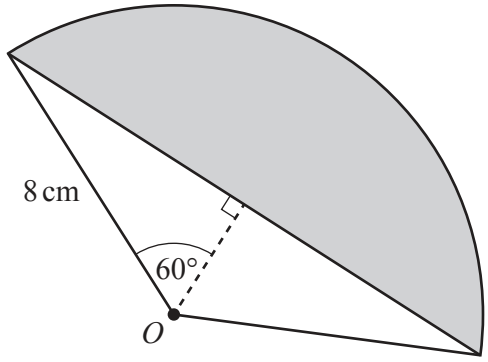
..... [2]

18 Find the equation of the straight line that passes through the points (2, −2) and (3, 10).

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

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

19



NOT TO SCALE

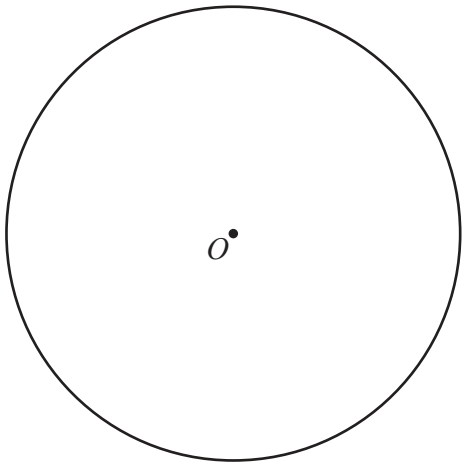
The diagram shows a sector of a circle, center O, radius 8 cm.
The perimeter of the shaded segment is $\left(a\sqrt{3}+b\pi\right)$ cm .

Find the value of a and the value of b.

$a =$ .....

$b =$ ..... [4]

20



The diagram shows a circle, center O.

Using compass and straight edge only, construct a tangent line from the point P to the circle. [3]

21 Simplify fully.

$$\left(243y^{10}\right)^{\frac{3}{5}}$$

..... [2]

22 x varies inversely as the square root of u.
When $u = 9$, $x = 2$.

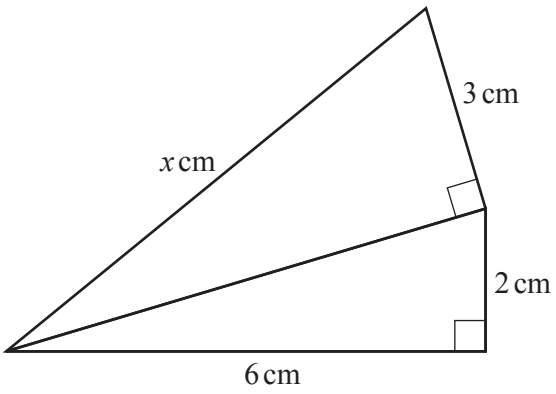
Find u when $x = 12$.

$u =$ ..... [3]

23 Find the least common multiple of $6x^2$ and $9x^3$.

..... [2]

24 (a)



NOT TO SCALE

Work out the value of x.

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

(b) A vertical pole of height 12 m stands on horizontal ground.
The angle of elevation of the top of the pole from a point P on the ground is 30°.

Work out the distance from P to the foot of the pole.
Give your answer in radical form.

..... m [3]

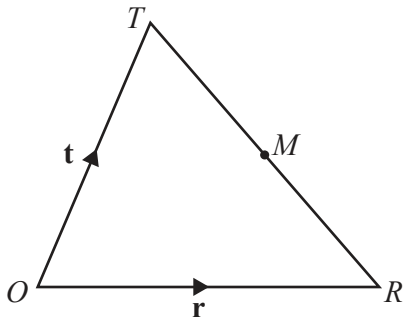
25 Simplify.

$$\frac{3x^2 - 18x}{ax - 6a + 2cx - 12c}$$

..... [4]

Questions 26 and 27 are printed on the next page.

26



NOT TO SCALE

ORT is a triangle and *M* is the midpoint of *TR*.
O is the origin, $\overrightarrow{OR} = \mathbf{r}$ and $\overrightarrow{OT} = \mathbf{t}$.

Find, in terms of **r** and **t**, in its simplest form,

(a) $\overrightarrow{TR}$,

..... [1]

(b) the position vector of *M*.

..... [2]

27 Solve $x^{-\frac{1}{3}} = 2$.

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