Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTER NUMBER | CANDIDATE NUMBER

5277689222

MATHEMATICS (US) **0444/23**

Paper 2 (Extended) **October/November 2018**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Geometrical instruments

READ THESE INSTRUCTIONS FIRST

Write your Center number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
CALCULATORS MUST NOT BE USED IN THIS PAPER.
All answers should be given in their simplest form.
If work is needed for any question it must be shown in the space provided.

The number of points is given in parentheses [ ] at the end of each question or part question.
The total of the points for this paper is 70.

This document consists of **12** printed pages.

DC (LEG/TP) 162422/2

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Formula List

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

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

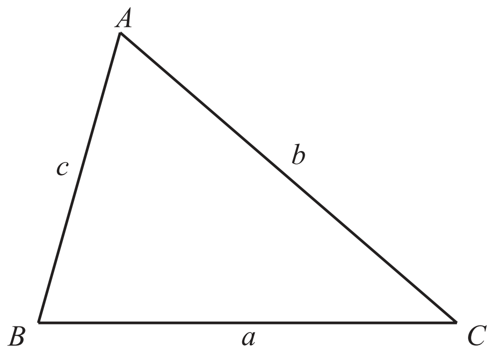
Lateral surface area, A, of cone of radius r, sloping edge l. $A = \pi rl$

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

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

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

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



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

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

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

1 Work out $\frac{7}{11}$ of 99 kg.

.... kg [1]

2 Factor.

$$y - 2y^2$$

.... [1]

3 Work out \$7 as a percentage of \$140 .

.... % [1]

4 Work out $7 - 2 \times 4 - 3$.

.... [1]

5 Work out $125^{\frac{2}{3}}$.

.... [1]

6 **(a)** Write the number five million, two hundred, seven in figures.

.... [1]

(b) Write 0.008 13 in scientific notation.

.... [1]

7 Simplify.

$$2p - q - 3q - 5p$$

.... [2]

8 Write these numbers correct to 2 significant figures.

(a) 0.076 499

.... [1]

(b) 10 100

.... [1]

9 Work out $\frac{1}{4} \div \frac{2}{3}$.

Give your answer as a fraction.

.... [2]

10 Solve.

$$3w - 7 = 32$$

$w =$ .... [2]

11 $$A = \pi rl + \pi r^2$$

Solve for l.

$l =$ .... [2]

12 Simplify $\sqrt{243} - \sqrt{27}$.

.... [2]

13 Solve the equation $\cos x = \frac{1}{2}$ for $0° \leqslant x \leqslant 360°$.

.... [2]

14 Find the amplitude and period of $5\sin(4x)$.

Amplitude = ...

Period = ... [2]

15 A car travels at 108 km/h for 20 seconds.

Calculate the distance the car travels.
Give your answer in meters.

.... m [3]

16 **(a)** Simplify $\frac{w^2}{w^3}$.

.... [1]

(b) Simplify $\left(3w^3\right)^3$.

.... [2]

17 y varies directly as the square root of x.
When $x = 9$, $y = 6$.

Find y when $x = 25$.

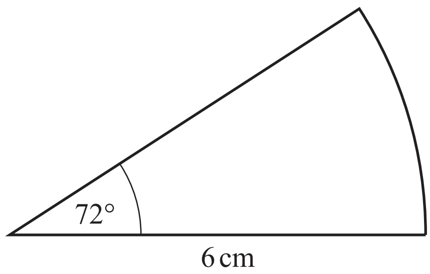
$y =$ .... [3]

18 Write as a single fraction in its simplest form.

$$\frac{1}{x} - \frac{1}{x+1}$$

.... [3]

19



NOT TO SCALE

The diagram shows a sector of a circle with radius 6 cm and sector angle 72°.
The perimeter of this sector is $(p + q\pi)$ cm.

Find the value of p and the value of q.

p = ...

q = ... [3]

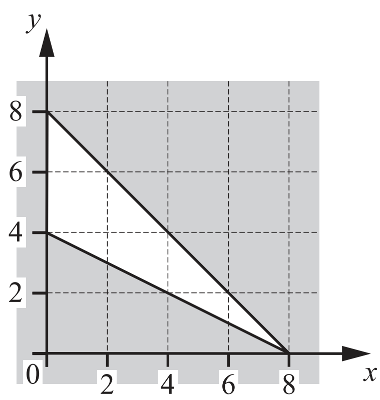
20 The solutions to the equation $x^2 - 2x - 4 = 0$ are $a + \sqrt{b}$ and $a - \sqrt{b}$, where a and b are integers.

Find the value of a and the value of b.

a = ...

b = ... [4]

21



Write down the three inequalities that define the **unshaded** region.

....

....

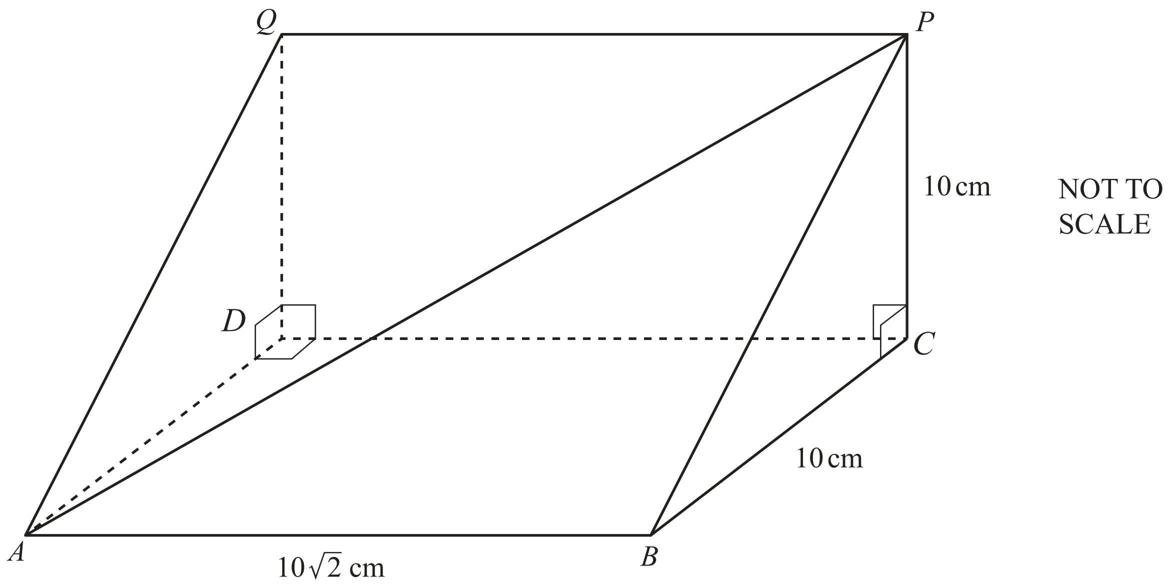
.... [4]

22 Simplify.

$$\frac{2x^2 - x - 1}{2x^2 + x}$$

.... [4]

23



The diagram shows a triangular prism.
$AB = 10\sqrt{2}$ cm, $BC = 10$ cm, $PC = 10$ cm, angle $BCP = 90°$, and angle $QDC = 90°$.

Calculate the angle between AP and the rectangular base $ABCD$.

.... [4]

24 Solve the equations.

(a) $\sqrt{w} = 3$

$w = $ .... [1]

(b) $\dfrac{2}{u-1} = 3$

$u = $ .... [2]

(c) $2x^{\frac{1}{4}} + 1 = 2$

$x = $ .... [2]

25 Factor completely.

(a) $px + py - x - y$

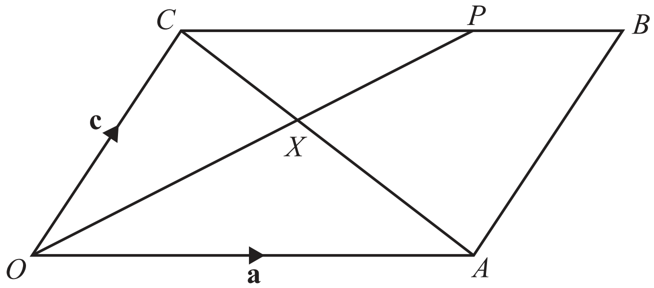
.... [2]

(b) $2t^2 - 98m^2$

.... [3]

Question 26 is printed on the next page.

26



NOT TO SCALE

In the diagram, $OABC$ is a parallelogram.
OP and CA intersect at X and $CP : PB = 2 : 1$.
$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OC} = \mathbf{c}$.

(a) Find $\overrightarrow{OP}$, in terms of $\mathbf{a}$ and $\mathbf{c}$, in its simplest form.

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

(b) $CX : XA = 2 : 3$

(i) Find $\overrightarrow{OX}$, in terms of $\mathbf{a}$ and $\mathbf{c}$, in its simplest form.

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

(ii) Find $OX : XP$.

$OX : XP =$ .... : .... [2]