



Cambridge IGCSE™

CANDIDATE
NAME

--

CENTRE
NUMBER

--	--	--	--	--

CANDIDATE
NUMBER

--	--	--	--



CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/43

Paper 4 (Extended)

October/November 2021

2 hours 15 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 graphic display calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
- 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 π , use your calculator value.

INFORMATION

- The total mark for this paper is 120.
- The number of marks for each question or part question is shown in brackets [].

This document has **20** pages. Any blank pages are indicated.

Formula List

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

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

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

Curved 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 cylinder of radius r , height h . $V = \pi r^2 h$

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

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



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

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

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

Answer **all** the questions.

- 1 The table shows the marks scored by 180 students in an examination.

Mark	0	1	2	3	4	5	6	7	8	9	10
Number of students	3	7	16	11	7	32	20	26	28	19	11

- (a) (i) Write down the mode.

..... [1]

- (ii) Write down the range.

..... [1]

- (iii) Find the median.

..... [1]

- (iv) Find the interquartile range.

..... [2]

- (v) Calculate the mean.

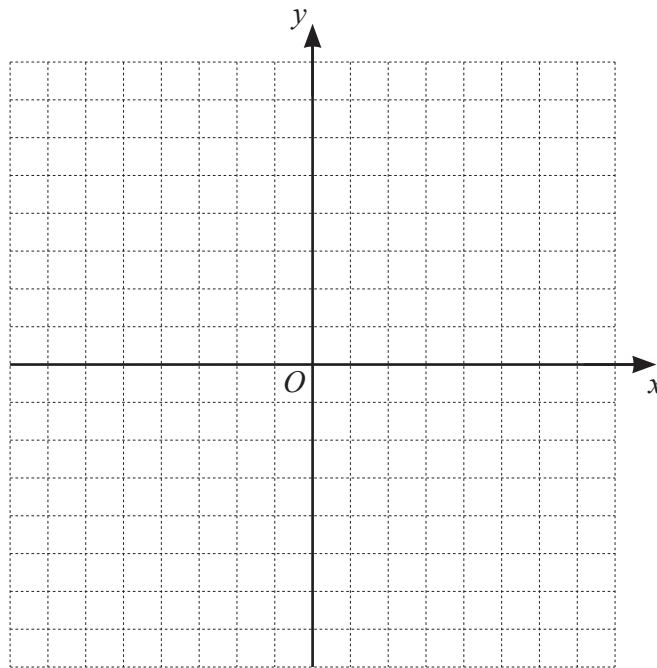
..... [2]

- (b) A different group of 140 students take the same examination.
The marks of the two groups are combined and the mean mark of the 320 students is 6.5 .

Find the mean mark of the 140 students.

..... [2]

- 2 You may use this grid to help you answer this question.



Transformation P is a rotation of 180° about the origin.

Transformation Q is a reflection in the line $y = x$.

- (a) Find the coordinates of the image of the point $(5, 2)$ under transformation P.

(..... ,) [1]

- (b) Find the coordinates of the image of the point $(5, 2)$ under transformation Q.

(..... ,) [1]

- (c) Find the coordinates of the image of the point (x, y) under transformation P followed by transformation Q.

(..... ,) [2]

- (d) Describe fully the **single** transformation that is equivalent to transformation Q followed by transformation P.

.....

..... [2]

- 3** Anna flies by plane from Manchester (UK) to Goa (India).
The plane flies a distance of 7650 km.

(a) The flight takes 8.5 hours.

(i) Calculate the average speed of the plane.

..... km/h [1]

(ii) The plane leaves Manchester at 2045.
The local time in Goa is 5 hours 30 minutes ahead of the local time in Manchester.

Find the local time in Goa when the plane lands.

..... [2]

(b) The exchange rate is 1 pound (£) = 90 Indian rupees (INR).

(i) The cost of the flight is £299.

Calculate the cost of the flight in Indian rupees.

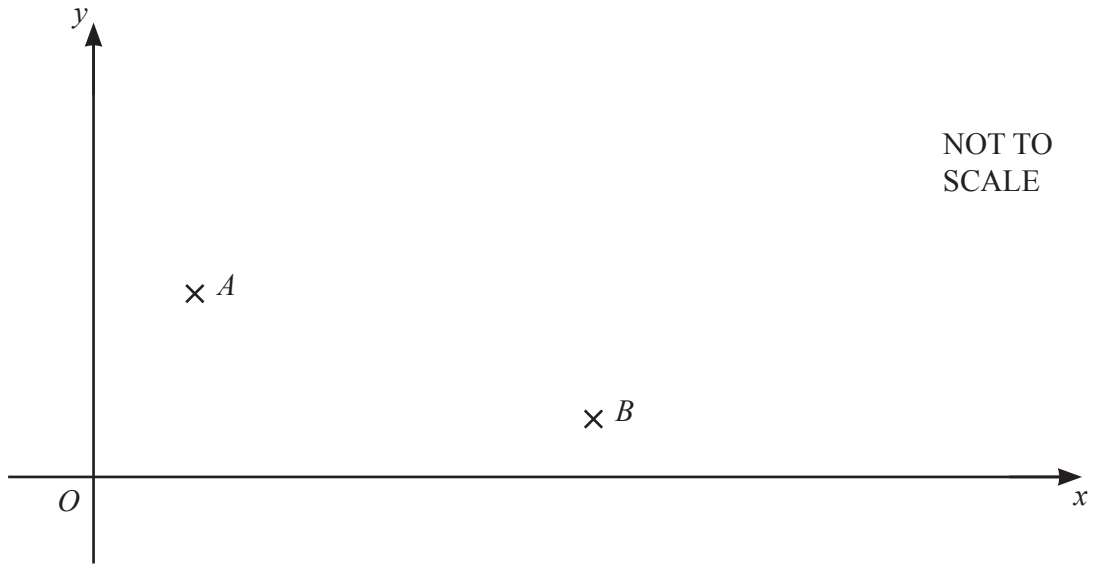
INR [1]

(ii) Anna returns to Manchester with 4014 Indian rupees.
She changes this money into pounds.

Calculate this amount in pounds.

£ [1]

4



The points $A (2, 5)$ and $B (10, 1)$ are shown on the diagram.

(a) Find the gradient of the line AB .

..... [2]

(b) Find the equation of the line AB .
Give your answer in the form $y = mx + c$.

$y =$ [2]

- (c) The point C has coordinates $(6, k)$ where $k > 0$.
The line CA is perpendicular to the line AB and $AC = AB$.

Find k .

$$k = \dots\dots\dots [3]$$

- (d) The point D is such that $ABDC$ is a square.

Find the coordinates of D .

$$(\dots\dots\dots, \dots\dots\dots) [2]$$

- (e) Find the area of triangle BCD .

$$\dots\dots\dots [3]$$

- 5 (a) Alana and Beau share \$200 in the ratio $x : y$.

An expression for the amount of money Alana receives is $\frac{200x}{x+y}$.

- (i) Write down an expression for the amount of money Beau receives.

..... [1]

- (ii) Alana and Beau are each given an extra \$50.
The ratio of the total amount of money that each person now has is 3 : 1.

Find the value of $\frac{x}{y}$.

$\frac{x}{y} =$ [5]

- (b) (i) On 1 January **each year** Bruno invests \$1000 in Bank A.
Bank A pays simple interest at a rate of 4% per year.

Show that the total value of Bruno's investment in Bank A at the end of 4 years is \$4400.

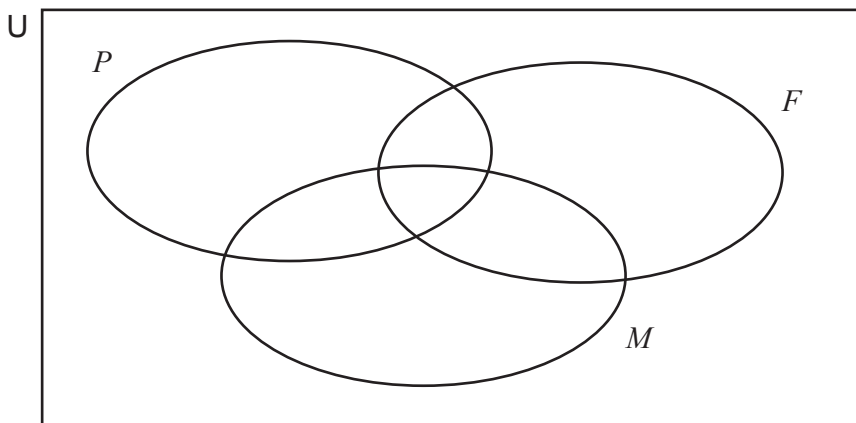
[3]

- (ii) On 1 January **each year** Bruno also invests \$1000 in Bank B.
Bank B pays compound interest at a rate of 3.5% per year.

Find the total value of Bruno's investment in Bank B at the end of 4 years.

\$ [3]

6 The Venn diagram shows the sets P , F and M .



$U = \{\text{integer values of } x \mid 2 \leq x \leq 12\}$

$P = \{\text{prime numbers}\}$

$F = \{\text{factors of } 12\}$

$M = \{\text{multiples of } 3\}$

(a) List the elements of set P and the elements of set F .

$P = \dots\dots\dots$

$F = \dots\dots\dots$ [2]

(b) Write each element of U in the correct region of the Venn diagram.

[2]

(c) List the elements of

(i) $F \cup M$,

$\dots\dots\dots$ [1]

(ii) $P' \cap M$,

$\dots\dots\dots$ [1]

(iii) $(P \cup F \cup M)'$.

$\dots\dots\dots$ [1]

(d) Find $n((P \cap F)' \cap M)$.

$\dots\dots\dots$ [1]

- 7 y varies inversely as the square of x .
 $y = 5$ when $x = 3$.

(a) (i) Find y in terms of x .

$$y = \dots\dots\dots [2]$$

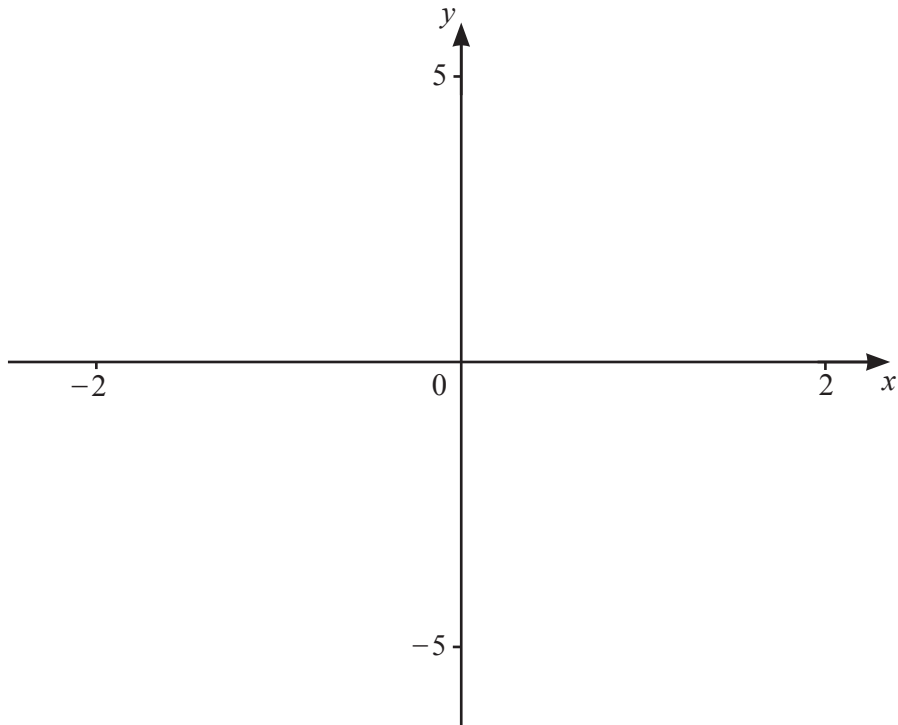
(ii) Find the value of x when $y = 20$.

$$x = \dots\dots\dots [2]$$

- (b) z varies directly as the square root of y .
 $z = 12$ when $y = 9$.

Use your answer to **part (a)(i)** to find z in terms of x .

$$z = \dots\dots\dots [3]$$



$f(x) = 3x - x^3$ for $-2 \leq x \leq 2$

(a) On the diagram, sketch the graph of $y = f(x)$. [2]

(b) Find the coordinates of the local maximum.
 (.....,) [1]

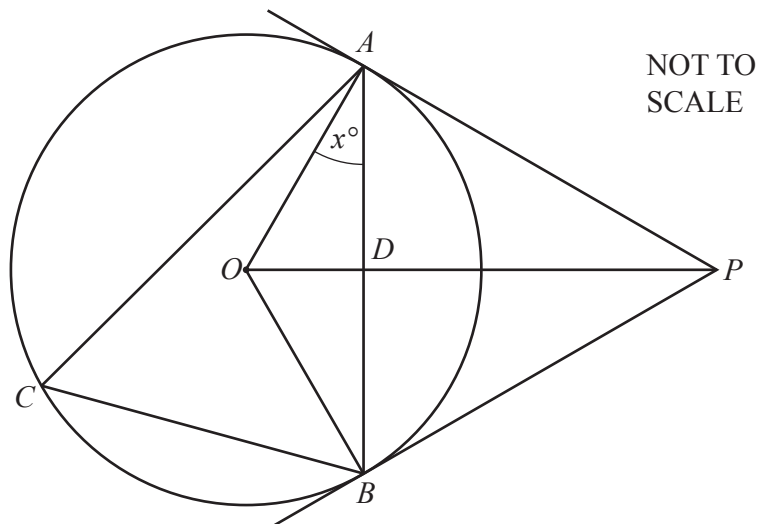
(c) Write down the x -coordinates of the points where the curve meets the x -axis.
 $x = \dots\dots\dots$, $x = \dots\dots\dots$, $x = \dots\dots\dots$ [2]

(d) (i) Describe fully the **single** transformation that maps $y = f(x)$ onto $y = f(x+1)$.

 [2]

(ii) Solve $f(x) = f(x+1)$ for $-2 \leq x \leq 2$.
 [2]

(iii) Solve $f(x) \geq f(x+1)$ for $-2 \leq x \leq 2$.
 [2]



A, B and C lie on a circle, centre O .
 AP and BP are tangents to the circle.
 AB intersects OP at D and angle $OAB = x^\circ$.

(a) Write down the size of angle OBP .

Angle $OBP = \dots\dots\dots$ [1]

(b) Find, in terms of x ,

(i) angle AOD ,

Angle $AOD = \dots\dots\dots$ [1]

(ii) angle ACB ,

Angle $ACB = \dots\dots\dots$ [1]

(iii) angle APB .

Angle $APB = \dots\dots\dots$ [1]

(c) Write down the mathematical name of quadrilateral $AOBP$.

$\dots\dots\dots$ [1]

(d) Write down

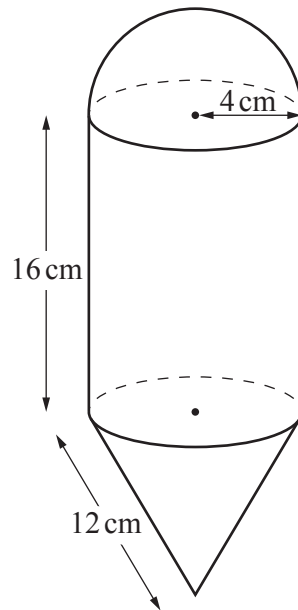
(i) two triangles that are congruent,

$\dots\dots\dots$ [1]

(ii) two triangles that are similar but not congruent.

$\dots\dots\dots$ [1]

10

NOT TO
SCALE

The diagram shows a solid made from a cylinder, a hemisphere and a cone, each with radius 4 cm.
 The cylinder has length 16 cm.
 The slant height of the cone is 12 cm.

(a) Find the volume of the solid.

..... cm³ [5]

(b) Show that the total surface area of the solid is $208\pi \text{ cm}^2$.

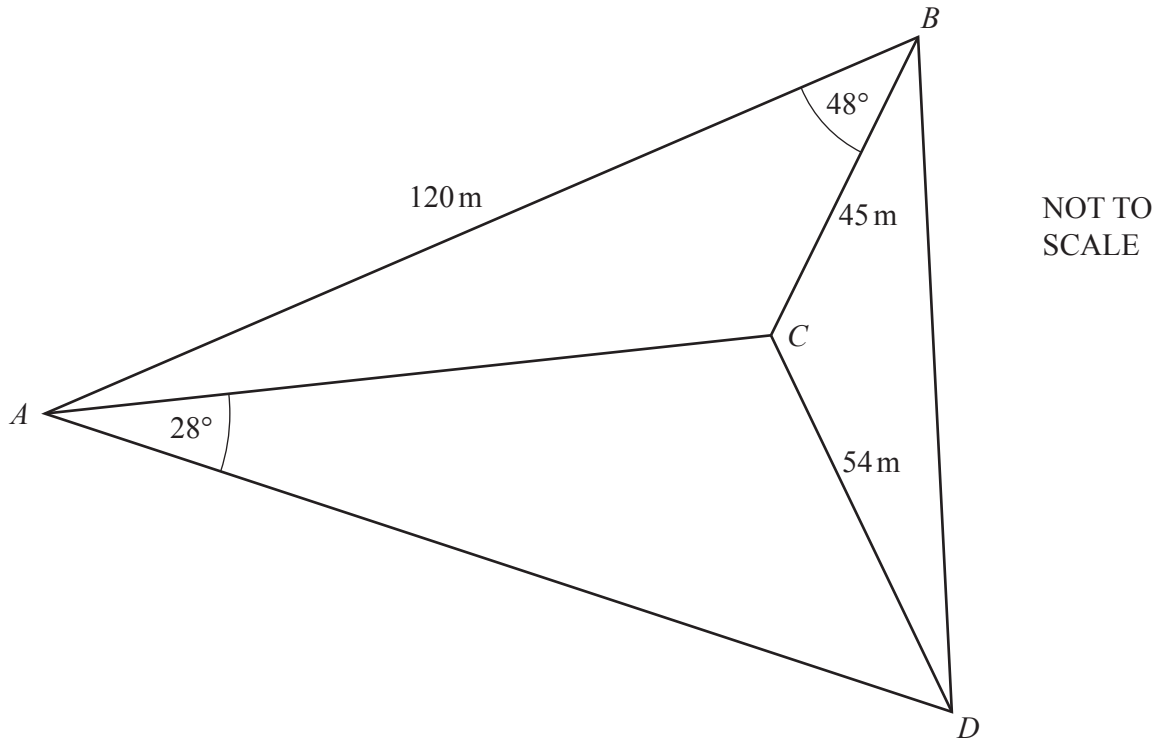
[4]

(c) A mathematically similar solid has a total surface area of $468\pi \text{ cm}^2$.

Find the radius of the cylinder in this solid.

..... cm [3]

11



Angles ACB and ACD are obtuse.

(a) Show that $AC = 95.9\text{ m}$ correct to the nearest 0.1 metre.

[3]

(b) Find angle ACD .

Angle $ACD = \dots\dots\dots$ [4]

(c) The area of triangle ABD is 5137 m^2 .

Calculate the area of triangle BCD .

$\dots\dots\dots \text{ m}^2$ [4]

12 (a) Solve.

(i) $9 = 5 - \frac{2}{x}$

$x = \dots\dots\dots$ [3]

(ii) $\frac{6}{x-4} > 3$

$\dots\dots\dots$ [3]

(b) (i) Solve the equation, giving your answers correct to 3 significant figures.

$$2x^2 - 5x + 1 = 0$$

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

(ii) Use your answers to **part (b)(i)** to solve

$$2(\tan y)^2 - 5(\tan y) + 1 = 0 \quad \text{for } 0^\circ \leq y \leq 180^\circ.$$

$y = \dots\dots\dots$ or $y = \dots\dots\dots$ [2]

- 13** Two bags each contain only blue balls and red balls.
Bag 1 contains 7 blue balls and 3 red balls.
Bag 2 contains 3 blue balls and 7 red balls.

Maria chooses a ball at random from Bag 1 and puts it into Bag 2.

- (a)** Find the probability that the ball chosen is blue.

..... [1]

- (b)** Maria now chooses a ball at random from Bag 2 and puts it into Bag 1.

- (i)** Find the probability that both balls chosen are red.

..... [2]

- (ii)** Find the probability that one of the balls chosen is red and the other is blue.

..... [3]

- (iii)** Find the probability that there are now exactly 7 blue balls in Bag 1.

..... [3]

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.