Cambridge Assessment International Education

Cambridge IGCSE™

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7326248900

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/33**

Paper 3 (Core) **October/November 2020**

1 hour 45 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 96.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages. Blank pages are indicated.

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Formula List

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle, radius r.	$A = \pi r^2$
Circumference, C, of circle, radius r.	$C = 2\pi r$
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 prism, cross-sectional area A, length l.	$V = Al$
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.	$V = \frac{4}{3}\pi r^3$

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Answer **all** the questions.

1 Ben was born on 25th March, 1936.

(a) Write the number 1936 in words.

..... [1]

(b) Work out how old Ben is on the 25th March, 2020.

..... [1]

(c) Work out the year of Ben's 99th birthday.

..... [1]

(d) Find $\sqrt{1936}$.

..... [1]

(e) Write down 1936

(i) correct to the nearest 10,

..... [1]

(ii) correct to 2 significant figures,

..... [1]

(iii) in standard form.

..... [1]

(f) Write down a multiple of 1936.

..... [1]

2 The number of seconds that it took each of 15 students to run 200 metres is shown below.

32	35	29	41	41
39	51	57	45	62
42	53	38	43	60

(a) Work out the mean.

..... s [1]

(b) Complete the stem-and-leaf diagram to show this information.

Key ..... | ..... represents ..... [3]

(c) Find

(i) the range,

..... s [1]

(ii) the mode,

..... s [1]

(iii) the median,

..... s [1]

(iv) the interquartile range.

..... s [2]

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3 A supermarket sells saving stamps for \$0.10 each.
These stamps are stuck onto pages in a special stamp book.

(a) Each page of the stamp book has 35 stamps.

Work out how much is paid for the stamps to fill one page.

\$ ..... [1]

(b) It costs \$49 to fill the book with stamps.

Find the number of pages in the book.

..... [2]

(c) Each full book of stamps can be used in the supermarket to pay for food costing \$52.

(i) Work out how much is saved by paying for food with a full book of stamps.

\$ ..... [1]

(ii) Work out the answer to **part (i)** as a percentage of \$49.

..... % [2]

(d) Fred buys fruit and coffee for \$49.
The ratio cost of fruit : cost of coffee = 3 : 4.

Find the cost of the coffee.

\$ ..... [2]

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4 **(a)** Petra has a birthday party.
The party starts at 19 30 and ends at 23 45.

(i) Find how long the party lasts.

..... hours ..... minutes [1]

(ii) The cost of hiring a band for the party is a total of $150.
The cost of hiring a hall is $50 per hour.
Petra hires the hall for 6 hours.

Find the **total** cost of hiring the hall and the band.

$ ..... [2]

(b) Petra received $650 for her birthday.

(i) She invests **half** of this in a bank at a rate of 3.1% per year compound interest.

Work out the value of her investment at the end of 3 years.

$ ..... [3]

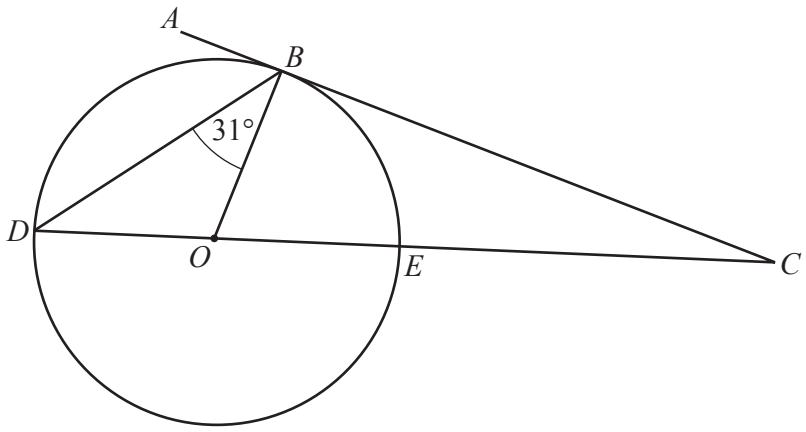
(ii) Petra invests the other **half** of her birthday money in a different bank at a rate of 3.5% per year simple interest.

Work out the value of this investment at the end of 3 years.

$ ..... [3]

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5



NOT TO SCALE

The diagram shows a circle, centre O.
The straight line ABC touches the circle at B.
$DOEC$ is a straight line, D and E lie on the circumference and angle $OBD = 31°$.

(a) Using the letters in the diagram, write down

(i) the diameter, ... [1]

(ii) a radius, ... [1]

(iii) a chord, ... [1]

(iv) the tangent. ..... [1]

(b) Find

(i) angle OBC,

Angle $OBC =$ ..... [1]

(ii) angle ABD,

Angle $ABD =$ ..... [1]

(iii) angle BOD,

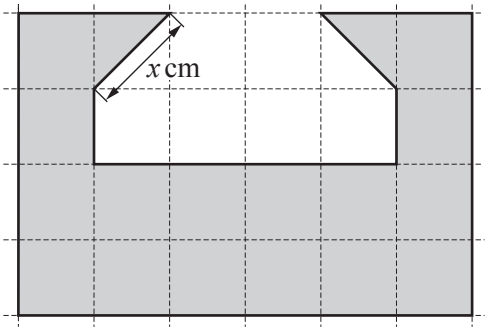
Angle $BOD =$ ..... [2]

(iv) angle BCO.

Angle $BCO =$ ..... [2]

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6 **(a)** The diagram shows a shape drawn on a 1cm^2 grid.



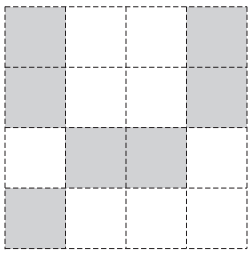
(i) Use Pythagoras' theorem to calculate the value of x.

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

(ii) Work out the perimeter of the shape.

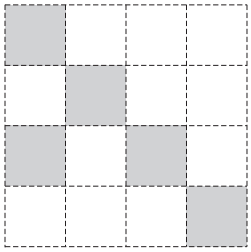
..... cm [1]

(b)



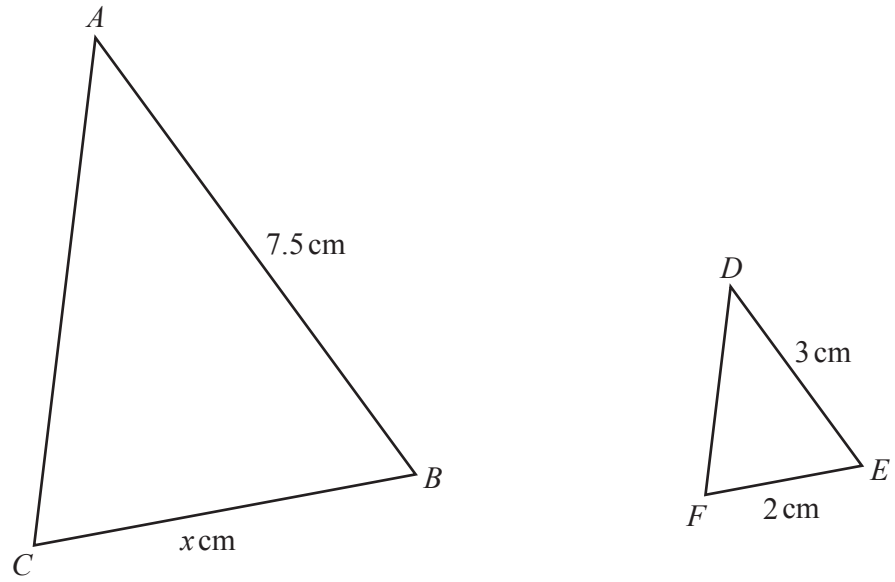
Shade one small square so that the diagram has line symmetry. [1]

(c)



Shade one small square so that the diagram has rotational symmetry of order 2. [1]

(d)



NOT TO SCALE

ABC and *DEF* are similar triangles.

Find the value of x.

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

7 One day, Mr Amir made a note of the number of employees who were on time for work and the number who were late for work.
He asked each employee if they ate breakfast or not.

The information is shown in the table.

	Number who ate breakfast	Number who did not eat breakfast	Total
Number who were on time for work	12	a	17
Number who were late for work	2	c	b
Total	14	6	20

(a) Work out the value of each of a, b and c.

$a =$ .....

$b =$ .....

$c =$ ..... [3]

(b) An employee is chosen at random.

Find the probability that this employee

(i) was on time,

..... [1]

(ii) did not eat breakfast,

..... [1]

(iii) ate breakfast and was late for work.

..... [1]

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8 $\mathsf{U} = \{F, R, A, C, T, I, O, N\}$

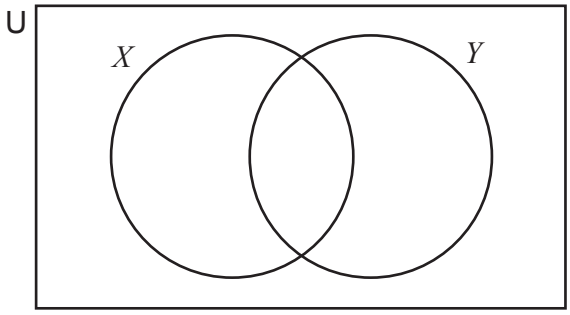
$X = \{R, A, T, I, O\}$

$Y = \{F, A, C, T\}$

(a) Write down the elements in $X \cap Y$.

..... [1]

(b) Complete the Venn diagram.

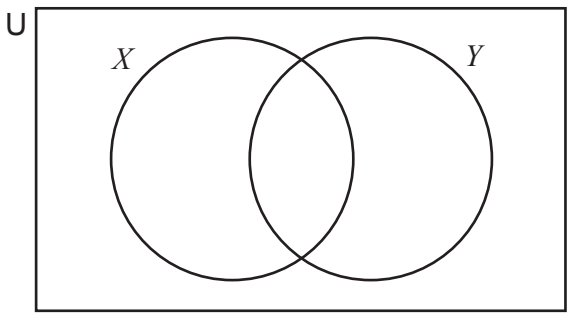


[2]

(c) Find $\mathrm{n}(X \cup Y)'$.

..... [1]

(d) On the Venn diagram below, shade the region $X' \cup Y$.



[1]

9 **(a)** $f(x) = 2x^2 - 1$

(i) Find f(4).

..... [1]

(ii) Find x when $f(x) = 17$.

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

(b) Solve.

(i) $7x - 14 = 14$

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

(ii) $5x - 3 = 3x + 7$

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

(c) Expand.

$3x(x - 4)$

..... [2]

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(d) Simplify fully.

$$\frac{18r^8}{6r^2}$$

..... [2]

(e) **(i)** $3^6 \times 3^m = 3^{18}$

Find the value of m.

$m =$ ..... [1]

(ii) $\frac{8^n}{8^3} = 8^2$

Find the value of n.

$n =$ ..... [1]

(f) Solve the simultaneous equations.
You must show all your working.

$$2x + 4y = 22$$

$$2x - 3y = 15$$

$x =$ .....

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

10



(a) **(i)** On the diagram, sketch the graph of $y = 8 \times (1.4)^{-x} + 2$ for $-1 \leqslant x \leqslant 12$. [2]

(ii) Find the coordinates of the point where the graph crosses the y-axis.

(..... , ...) [1]

(iii) Write down the equation of the horizontal asymptote.

..... [1]

(b) On the same diagram, sketch the graph of $y = x + 3$. [2]

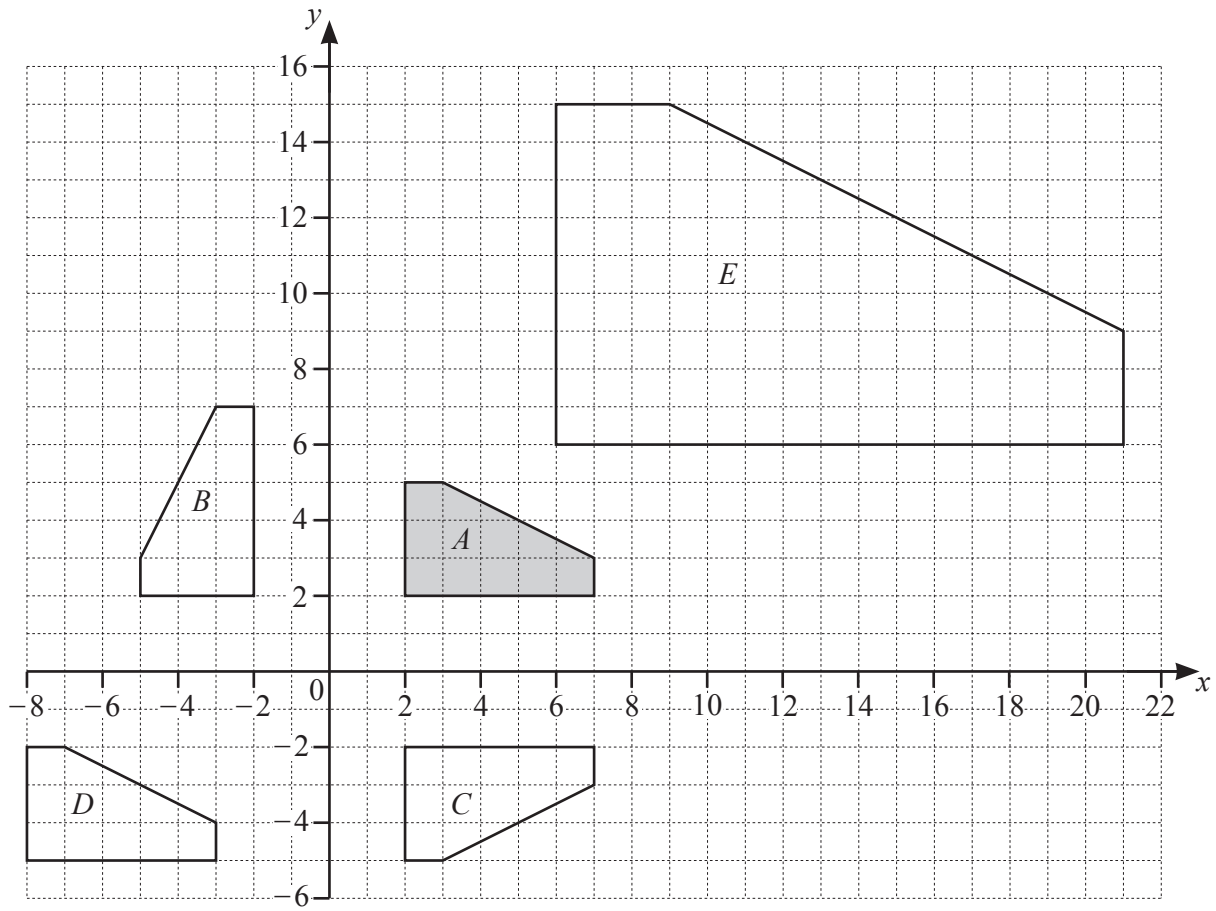
(c) Find the coordinates of the point of intersection of the graphs of

$$y = 8 \times (1.4)^{-x} + 2 \text{ and } y = x + 3.$$

(..... , ...) [2]

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11



Describe fully the **single** transformation that maps

(a) shape *A* onto shape *B*,

.....

..... [3]

(b) shape *A* onto shape *C*,

.....

..... [2]

(c) shape *A* onto shape *D*,

.....

..... [2]

(d) shape *A* onto shape *E*.

.....

..... [3]

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