Cambridge International Examinations
Cambridge International General Certificate of Secondary Education
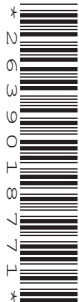
CANDIDATE NAME

CENTER NUMBER

CANDIDATE NUMBER

MATHEMATICS (US) 0444/33

Paper 3 (Core) **October/November 2018**

2 hours

Candidates answer on the Question Paper.

Additional Materials: Geometrical instruments
Electronic calculator

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.
If work is needed for any question it must be shown in the space provided.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant digits.
Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

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 104.

Write your calculator model in the box below.

This document consists of **16** printed pages.

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Formula List

Area, A, of triangle, base b, height h. $\qquad A = \frac{1}{2}bh$

Area, A, of circle, radius r. $\qquad A = \pi r^2$

Circumference, C, of circle, radius r. $\qquad C = 2\pi r$

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

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

Volume, V, of prism, cross-sectional area A, length l. $\qquad V = Al$

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

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

1 **(a)** Write the number 602 047 in words.

.... [1]

(b) Find

(i) a multiple of 14,

.... [1]

(ii) 56^2,

.... [1]

(iii) $\sqrt[3]{103\,823}$,

.... [1]

(iv) 12^0.

.... [1]

(c) Find the least common multiple (LCM) of 12 and 78.

.... [2]

(d) Find the greatest common factor (GCF) of 12 and 78.

.... [2]

(e) Write 432 as a product of its prime factors.

.... [2]

2   **(a)** Some people each recorded their favorite vacation destination.
The results are shown in the pie chart.
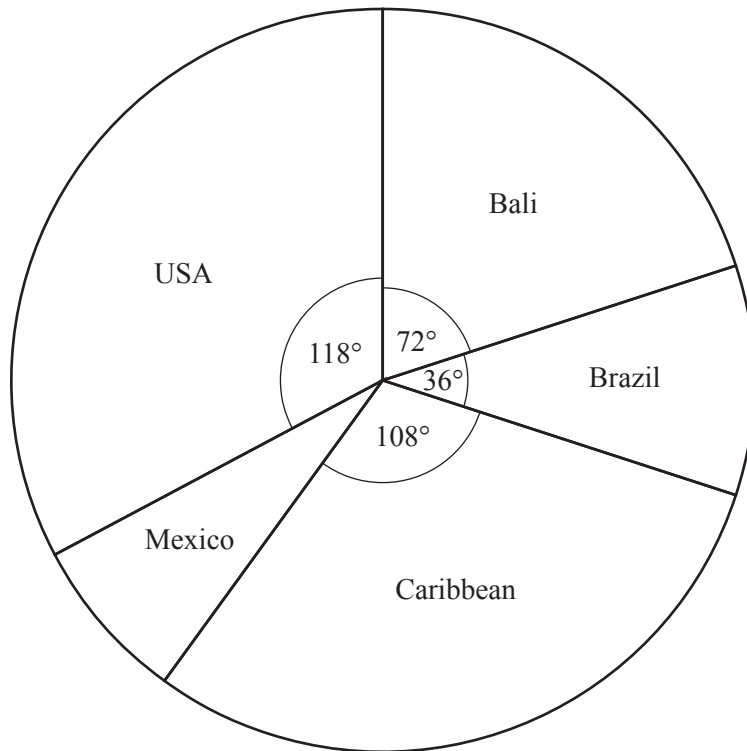
(i)   Complete the statements about the pie chart.

The sector angle for Mexico is .... degrees.

The most popular destination is ....

$\frac{1}{5}$ of the people chose ....

Three times as many people chose .... as ....   [4]

(ii) 180 people chose Bali.

Find how many people were asked altogether.

.... [2]

(b) Mr and Mrs Baker go on vacation with their three children.
They fly from Miami to Mexico City.

(i) The cost of each adult ticket is $450.
The cost of each child ticket is 70% of the cost of an adult ticket.

Calculate the total cost of the five tickets.

$ .... [3]

(ii) The plane leaves Miami at 09 29.
It arrives in Mexico City 2 hours, 11 minutes later.
The local time in Miami is 1 hour ahead of the local time in Mexico City.

Work out the time in Mexico City when the plane arrives.

.... [2]

(iii) The family travels 38 kilometers by taxi.
The journey costs $3.50 plus an extra $2.15 for each kilometer traveled.
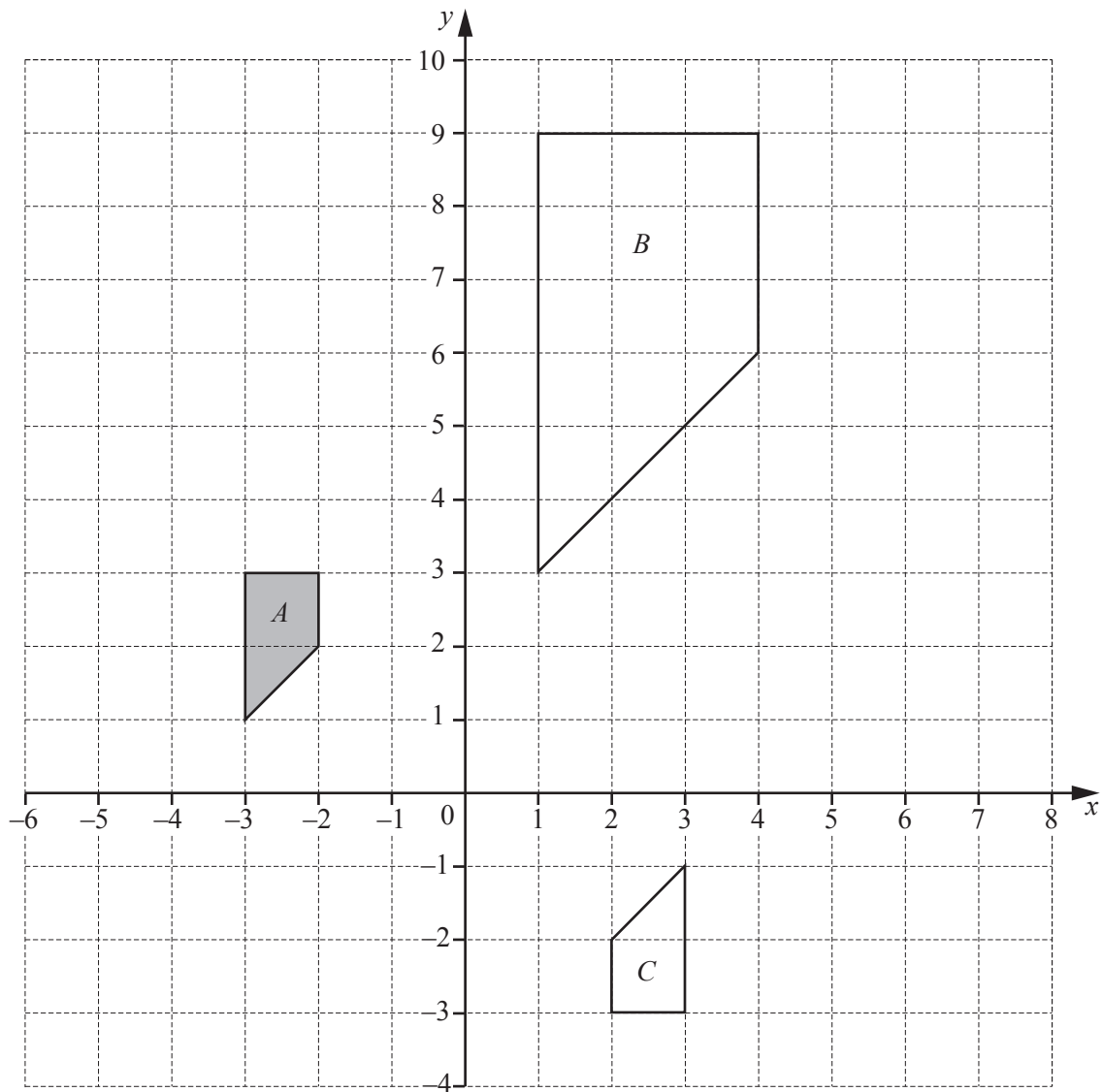
Find the cost of the journey.

$ .... [2]

(iv) At the end of the vacation Mr Baker changes 1335 pesos into dollars.
The exchange rate is $1 = 17.8 pesos.

Find how many dollars Mr Baker receives.

$ .... [2]

3 Shapes *A, B* and *C* are shown on the 1 cm² grid.

(a) Shape *A* is a special type of quadrilateral.

Write down the mathematical name for shape *A*.

.... [1]

(b) Describe fully the **single** transformation that maps

    (i) shape A onto shape B,

    ....

    .... [3]

    (ii) shape A onto shape C.

    ....

    .... [3]
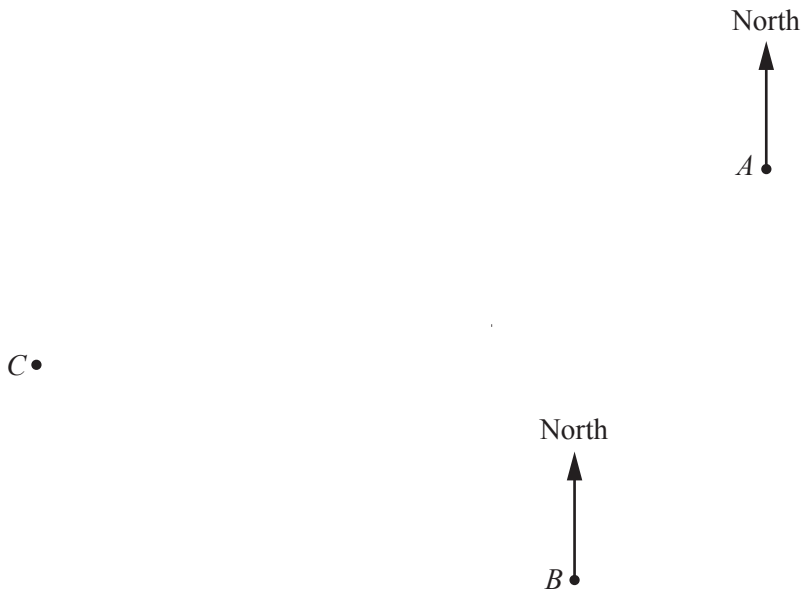
(c) On the grid,

    (i) translate shape A by the vector $\begin{pmatrix} 8 \\ -4 \end{pmatrix}$,   [2]

    (ii) reflect shape A in the line $x = 2$.   [2]

(d) Find the area of **shape B**.

    .... cm^2 [1]

**4** The scale drawing shows the positions of three towns *A*, *B*, and *C* on a map.
The scale is 1 centimeter represents 10 kilometers.

North

↑

A •

C •

North

↑

B •

Scale : 1 cm to 10 km

(a) Work out the actual distance between town *A* and town *B*.

.... km [2]

(b) (i) Measure the bearing of town *C* from town *A*.

.... [1]

(ii) Show how to use your answer to **part (b)(i)** to find the bearing of town *A* from town *C*.

.... [1]

(c) Town *D* is 96 km from town *C* on a bearing of 100°.

(i) Mark the position of town *D* on the map. [2]

(ii) Jez drives from town *C* to town *D* in $1\frac{1}{2}$ hours.

Work out his average speed.

.... km/h [2]

(iii) Change 96 km into miles.
Assume that 8 km equals 5 miles.

.... miles [2]

5 **(a)** The diagram shows the first three patterns in a sequence.
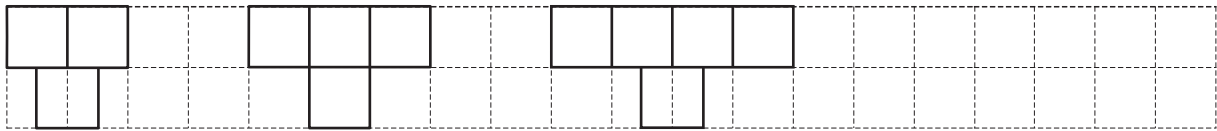
Pattern 1   Pattern 2   Pattern 3   Pattern 4

On the grid, draw pattern 4. [1]

(b) These are the first four terms of another sequence.

$$41 \qquad 35 \qquad 29 \qquad 23$$

(i) Write down the next two terms.

.... , ... [2]

(ii) Write down the rule for continuing this sequence.

.... [1]

(c) These are the first four terms of a different sequence.

$$11 \qquad 15 \qquad 19 \qquad 23$$

(i) Write down an expression for the nth term.

.... [2]

(ii) Is 129 a term in this sequence?
Show how you decide.

.... because ....[2]

6 **(a)** Stef buys 3.5 kilograms of bananas.

    (i) Bananas cost $1.24 per kilogram.
        Stef pays with a $5 bill.

        Work out how much change she receives.

$ .... [2]

    (ii) Write 3.5 kilograms in grams.

.... g [1]

(b) Oranges cost 85 cents each.
    Leo has a $10 bill.

    Work out the maximum number of oranges he can buy.

.... [2]

(c) 87% of the mass of a pineapple is water.
    A pineapple has a mass of 700 g.

    Work out the mass of water in this pineapple.

.... g [2]

(d) The number of melons sold in a shop each day for 7 days is shown below.

           18   5   23   40   28   19   17

    Work out the mean number of melons sold.

.... [2]

(e) Rio and Chi go to a fruit shop.
Rio buys 4 apples and 2 plums for $1.96 .
Chi buys 7 apples and 3 plums for $3.24 .

Write down a pair of simultaneous linear equations and solve them to find the cost of 1 apple and the cost of 1 plum.
You must show all your working.

Apple $ ....

Plum $ .... [6]

7 **(a)** A bag contains 20 bulbs.
8 are yellow, 5 are red, 4 are white, and 3 are pink.
Sam takes one bulb at random.

Find the probability that the bulb he takes is

(i) white,

.... [1]

(ii) blue,

.... [1]

(iii) not pink.

.... [1]

(b) Sam has a rectangular pond, *ABCD*.
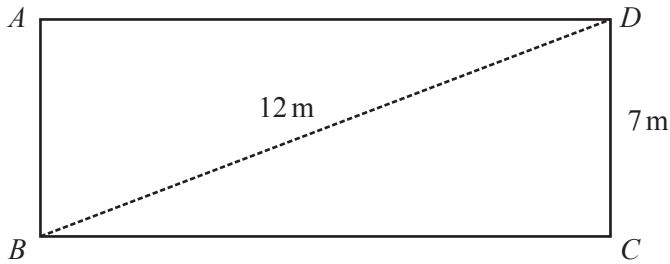
NOT TO
SCALE

(i) Calculate *BC*.

BC = ... m [3]

(ii) He puts a fence around the edge of the pond.

Calculate the length of the fence.

.... m [1]

(c) This scale drawing shows Sam's garden, *PQRS*, with a gate marked at *G*.
The scale is 1 centimeter represents 4 meters.
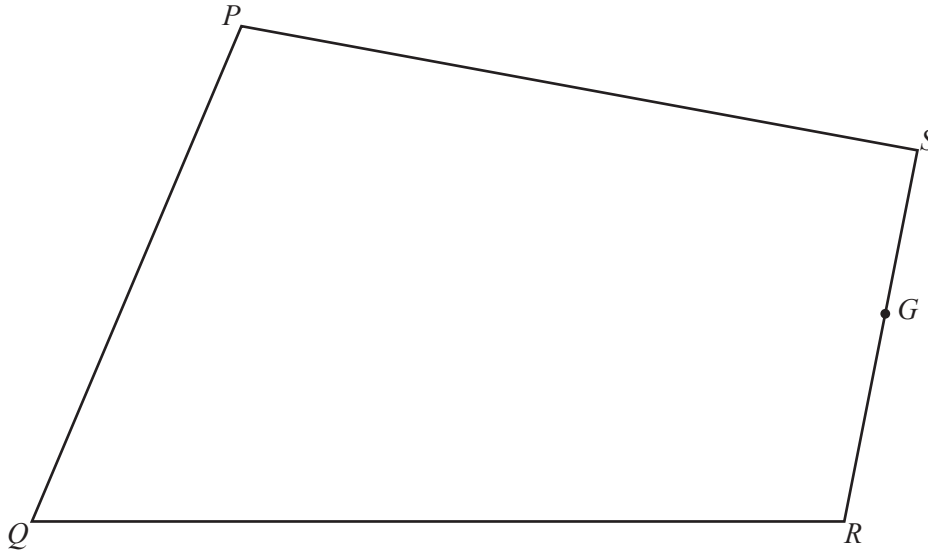
Scale : 1 cm to 4 m

There is a water sprinkler at the point where the perpendicular bisector of *PS* and the bisector of angle *PQR* meet.

(i) **Using a straight edge and compass only and showing all your construction arcs**, construct the position of the water sprinkler. [4]

(ii) Find the actual distance of the water sprinkler from the gate.

.... m [1]

8

NOT TO SCALE
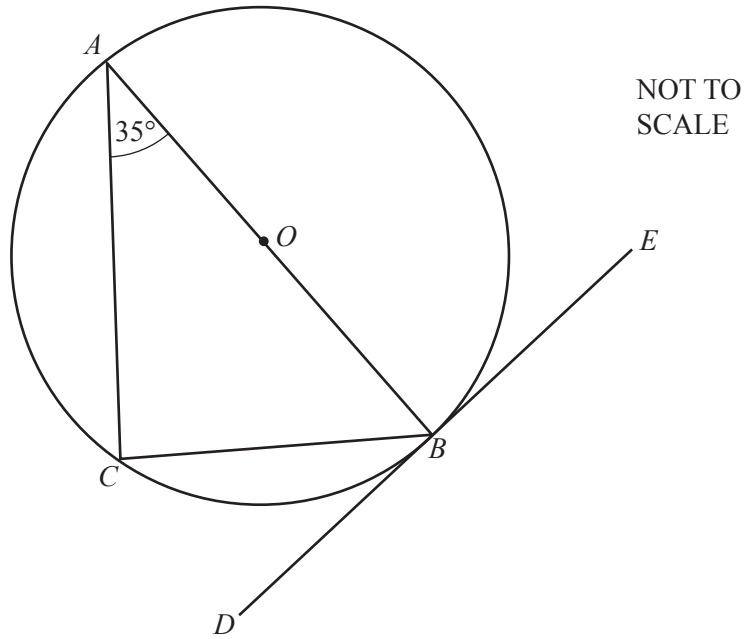
A, *B*, and *C* are points on the circumference of the circle, center *O*.
The straight line *DE* touches the circle at *B*.

(a) Write down the mathematical name for the line *DE*.

.... [1]

(b) On the circle, draw a radius. [1]

(c) Complete the following statements.

   (i) Angle *ABD* = ... because ....

      .... [2]

   (ii) Angle *ACB* = ... because ....

      .... [2]

(d) $AB = 9$ cm.

    (i) Calculate the area of the circle.
        Give the units of your answer.

                            .... [3]

    (ii) Calculate BC.

                                $BC = $ .... cm [2]

Question 9 is printed on the next page.

9 **(a)** Complete the table of values for $y = \dfrac{6}{x}$.

x	−6	−5	−4	−3	−2	−1		1	2	3	4	5	6
y	−1			−2	−3	−6		6	3	2		1.2	1

[2]

(b) On the grid, draw the graph of $y = \dfrac{6}{x}$ for $-6 \leqslant x \leqslant -1$ and $1 \leqslant x \leqslant 6$.
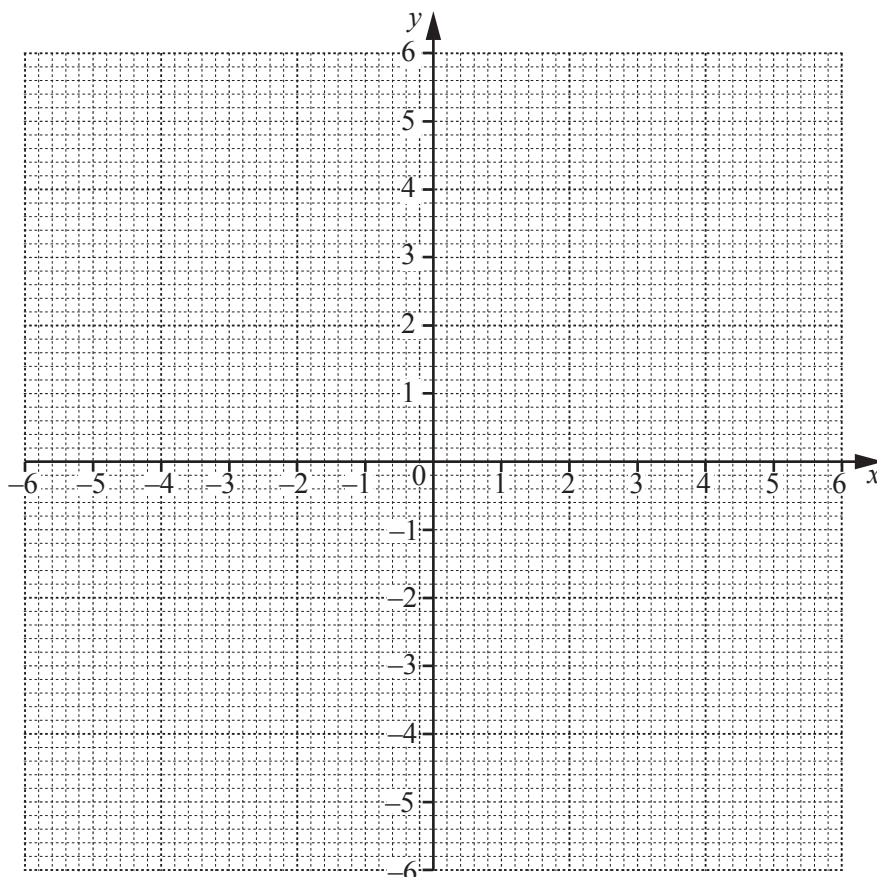
[4]

(c) Use your graph to solve the equation $\dfrac{6}{x} = 4.5$.

$x =$ .... [1]

(d) **(i)** On the grid, draw the line $y = x$. [1]

(ii) Write down the co-ordinates of the points of intersection of $y = \dfrac{6}{x}$ and $y = x$.

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