Cambridge IGCSE

MATHEMATICS 0626/04

Paper 4 (Extended)

October/November 2019

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Geometrical instruments
Tracing paper (optional)

READ THESE INSTRUCTIONS FIRST

Write your centre 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 MAY NOT BE USED IN THIS PAPER.
If working is required for any question it must be shown below that question.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 84.

Cambridge Assessment
International Education

[Turn over

1 Find the reciprocal of $2\frac{3}{4}$.

.... [2]

2 The bearing of a lighthouse from a boat is 153°.

Work out the bearing of the boat from the lighthouse.

.... [2]

3 Marcia goes to the supermarket.
She buys
- 1.6 kg of apples at $2k$ pence per kilogram
- 0.8 kg of bananas at $(k+5)$ pence per kilogram.

(a) Write down an expression, in terms of k, for the cost in pence of Marcia's shopping.
Give your answer in its simplest form.

....pence [2]

(b) The total cost of Marcia's shopping is £2.44.

Find the value of k.

$k =$ .... [2]

(c) Find the cost of 1 kilogram of bananas.

....pence [1]

4 Work out.

$$5\frac{7}{9} - \frac{11}{12} \times \frac{2}{3}$$

Give your answer as a mixed number.

.... [3]

5 (a) Write 0.0567 in standard form.

.... [1]

(b) Work out $7.3 \times 10^{14} + 2.4 \times 10^{12}$.
Give your answer in standard form.

.... [2]

6
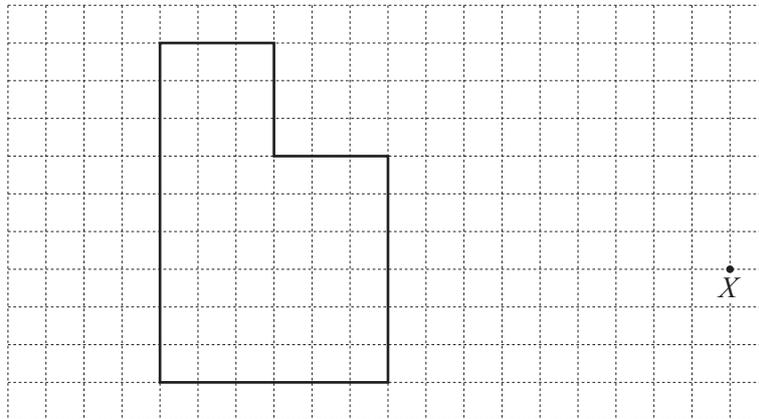
Enlarge this shape by scale factor $\frac{1}{3}$ from the centre of enlargement X. [2]

7 Here is a description of triangle *DEF*.

- Side *DE* = 8 cm
- Angle *EDF* = 42°
- Side *EF* = 6 cm

Two different triangles can be constructed using this description.

Construct accurately these two triangles.

[4]

8 Find five positive integers which satisfy all four of the following conditions.

- mode = 5
- median = 5
- mean = 6
- range = 7

.... , ... , ... , ... , ... [3]

9 Simplify.

(a) $x(x-3) - x(x+3)$

.... [2]

(b) $\left(x^5\right)^2$

.... [1]

(c) $\sqrt{x^{36}}$

.... [1]

 [Turn over

10 **(a)** Change $\frac{3}{8}$ into a decimal.

.... [2]

(b) Change the recurring decimal $0.1\dot{4}$ into a fraction.

.... [2]

11 **(a)** Factorise $4x^2 - y^2$.

.... [2]

(b) Use your answer to **part (a)** to evaluate $4 \times 343^2 - 314^2$.

.... [2]

12 Work out.

(a) $0.64^{\frac{1}{2}}$

.... [1]

(b) $8^{-\frac{2}{3}}$

.... [2]

13 Here are two sets.

$A = \{4, 8, 12, 16, 20, 24\}$

$B = \{8, 16, 24\}$

Use set notation to complete this statement.

B .... A [1]

14 Cylinder P has radius 5 cm and height 4 cm.

(a) Calculate the volume of cylinder P.
Give your answer as a multiple of π.

....cm^3 [2]

(b) Cylinder Q is mathematically similar to cylinder P.
The surface area of cylinder Q is 9 times the surface area of cylinder P.

Find the volume of cylinder Q.
Give your answer as a multiple of π.

....cm^3 [3]

15 These two triangles are mathematically similar.
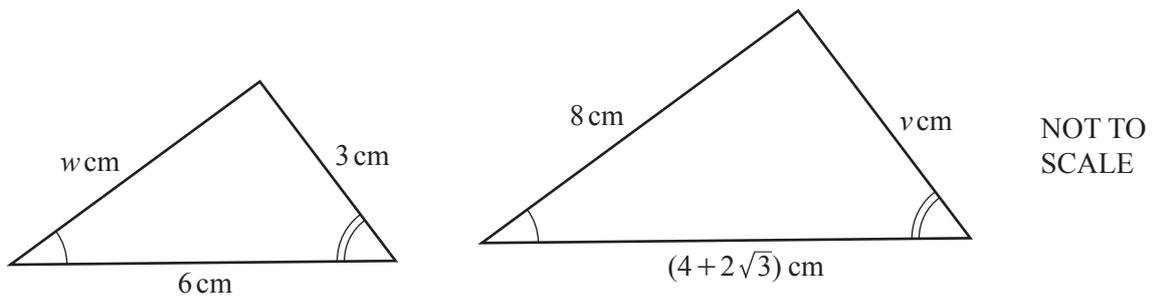
NOT TO SCALE

(a) Find the value of v.
Give your answer in the form $a + b\sqrt{3}$, where a and b are integers.

$v = $ .... [2]

(b) Find the value of w.
Give your answer in the form $c + d\sqrt{3}$, where c and d are integers.

$w = $ .... [4]

16 Expand and simplify.

$$(x+4)(x-4)(x+2)$$

.... [3]

17
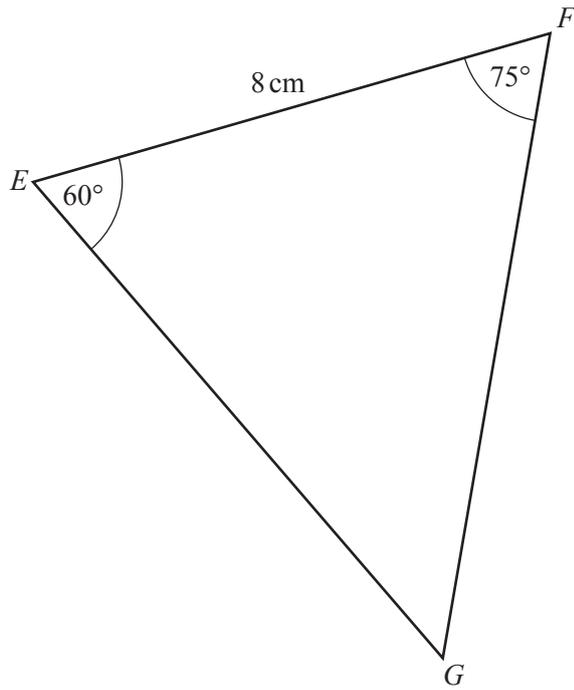
NOT TO
SCALE

The diagram shows triangle *EFG*.

Find *FG*.
Give your answer in the form $a\sqrt{b}$, where *a* and *b* are integers.

FG = ... cm [5]

18 w is inversely proportional to the square root of y.
When $y = 25$, $w = 22$.

Find y when $w = 10$.

$y =$ .... [3]

19 $\tan 45° = 1$

Use the information above to solve the equation $\tan x = -1$ for x between $0°$ and $360°$.

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

20 $\qquad$ $f(x) = ax + b$ where a and b are numbers.

(a) Show that $ff(x) = a^2x + ab + b$.

[1]

(b) $\qquad$ $a^2x + ab + b = x$

(i) Find the value of b when $a = 1$.

$b = $ .... [1]

(ii) Comment on the value of b when $a = -1$.

.... [1]

21 Rearrange $w = \sqrt{\dfrac{5x^3 - 4}{7y}}$ to make x the subject of the formula.

.... [4]

22 (a) Describe fully the **single** transformation represented by the matrix $\begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$.

....

.... [2]

(b)
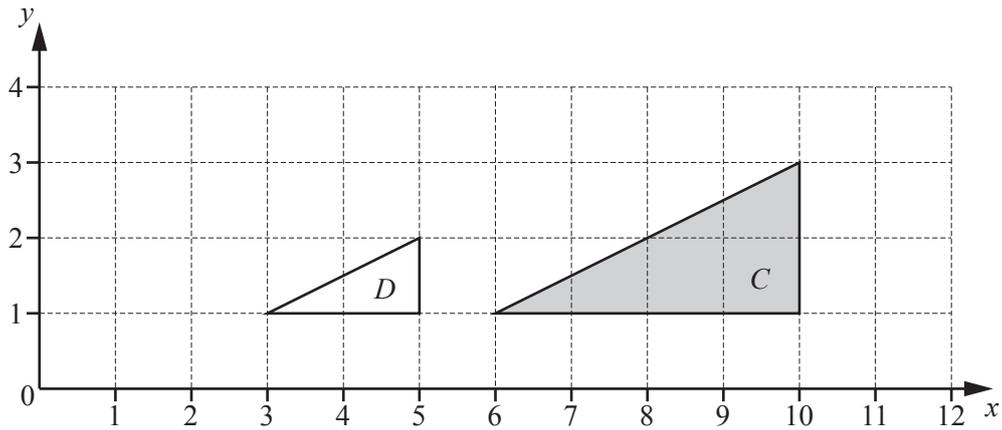
Sosuke says the enlargement that maps triangle C onto triangle D is represented by the matrix $\begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$.

Give two reasons why he is not correct.

1. ....

2. .... [2]

(c) Matrix **A** represents a rotation about the origin and $\mathbf{A}^{-1} = \mathbf{A}$.

Find matrix **A**.

$\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

23 A bag contains n marbles.
There are w white marbles in the bag.
Two marbles are selected at random from the bag.

(a) p_1 is the probability of selecting 2 white marbles from the bag with replacement.

Find an expression, in terms of n and w, for p_1.

$p_1 = $ .... [1]

(b) p_2 is the probability of selecting 2 white marbles from the bag **without** replacement.

Find an expression, in terms of n and w, for p_2.

$p_2 = $ .... [1]

(c) $$p_1 = \frac{21}{20} \times p_2$$

Show that $n = \dfrac{20w}{21 - w}$.

[3]

(d) Complete this statement.

The largest possible number of white marbles in the bag is ....

and this occurs when there is a total of .... marbles in the bag. [2]

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