Cambridge IGCSE

CANDIDATE NAME	

CENTRE NUMBER		CANDIDATE NUMBER	

MATHEMATICS **0626/04**

Paper 4 (Extended) **For Examination from 2017**

SPECIMEN PAPER

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 the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams and 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.

This document consists of **14** printed pages.

CAMBRIDGE
International Examinations

[Turn over

1 **(a)** Write 230 000 in standard form.

.... [1]

(b) Write 4.8×10^{-4} as an ordinary number.

.... [1]

2 Solve the following equations.

(a) $4(5x - 2) = 18x$

$x =$ .... [3]

(b) $x^2 + 2x - 3 = 0$

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

3 Factorise completely.

$$6ab - 24bc$$

.... [2]

4 Robert says it is possible to draw a regular polygon with interior angles of 130°.

Explain why Robert is wrong.

....

.... [2]

5 Sue takes the bus to school.

The probability that it is raining is $\frac{1}{5}$.

When it is raining, the probability that the bus is late is $\frac{1}{2}$.

When it is not raining, the probability that the bus is late is $\frac{1}{3}$.

(a) Complete the tree diagram.

Weather   Bus

                                                        ....   late

                    $\frac{1}{5}$ raining

                                                        ....   not late

        ....   not raining   ....   late
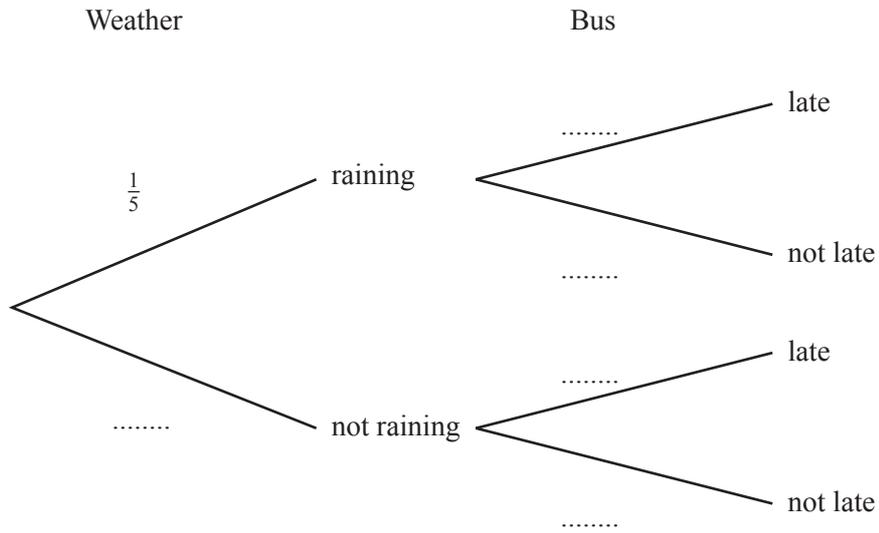
                                                        ....   not late

[2]

(b) Find the probability that the bus is **not** late.

.... [3]

6   Two stem and leaf diagrams show the heights, in centimetres, of a random sample of 20 students of the same age in each of two schools.

School A

13	1	3							
14	0	0	5	6					
15	0	2	2	4	4	6	8		
16	2	3	6	8	9				
17	3								
18	1								

School B

13										
14	2	3	7							
15	1	1	3	4	7	7	7	7	8	9
16	0	2	3	4	8					
17	3	5								
18										
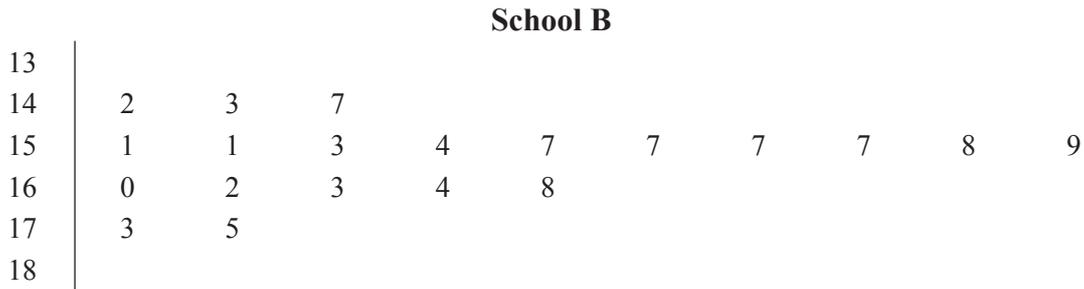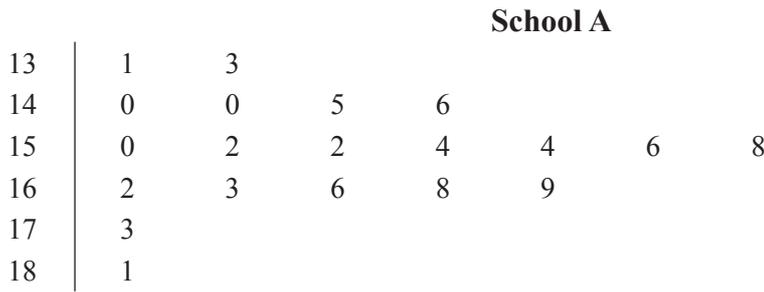
Key: 15 | 2 represents 152 cm

(a) Compare these two distributions.

....

....

....

....

.... [3]

(b) School A is in Manchester and School B is in Cambridge.

Give **two** reasons why you should not use your answers to **part (a)** to draw conclusions about the heights of the **girls** from Manchester and the **girls** from Cambridge.

1 ....

....

2 ....

.... [2]

7 **Use a ruler and compasses only for this question.**
Leave in all your construction arcs.
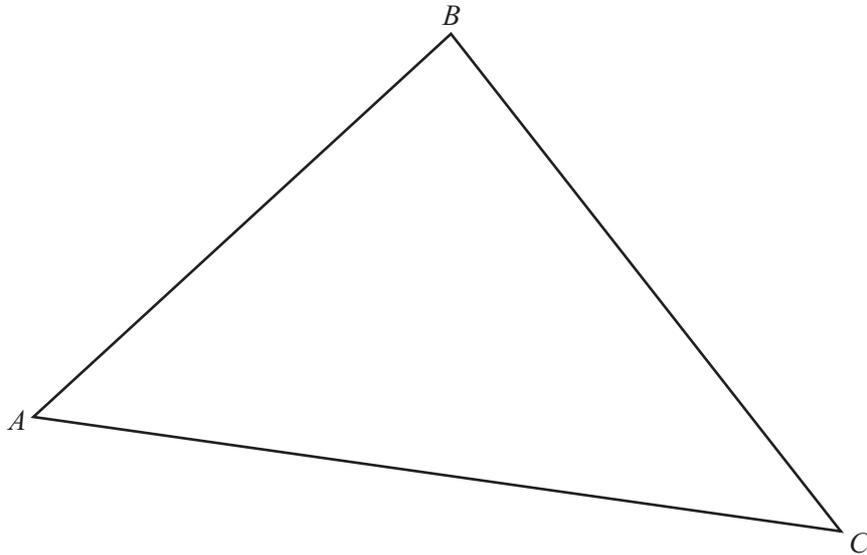
Construct and shade the region inside triangle *ABC* containing points that are

- less than 7 cm from *C*

and

- closer to *A* than to *B*. [4]

8 Lea uses the following method to estimate the value of $\sqrt{90\,005 \times 3.97^2}$

$$\sqrt{100\,000 \times 4^2}$$

$$\sqrt{1\,600\,000}$$

$$= 4000$$

Comment on her method and solution.

....

.... [2]

9 **(a)** Convert 144 km/h into metres per second.

.... m/s [2]

(b) A train of length 120 m is travelling at 144 km/h.
It passes through a tunnel 20 m long.

20 m

120 m

.
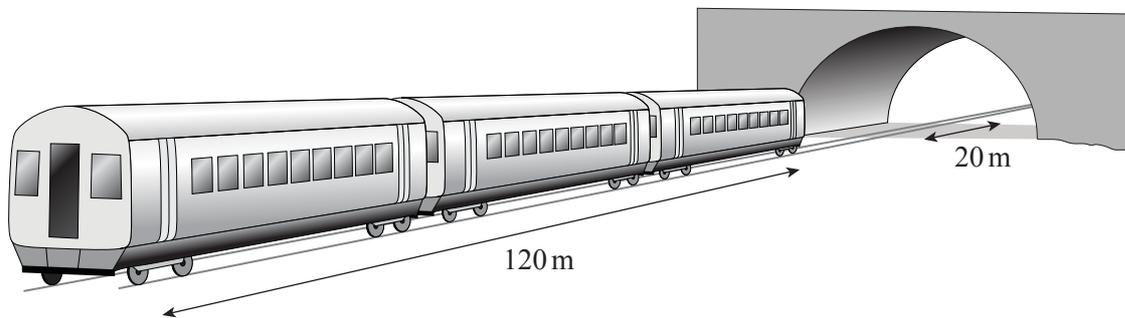
Find the time taken for the whole train to pass through the tunnel.
Give your answer in seconds.

.... s [2]

10
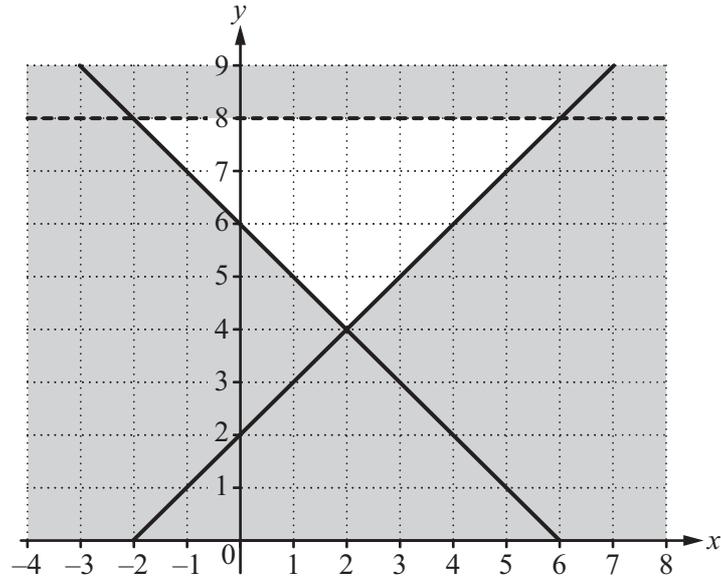
Write down the 3 inequalities which define the unshaded region.

....

....

.... [4]

11 Find the value of

(a) $64^{0.5} \times 5^{-2}$,

.... [2]

(b) $\left(\dfrac{8}{27}\right)^{-\frac{1}{3}}$.

.... [2]

12
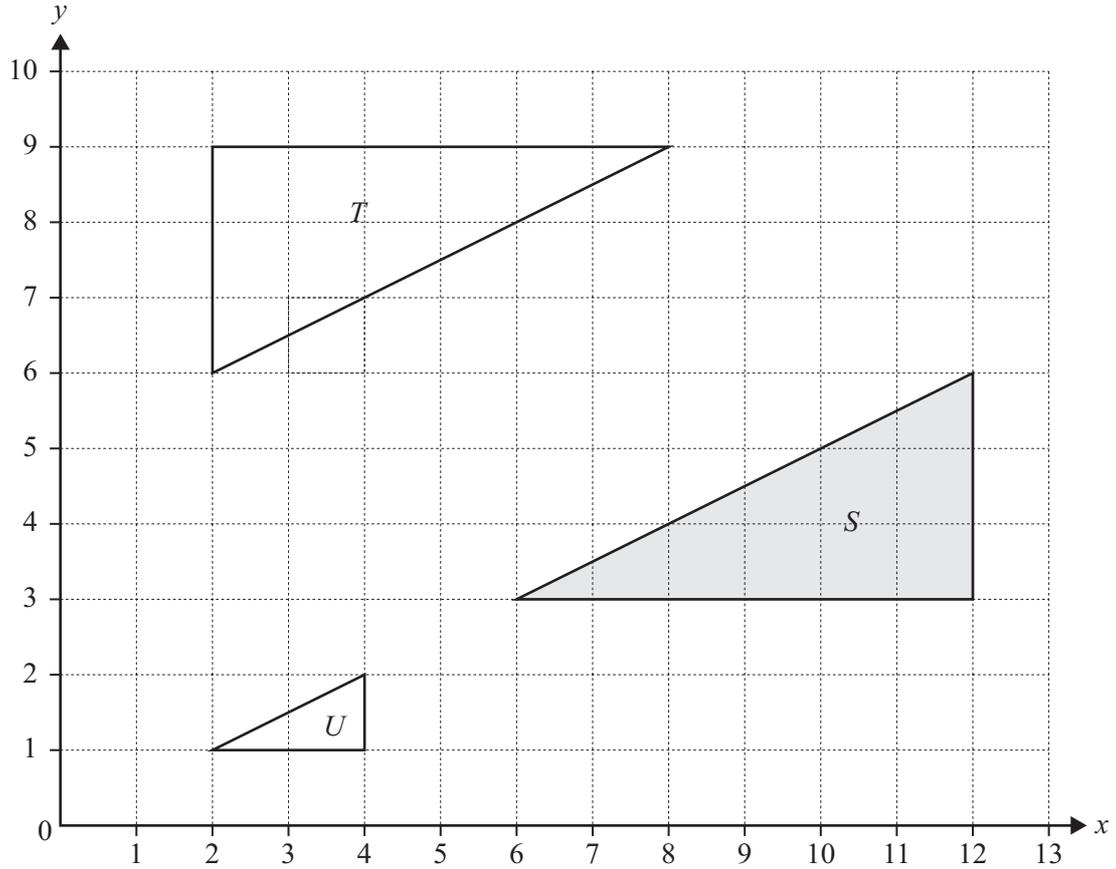
(a) Describe fully the **single** transformation that maps triangle *S* onto triangle *T*.

....

.... [3]

(b) Describe fully the **single** transformation that maps triangle *S* onto triangle *U*.

....

.... [3]

13 These box plots show the monthly electricity costs for 100 different households who use Electro company or Spark company.

Electro company

Spark company
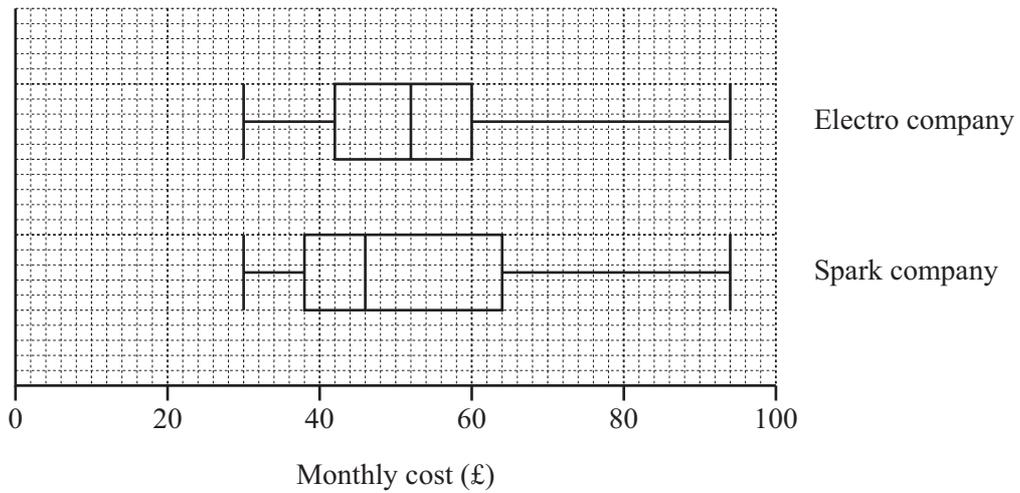
Monthly cost (£)

Tom says that the monthly costs with Electro company are lower and vary less than with Spark company.

Is Tom correct?
Justify your answer with reference to the box plots.

[4]

14 Shade the region $(A \cap B)' \cap C$.
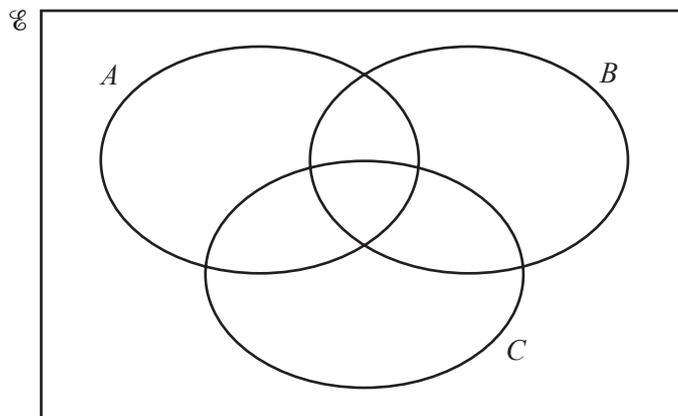
[1]

15 $f(x) = (x - 3)^2$ $g(x) = \dfrac{x - 1}{4}$ $h(x) = x^3$

Find

(a) $h(f(1))$,

.... [2]

(b) $g^{-1}(x)$,

$g^{-1}(x) =$ .... [2]

(c) $g(h(x))$,

$g(h(x)) =$ .... [1]

16 y is inversely proportional to the square root of x.
$y = 18$ when $x = 9$.

Find y when $x = 36$.

$y =$ .... [3]

17 $\mathbf{A} = \begin{pmatrix} 5 & 2 \\ 4 & 3 \end{pmatrix}$

(a) Find $|\mathbf{A}|$.

.... [1]

(b) Calculate $\mathbf{A}^2$.

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

18 $g(x) = 1 - 2x$

Solve the equation $g(3x) = 2x$.

$x =$ .... [3]

19 The diagram shows the entrance to a tunnel.

The circular arc has a radius of 6 m and centre O.
AB is horizontal and angle $AOB = 120°$.

NOT TO
SCALE
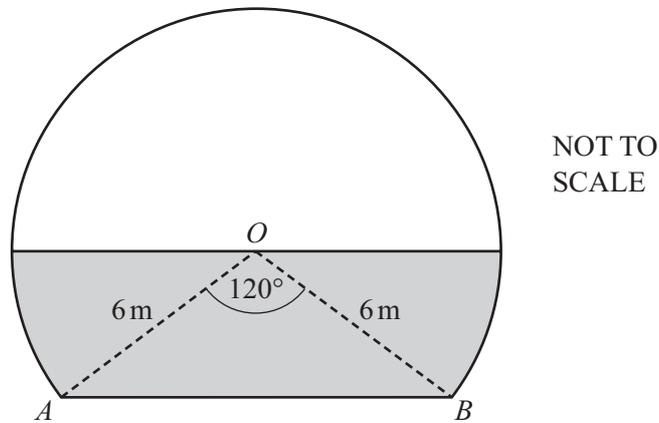
During a storm the tunnel filled with water, to the level shown by the shaded area in the diagram.

The shaded area is equal to $c\pi + d\sqrt{3}$.

Find the value of c and the value of d.

$c =$ ....

$d =$ .... [5]

20 **(a)** Simplify $\dfrac{\sqrt{12}}{\sqrt{6}}$.

.... [1]

(b) Write $\left(\dfrac{8}{2-\sqrt{2}}\right)$ in the form $a + b\sqrt{2}$, where a and b are integers.

.... [3]

21 **(a)** Simplify $\dfrac{15x + 3x^2}{x^2 - 25}$

.... [3]

(b) Show that $3 - \dfrac{t+2}{t-1}$ can be written as $\dfrac{2t-5}{t-1}$.

[2]

Question 22 is printed on the next page.

22 The diagram below shows a solid circular cone and a solid sphere.

NOT TO SCALE
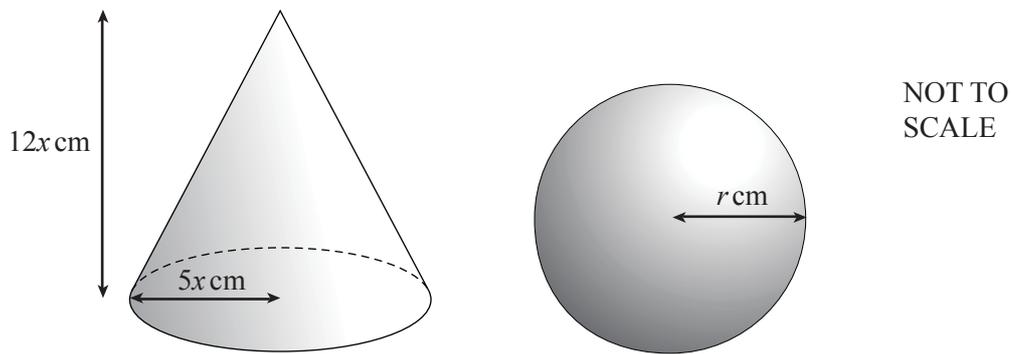
The cone has the same **total** surface area as the sphere.
The cone has radius $5x$ cm and height $12x$ cm.
The sphere has radius r cm.

Show that $r^2 = \dfrac{45}{2}x^2$.

[The curved surface area, A, of a cone with radius r and slant height l is $A = \pi rl$.]
[The surface area, A, of a sphere with radius r is $A = 4\pi r^2$.]

[5]