Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

9968535689

MATHEMATICS **0580/21**

Paper 2 (Extended) **October/November 2017**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Tracing paper (optional)
Geometrical instruments

READ THESE INSTRUCTIONS FIRST

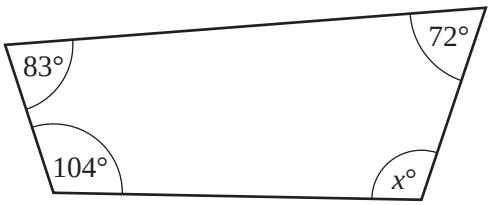
Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
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 figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

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 70.

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1



NOT TO SCALE

The diagram shows a quadrilateral.

Find the value of x.

$x =$ ..... [1]

2 Work out.

$$2^{-4} \times 2^{5}$$

..... [1]

3 **(a)** Use a calculator to work out $\dfrac{5^{0.4} - \sqrt{3}}{0.13 - 0.015}$.

Write down all the digits in your calculator display.

..... [1]

(b) Write your answer to **part (a)** correct to 2 significant figures.

..... [1]

4 Amber's mean mark on five tests is 80.
Her marks on four of these tests are 68, 81, 74 and 89.

Work out her mark on the fifth test.

..... [2]

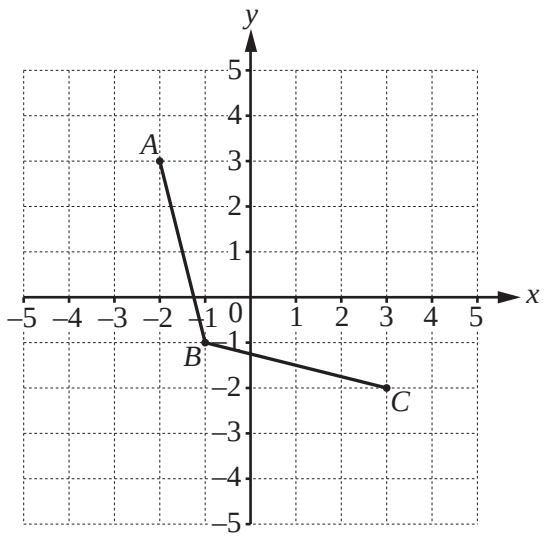
5 Factorise completely.

$$12x^2 + 15xy - 9x$$

..... [2]

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6



The diagram shows two sides of a rhombus *ABCD*.

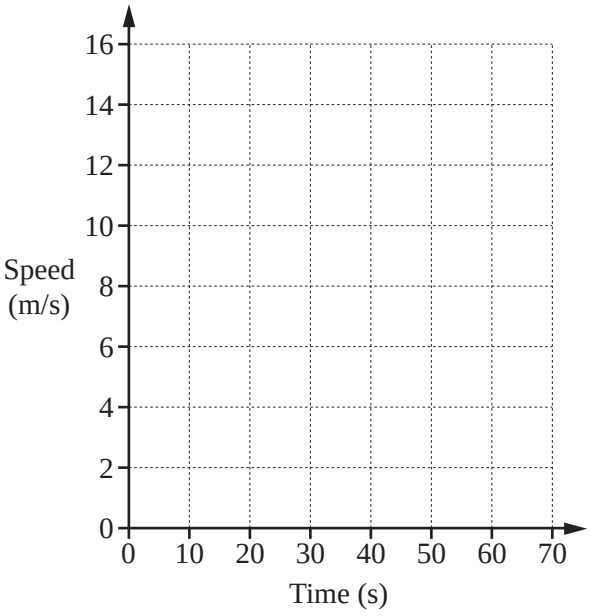
(a) Write down the co-ordinates of *A*.

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

(b) Complete the rhombus *ABCD* on the grid. [1]

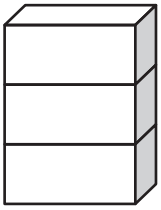
7 Petra begins a journey in her car.
She accelerates from rest at a constant rate of 0.4 m/s^2 for 30 seconds.
She then travels at a constant speed for 40 seconds.

On the grid, draw the speed-time graph for the first 70 seconds of Petra's journey.



[2]

8



NOT TO SCALE

The diagram shows three identical cuboids in a tower.
The height of one cuboid is 6.5 cm, correct to the nearest millimetre.

Work out the upper bound of the height of the tower.

..... cm [2]

9 The value of a motorbike is \$12 400.
Each year, the value of the motorbike decreases exponentially by 15%.

Calculate the value of the motorbike after 3 years.

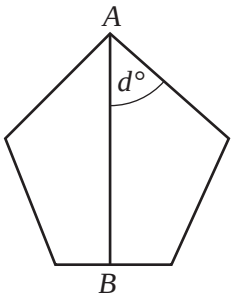
\$..... [2]

10 **Without using a calculator**, work out $1\frac{2}{3} - \frac{11}{15}$.
Write down all the steps of your working and give your answer as a fraction in its lowest terms.

..... [3]

11 The diagram shows a regular pentagon.
AB is a line of symmetry.

Work out the value of *d*.



NOT TO SCALE

d = ... [3]

12 $\sqrt{5}$ -7 343 -11 0.4 2.5 $\frac{1}{3}$

From this list of numbers, write down

(a) a cube number,

..... [1]

(b) the smallest number,

..... [1]

(c) a natural number.

..... [1]

13 Simplify.

(a) $(m^5)^2$

..... [1]

(b) $4x^3y \times 5x^2y$

..... [2]

14 **(a)** D is the point $(2, -5)$ and $\overrightarrow{DE} = \begin{pmatrix} 7 \\ 1 \end{pmatrix}$.

Find the co-ordinates of the point E.

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

(b) $\mathbf{v} = \begin{pmatrix} t \\ 12 \end{pmatrix}$ and $|\mathbf{v}| = 13$.

Work out the value of t, where t is negative.

$t =$ ..... [2]

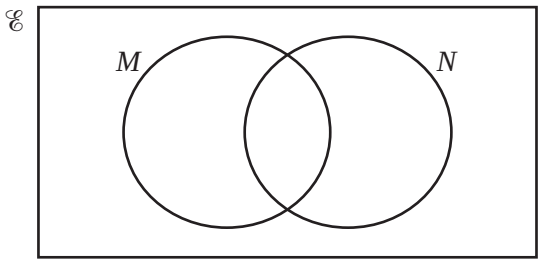
15 **(a)** $Q = \{1, 2, 3, 4, 5, 6\}$

Write down a set P where $P \subset Q$.

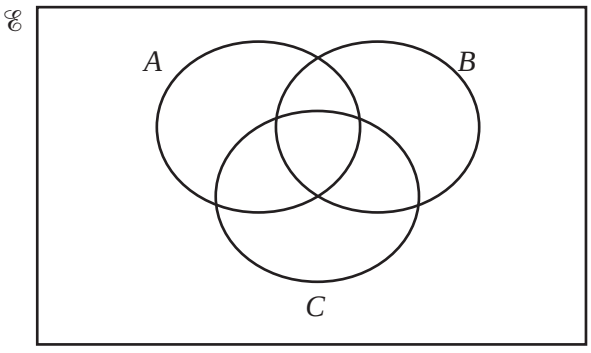
$P =$ ..... [1]

(b) Shade these regions in the Venn diagrams.

$M \cup N'$



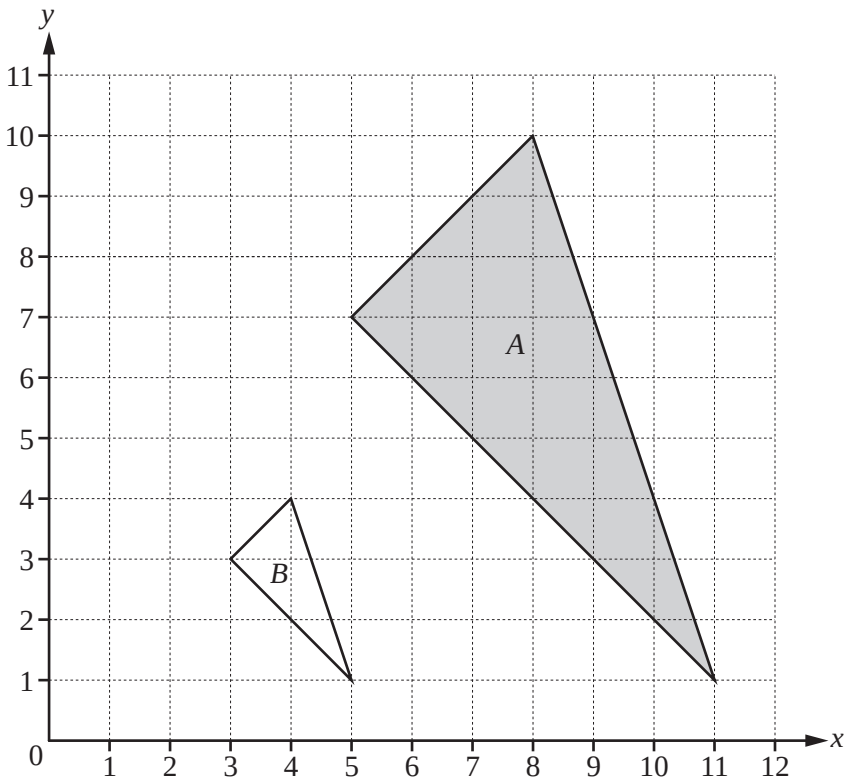
$(A \cup B) \cap C'$



[2]

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16



Describe fully the **single** transformation that maps triangle *A* onto triangle *B*.

.....

..... [3]

17 y is inversely proportional to $(x+1)^2$.
$y = 50$ when $x = 0.2$.

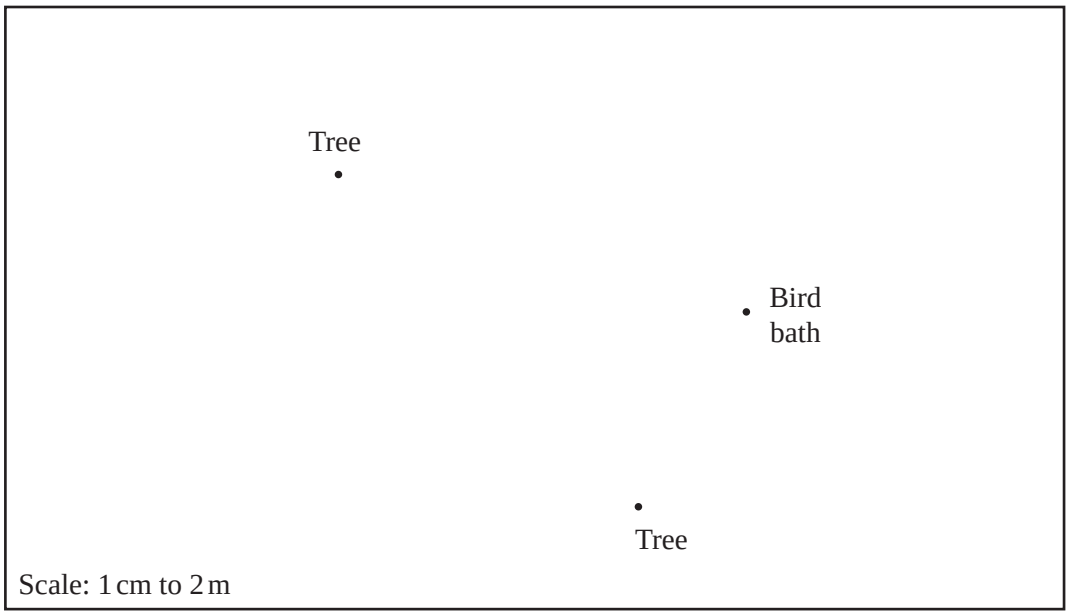
(a) Write y in terms of x.

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

(b) Find the value of y when $x = 0.5$.

$y =$ ..... [1]

18 The diagram shows a scale drawing of Tariq's garden.
The scale is 1 centimetre represents 2 metres.



Tariq puts a statue in the garden.
The statue is equidistant from the two trees and 10 m from the bird bath.

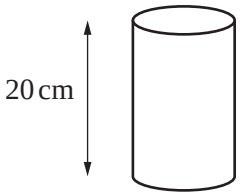
Find, by construction, the point where Tariq puts the statue.
Label the point *S*. [4]

19 Write as a single fraction in its simplest form.

$$\frac{5}{x-3}+\frac{3}{x+7}+\frac{1}{2}$$

..... [4]

20 (a)



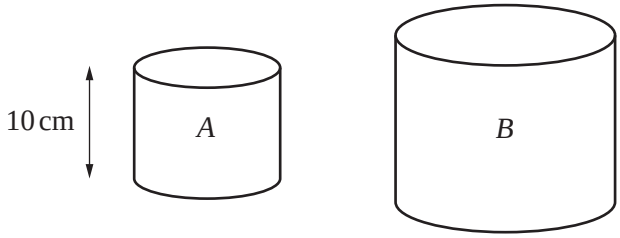
NOT TO SCALE

A cylinder has height 20 cm.
The area of the circular cross section is 74 cm^2.

Work out the volume of this cylinder.

..... cm^3 [1]

(b) Cylinder *A* is mathematically similar to cylinder *B*.



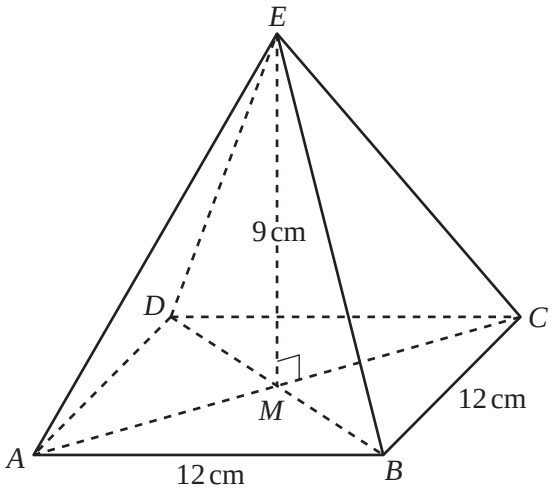
NOT TO SCALE

The height of cylinder *A* is 10 cm and its surface area is 440 cm^2.
The surface area of cylinder *B* is 3960 cm^2.

Calculate the height of cylinder *B*.

..... cm [3]

21



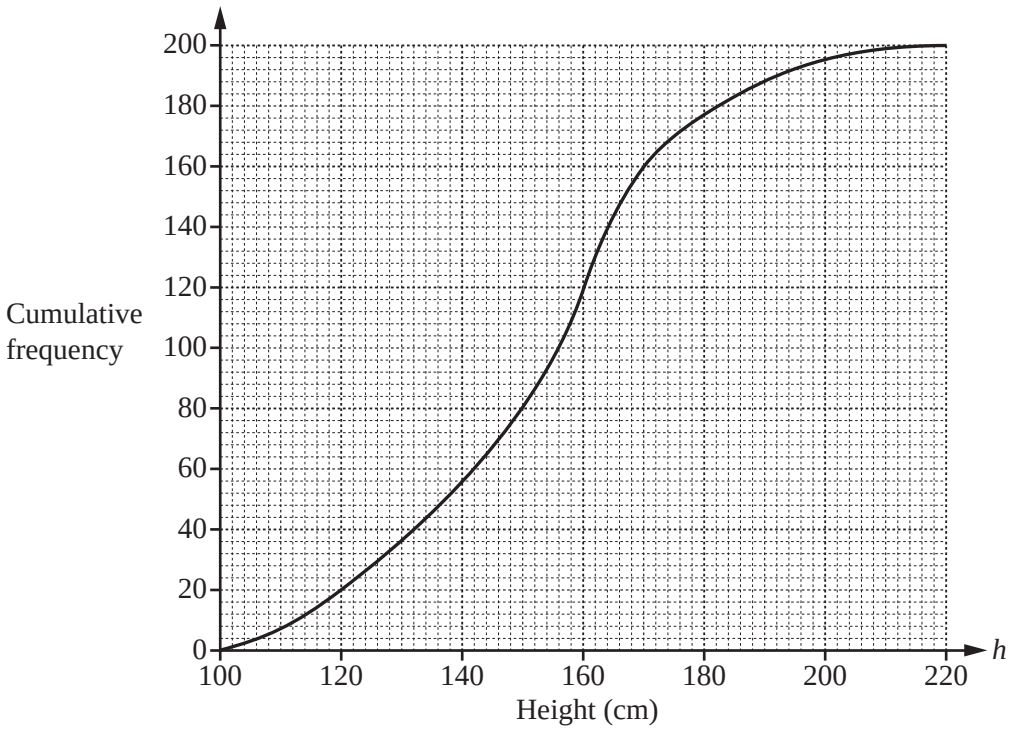
NOT TO SCALE

The diagram shows a square-based pyramid *ABCDE*.
The diagonals of the square meet at *M*.
E is vertically above *M*.
$AB = BC = 12$ cm and $EM = 9$ cm.

Calculate the angle between the edge *EC* and the base, *ABCD*, of the pyramid.

..... [4]

22 Simon records the heights, h cm, of 200 sunflowers in his garden.
The cumulative frequency diagram shows this information.



(a) Find the number of these sunflowers that have a height of more than 160 cm.

..... [2]

(b) Sue records the heights, h cm, of 200 sunflowers in her garden.
The cumulative frequency table shows this information.

Height (h cm)	Cumulative frequency
$h \leqslant 100$	0
$h \leqslant 110$	20
$h \leqslant 120$	48
$h \leqslant 130$	100
$h \leqslant 140$	140
$h \leqslant 150$	172
$h \leqslant 160$	188
$h \leqslant 170$	200

On the grid above, draw another cumulative frequency diagram to show this information. [3]

(c) Work out the difference between the median heights of Simon's sunflowers and Sue's sunflowers.

..... cm [2]

Question 23 is printed on the next page.

23 In one week, Neha spends x hours cooking and y hours cleaning.
The time she spends cleaning is at least equal to the time she spends cooking.
This can be written as $y \geqslant x$.

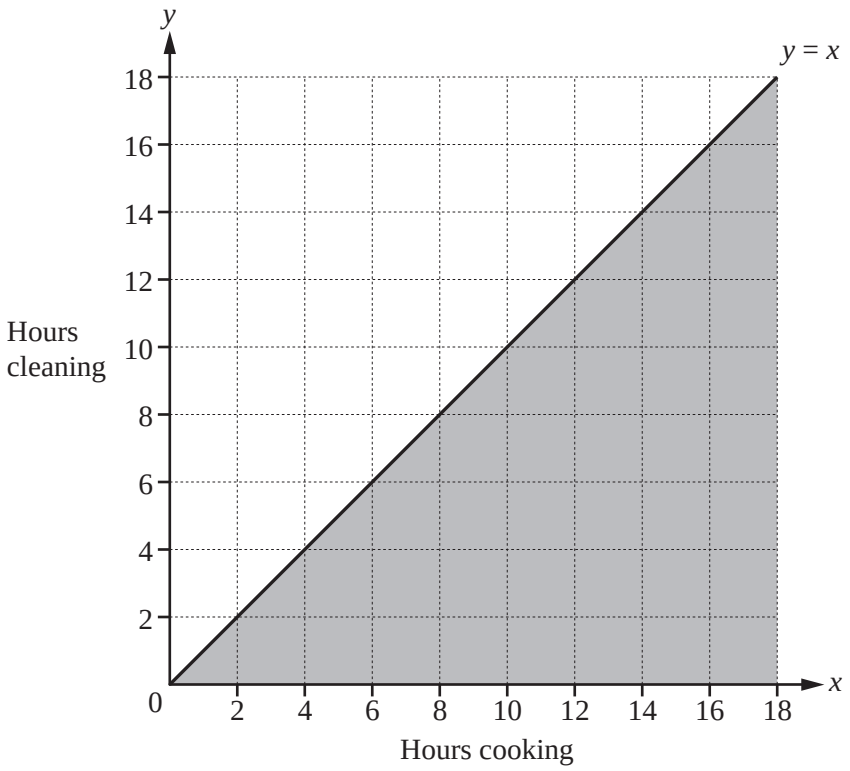
She spends no more than 16 hours in total cooking and cleaning.
She spends at least 4 hours cooking.

(a) Write down two more inequalities in x and/or y to show this information.

.....

..... [2]

(b) Complete the diagram to show the three inequalities.
Shade the **unwanted** regions.



[3]

(c) Neha receives \$10 for each hour she spends cooking and \$8 for each hour she spends cleaning.

Work out the largest amount she could receive.

\$..... [2]

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