Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

1455272875

MATHEMATICS **0580/22**

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.

DC (ST/JG) 136858/2
© UCLES 2017

1 One day, at noon, in Maseru, the temperature was 17 °C.
At midnight the temperature was 20 °C lower.

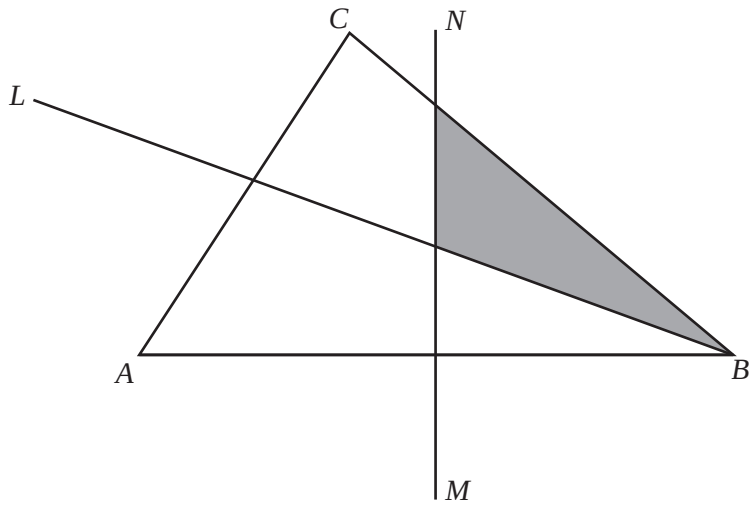
Work out the temperature at midnight.

..... °C [1]

2 Write 5.17×10^{-3} as an ordinary number.

..... [1]

3



In the diagram, *BL* is the bisector of angle *ABC* and *MN* is the perpendicular bisector of *AB*.

Complete the statement.

The shaded region contains the points, inside triangle *ABC*, that are

- nearer to *B* than to *A*

and

- nearer to ..... than to ..... [1]

4 **(a)** 1 and 12 are factors of 12.

Write down all the other factors of 12.

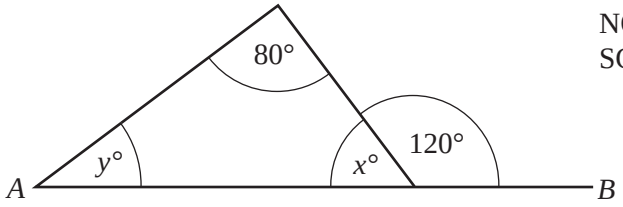
..... [1]

(b) Write down the multiples of 9 between 20 and 40.

..... [1]

© UCLES 2017

5



NOT TO SCALE

In the diagram, *AB* is a straight line.

Find the value of *x* and the value of *y*.

x = ...

y = ... [2]

6 Write 55 g as a percentage of 2.2 kg.

.....% [2]

7 The area of a triangle is 528 cm^2.
The length of its base is 33 cm.

Calculate the perpendicular height of the triangle.

..... cm [2]

8 Amar cycles at a speed of 18 km/h.
It takes him 55 minutes to cycle between two villages.

Calculate the distance between the two villages.

..... km [2]

9 Work out, giving your answer in standard form.

$$1.2 \times 10^{40} + 1.2 \times 10^{41}$$

..... [2]

10 The sides of a triangle are 5.2 cm, 6.3 cm and 9.4 cm, each correct to the nearest millimetre.

Calculate the lower bound of the perimeter of the triangle.

..... cm [2]

11 Write the recurring decimal $0.\dot{4}\dot{8}$ as a fraction.
Show all your working.

..... [2]

© UCLES 2017

12 Expand the brackets and simplify.

$$(5-n)(3+n)$$

..... [2]

13 **(a)** Write $\frac{11}{3}$ as a mixed number.

..... [1]

(b) **Without using a calculator**, work out $\frac{1}{4}+\frac{5}{12}$.
Show all the steps of your working and give your answer as a fraction in its lowest terms.

..... [2]

14 Find the integers which satisfy the inequality.

$$-5 < 2n-1 \leqslant 5$$

..... [3]

15 Write as a single fraction in its simplest form.

$$\frac{x+1}{x} - \frac{y-1}{y}$$

..... [3]

16 Here are the first four terms of a sequence.

23 17 11 5

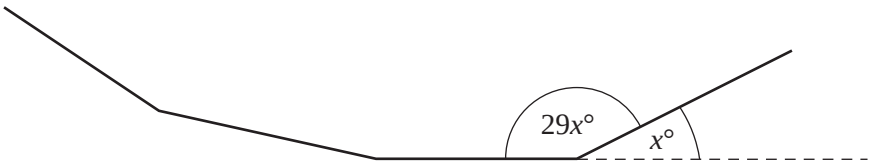
(a) Find the next term.

..... [1]

(b) Find the nth term.

..... [2]

17



The diagram shows part of a regular polygon.
The exterior angle is $x°$.
The interior angle is $29x°$.

Work out the number of sides of this polygon.

..... [3]

18 Solve the simultaneous equations.
You must show all your working.

$$y = \frac{x}{2}$$
$$2x - y = 1$$

$x =$ .....

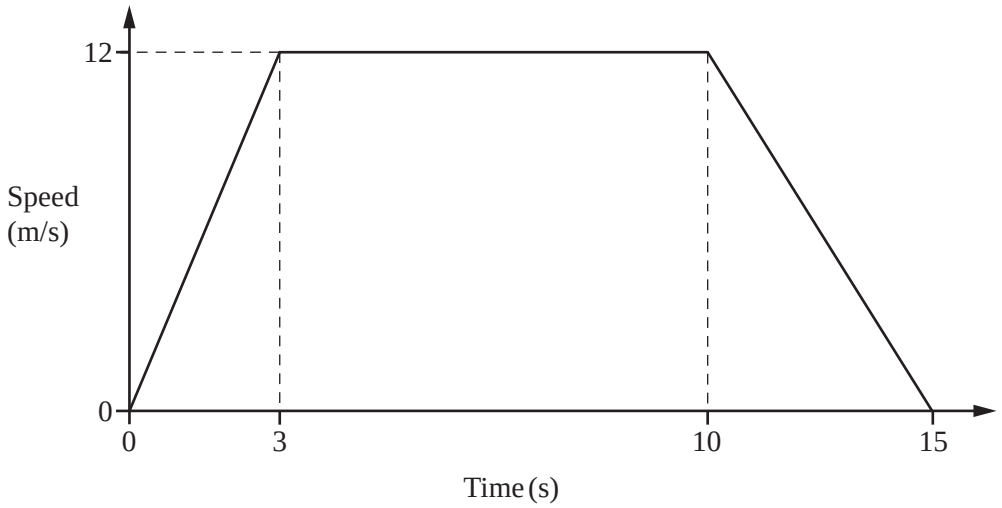
$y =$ ..... [3]

19 Make x the subject of the formula.

$$y = \sqrt{x^2 + 1}$$

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

20



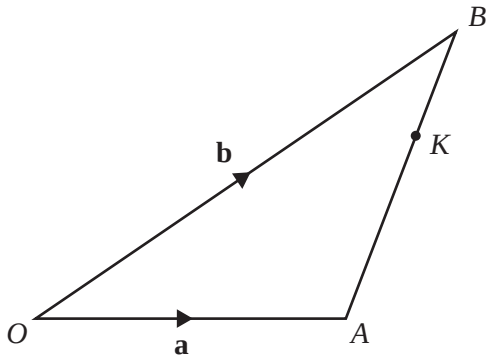
NOT TO SCALE

The diagram shows a speed-time graph.

Calculate the total distance travelled.

..... m [3]

21



NOT TO SCALE

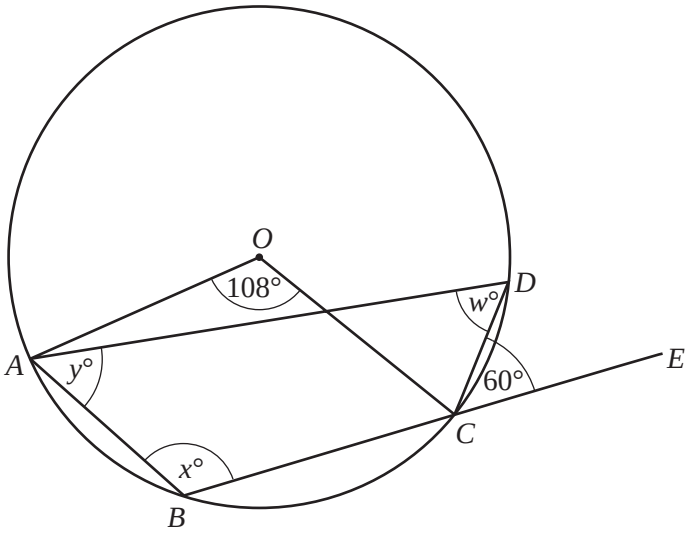
O is the origin and K is the point on AB so that $AK : KB = 2 : 1$.
$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$.

Find the position vector of K.
Give your answer in terms of **a** and **b** in its simplest form.

..... [3]

© UCLES 2017

22



NOT TO SCALE

A, *B*, *C* and *D* are points on the circle, centre *O*.
BCE is a straight line.
Angle *AOC* = 108° and angle *DCE* = 60°.

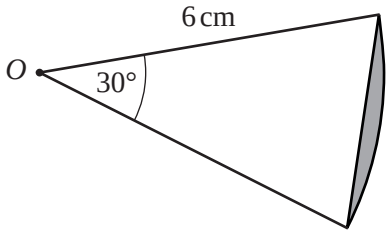
Calculate the values of *w*, *x* and *y*.

w = ...

x = ...

y = ... [3]

23



NOT TO SCALE

The diagram shows a sector of a circle, centre *O* and radius 6 cm.
The sector angle is 30°.
The area of the shaded segment is $(k\pi - c)$ cm^2, where *k* and *c* are integers.

Find the value of *k* and the value of *c*.

k = ...

c = ... [3]

24 Solve the equations.

(a) $7-3n=11n+2$

$n =$ ..... [2]

(b) $\frac{p-3}{5}=3$

$p =$ ..... [2]

25 Factorise completely.

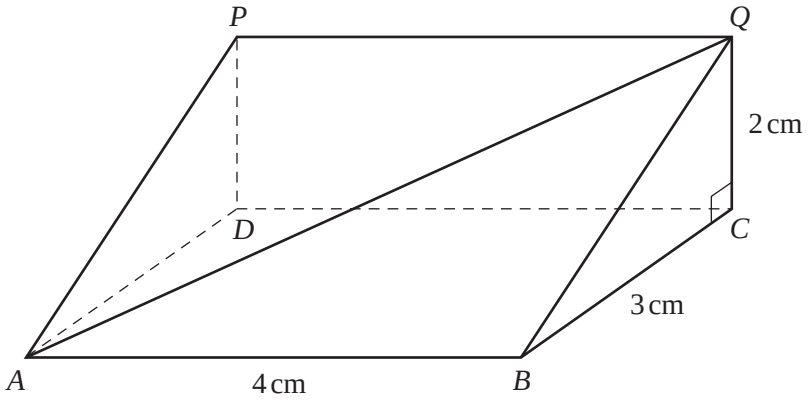
(a) $x^2-x-132$

..... [2]

(b) x^3-4x

..... [2]

26



NOT TO SCALE

The diagram shows a prism of length 4 cm.
The cross section is a right-angled triangle.
$BC = 3$ cm and $CQ = 2$ cm.

Calculate the angle between the line AQ and the base, $ABCD$, of the prism.

..... [4]

27 Simplify.

(a) $81^{\frac{3}{4}}$

..... [1]

(b) $x^{\frac{2}{3}} \div x^{-\frac{4}{3}}$

..... [1]

(c) $\left(\frac{8}{y^6}\right)^{-\frac{1}{3}}$

..... [2]

© UCLES 2017

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.