Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

MATHEMATICS **0580/22**

Paper 2 (Extended) **May/June 2018**

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.

© UCLES 2018

CAMBRIDGE International Examinations

1 One morning, Marcia works from 08 20 to 11 15.

View solution

Find how long she works for.
Give your answer in hours and minutes.

..... h ..... min [1]

2 Expand.

$7(x - 8)$

View solution

..... [1]

3 Here is a sequence.

View solution

a, 13, 9, 3, –5, –15, b, …

Find the value of a and the value of b.

a = ...

b = ... [2]

4 Complete these statements.

(a) When w = ... , $10w = 70$.

View solution [1]

(b) When $5x = 15$, $12x$ = ...

View solution [1]

5 22 17 25 41 39 4

View solution

Work out the difference between the two prime numbers in the list above.

..... [2]

© UCLES 2018

6 **Without using your calculator**, work out $\frac{2}{3} - \frac{1}{12}$.

View solution

You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

7 A and B are two towns on a map.
The bearing of A from B is 140°.

View solution

Work out the bearing of B from A.

..... [2]

8 Here are some numbers written in standard form.

3.4×10^{-1} 1.36×10^{6} 7.9×10^{0} 2.4×10^{5} 5.21×10^{-3} 4.3×10^{-2}

From these numbers, write down

(a) the largest number,

View solution

..... [1]

(b) the smallest number.

..... [1]

View solution

© UCLES 2018

9 **Using a straight edge and compasses only**, construct the locus of points that are equidistant from A and B.

View solution



[2]

10 Factorise completely.

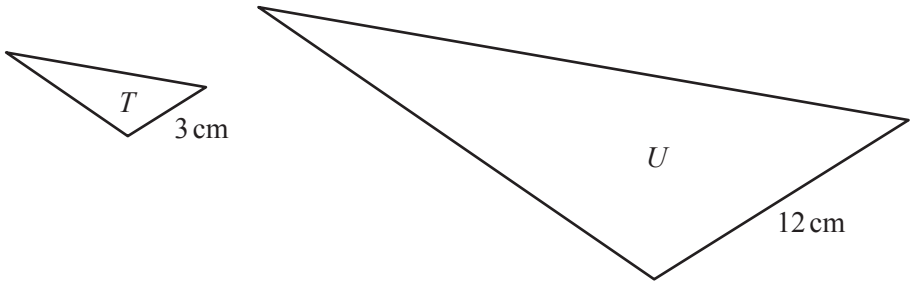
$xy + 2y + 3x + 6$

View solution

..... [2]

11

View solution



NOT TO SCALE

The diagram shows two mathematically similar triangles, T and U.
Two corresponding side lengths are 3 cm and 12 cm.
The area of triangle T is 5 cm^2.

Find the area of triangle U.

..... cm^2 [2]

12 Anna walks 31 km at a speed of 5 km/h.
Both values are correct to the nearest whole number.

View solution

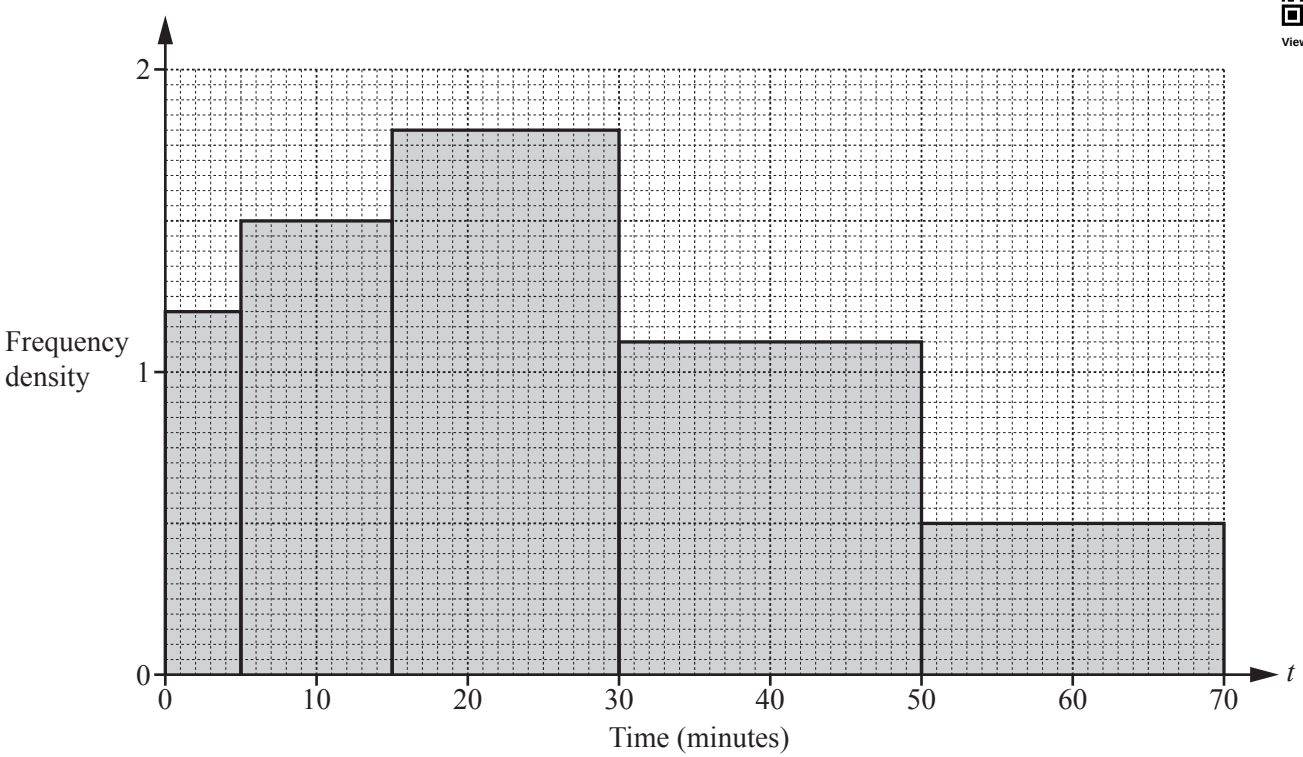
Work out the upper bound of the time taken for Anna's walk.

..... hours [2]

© UCLES 2018

13 The histogram shows information about the time, t minutes, spent in a shop by each of 80 people.

View solution



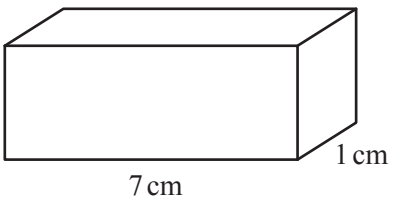
Complete the frequency table.

Time (t minutes)	$0 < t \leqslant 5$	$5 < t \leqslant 15$	$15 < t \leqslant 30$	$30 < t \leqslant 50$	$50 < t \leqslant 70$
Number of people	6		27		10

[2]

14

View solution



NOT TO SCALE

The diagram shows a solid cuboid with base area $7\,cm^2$.
The volume of this cuboid is $21\,cm^3$.

Work out the total surface area.

..... cm^2 [3]

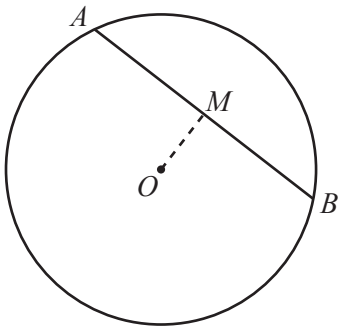
15 Find the volume of a cylinder of radius 5 cm and height 8 cm.
Give the units of your answer.

View solution

.... [3]

16

View solution



NOT TO SCALE

The diagram shows a circle, centre O.
AB is a chord of length 12 cm.
M is the mid-point of AB and $OM = 4.5$ cm.

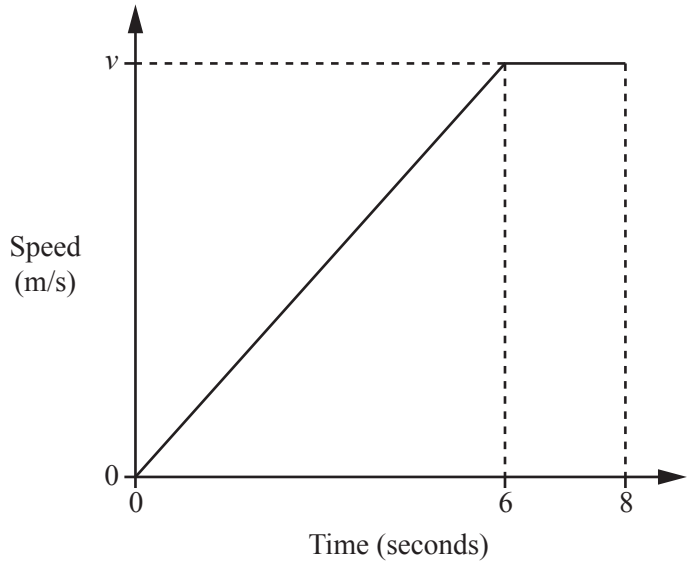
Calculate the radius of the circle.

..... cm [3]

© UCLES 2018

17 The diagram shows information about the first 8 seconds of a car journey.

View solution



NOT TO SCALE

The car travels with constant acceleration reaching a speed of v m/s after 6 seconds.
The car then travels at a constant speed of v m/s for a further 2 seconds.
The car travels a total distance of 150 metres.

Work out the value of v.

v = ... [3]

© UCLES 2018

18 A ball falls d metres in t seconds.
d is directly proportional to the square of t.
The ball falls 44.1 m in 3 seconds.

(a) Find a formula for d in terms of t.

View solution

$d =$ ..... [2]

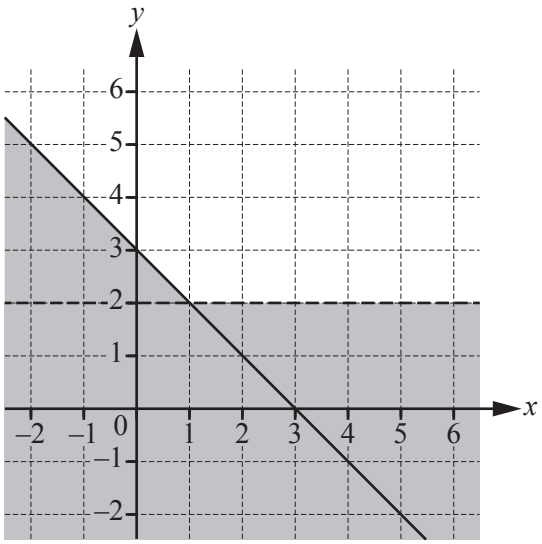
(b) Calculate the distance the ball falls in 2 seconds.

View solution

..... m [1]

19

View solution



Find the two inequalities that define the region on the grid that is **not** shaded.

.....

..... [3]

20 $\mathbf{A} = \begin{pmatrix} 1 & 1 \\ 9 & 9 \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} 0 & 1 \\ 9 & 8 \end{pmatrix}$ $\mathbf{C} = \begin{pmatrix} 1 & 1 \\ 3 & 3 \end{pmatrix}$ $\mathbf{I} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

View solution

(a) Here are four matrix calculations.

AI **IA** $\mathbf{C}^2$ $\mathbf{B} + \mathbf{I}$

Work out which matrix calculation does **not** give the answer $\begin{pmatrix} 1 & 1 \\ 9 & 9 \end{pmatrix}$.

..... [2]

(b) Find $|\mathbf{B}|$.

View solution

..... [1]

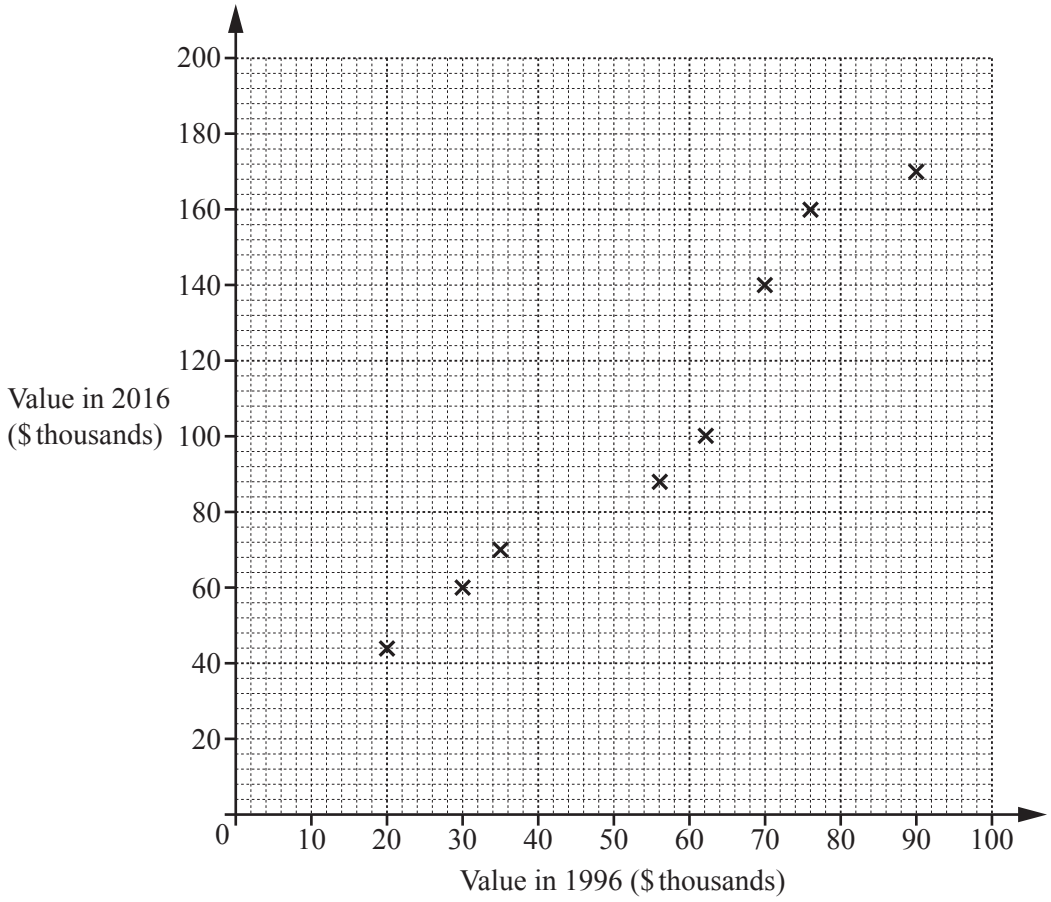
(c) Explain why matrix **A** has no inverse.

..... [1]

View solution

© UCLES 2018

21 The scatter diagram shows the value, in thousands of dollars, of eight houses in 1996 and the value of the same houses in 2016.



(a) One of these eight houses had a value of $70 000 in 1996.

Write down the value of this house in 2016.

$ ..... [1]

(b) The values of two more houses are shown in the table.

Value in 1996 ($ thousands)	40	80
Value in 2016 ($ thousands)	80	150

On the scatter diagram, plot these values. [1]

(c) On the scatter diagram, draw a line of best fit. [1]

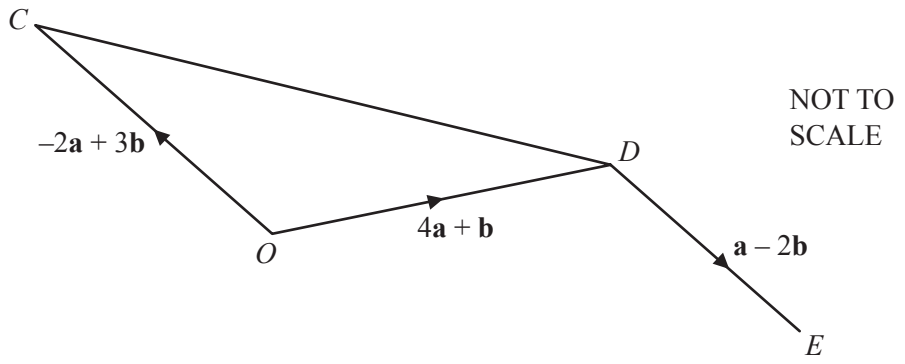
(d) Another house had a value of $50 000 in 1996.

Find an estimate of the value of this house in 2016.

$ ..... [1]

View solution

22



In the diagram, O is the origin, $\overrightarrow{OC} = -2\mathbf{a} + 3\mathbf{b}$ and $\overrightarrow{OD} = 4\mathbf{a} + \mathbf{b}$.

(a) Find $\overrightarrow{CD}$, in terms of **a** and **b**, in its simplest form.

View solution

$\overrightarrow{CD} =$ ..... [2]

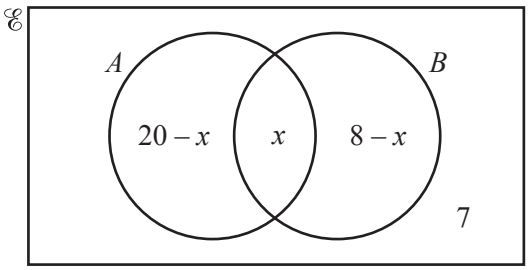
(b) $\overrightarrow{DE} = \mathbf{a} - 2\mathbf{b}$

View solution

Find the position vector of E, in terms of **a** and **b**, in its simplest form.

..... [2]

23 The Venn diagram shows information about the number of elements in sets A, B and $\mathscr{E}$.



(a) $n(A \cup B) = 23$

Find the value of x.

View solution

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

(b) An element is chosen at random from $\mathscr{E}$.

Find the probability that this element is in $(A \cup B)'$.

View solution

..... [2]

24 Box A and box B each contain blue and green pens only.
Raphael picks a pen at random from box A and Paulo picks a pen at random from box B.
The probability that Raphael picks a blue pen is $\frac{2}{3}$.
The probability that both Raphael and Paulo pick a blue pen is $\frac{8}{15}$.

(a) Find the probability that Paulo picks a blue pen.

View solution

..... [2]

(b) Find the probability that both Raphael and Paulo pick a green pen.

View solution

..... [3]

© UCLES 2018

25 P is the point (16, 9) and Q is the point (22, 24).

(a) Find the equation of the line perpendicular to PQ that passes through the point (5, 1).
Give your answer in the form $y = mx + c$.

View solution

$y =$ ..... [4]

(b) N is the point on PQ such that $PN = 2NQ$.

View solution

Find the co-ordinates of N.

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

© UCLES 2018

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.