Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

0331239 75

MATHEMATICS (SYLLABUS D) **4024/11**

Paper 1 **May/June 2019**

2 hours

Candidates answer on the Question Paper.

Additional Materials: 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 in the space below that question.
Omission of essential working will result in loss of marks.

ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER.

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 80.

This document consists of **16** printed pages.

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ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER

1 **(a)** Evaluate $\frac{4}{9}+\frac{2}{5}$.

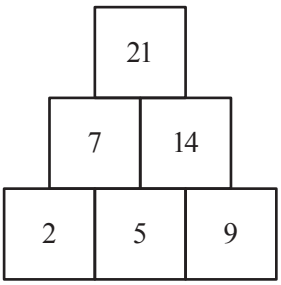
..... [1]

(b) Evaluate $1+0.6\div 0.02$.

..... [1]

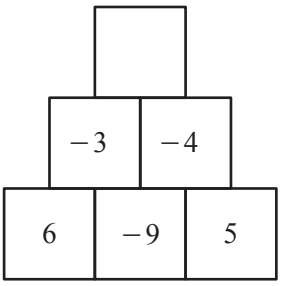
2 In the grids below, the number in each square is the sum of the two numbers immediately below it.

This grid has been completed for you.



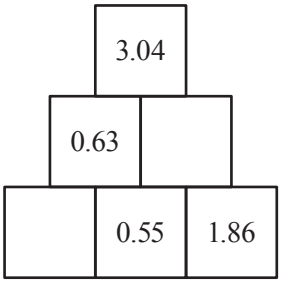
Complete the two grids below.

(a)



[1]

(b)



[2]

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3 Write these numbers in order of size, starting with the smallest.

$\sqrt{17}$ 4 4.5 $\sqrt[3]{63}$

..... , ... , ... , ... [2]
smallest

4 **(a)** Write 0.09 as a percentage.

.....% [1]

(b) Evaluate 75% of $\frac{3}{4}$.

..... [1]

5 A glass of drink is made by adding water to 20 millilitres of orange juice.

(a) Anna is making a glass of this drink.
She uses 9 ml of water for every 1 ml of orange juice.

Work out the volume of drink in this glass.

.....ml [1]

(b) Tariq has a bottle containing 2 litres of orange juice.
He uses all of the orange juice to make glasses of this drink.

Work out the number of glasses that he makes.

..... [1]

6 **(a)** Evaluate.

(i) $36^{\frac{1}{2}}$

..... [1]

(ii) 5^{-2}

..... [1]

(b) $2^2 \times 8^{\frac{5}{3}} = 2^k$

Find the value of k.

$k =$ ..... [2]

7 Yasmin swims at her local swimming pool.

(a) She pays \$4.65 each time she visits the pool.

Calculate the total amount of money she pays for 7 visits to the pool.

\$ ..... [1]

(b) On one visit she swims 40 lengths.
The first length she swims is length 1, the second is length 2 and so on.

She swims on her back on lengths which have numbers that are multiples of 4 or 5.

Calculate the number of lengths that she swims on her back.

..... [2]

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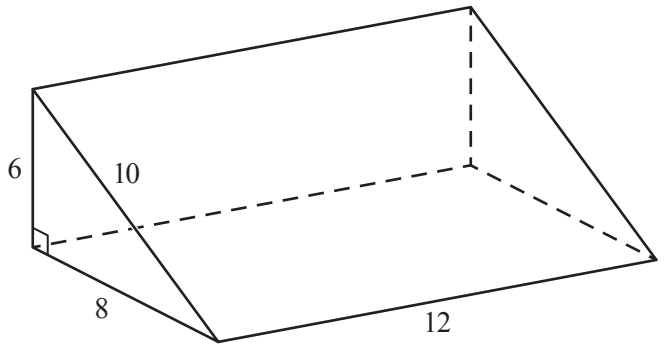
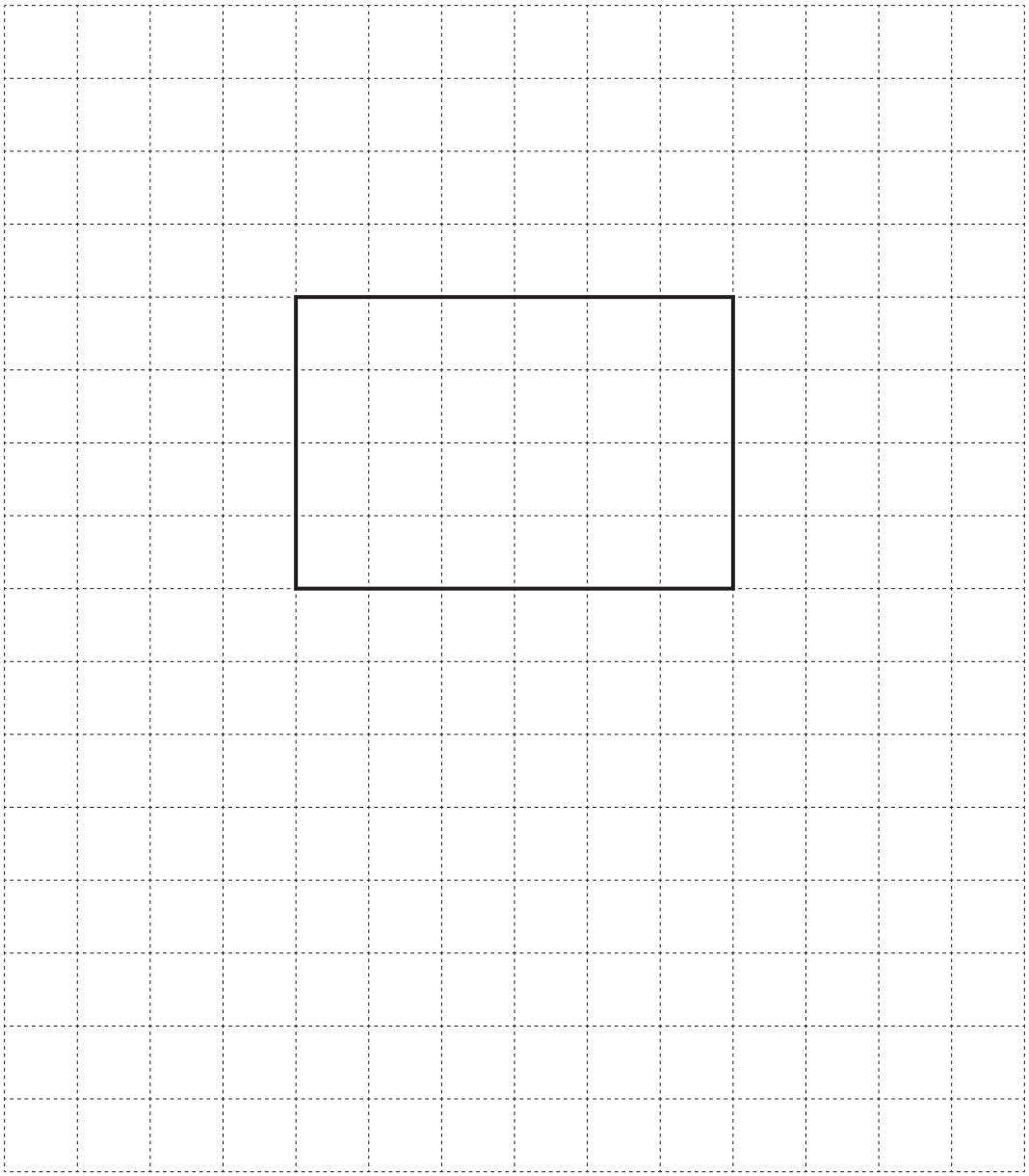
8



The diagram shows a triangular prism of length 12 cm.
The cross section is a right-angled triangle with sides 6 cm, 8 cm and 10 cm.

On the grid, draw a net of this prism.
Use a scale of 1 cm to represent 2 cm.
One face has been drawn for you.



[2]

9 The students in a school each choose a piece of fruit to eat with their lunch.
They can choose from either an apple, a banana or an orange.

(a) On Monday, Klaudia records the fruit chosen by 30 of her classmates.
Their choices are given below.

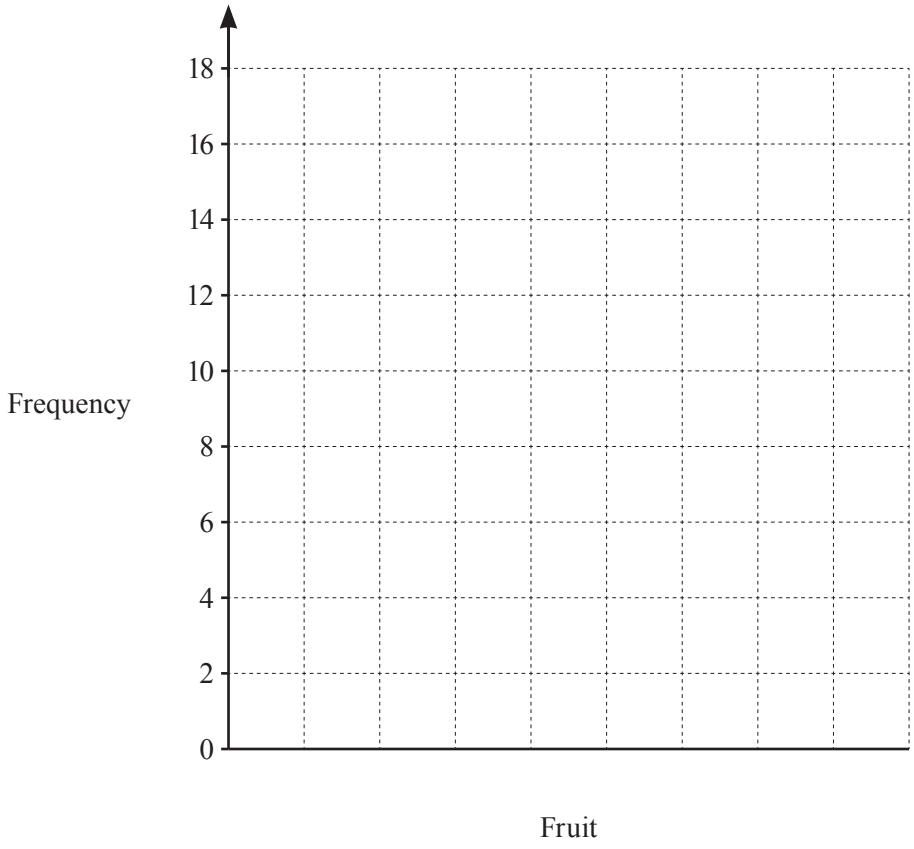
Orange	Apple	Orange	Apple	Apple	Orange
Banana	Orange	Apple	Banana	Orange	Orange
Apple	Banana	Orange	Apple	Orange	Banana
Orange	Apple	Banana	Apple	Banana	Orange
Apple	Orange	Orange	Banana	Apple	Banana

(i) Complete the frequency table for the data.

Fruit	Apple	Banana	Orange
Frequency			

[1]

(ii) On the grid below, draw a bar chart to show the data.



[2]

(b) On Tuesday, Ahmed records the fruit chosen by a random sample of 30 students in the lunch queue. His results are shown in the table below.

Fruit	Apple	Banana	Orange
Frequency	8	15	7

(i) Use Ahmed's results to estimate the probability that a student selected at random chooses an **orange**.

..... [1]

(ii) There is a total of 180 students in the school.

Use Ahmed's results to estimate the number of students in the school who chose an **apple** on Tuesday.

..... [1]

10 Factorise.

(a) $25x - 5$

..... [1]

(b) $2x^2 - 18y^2$

..... [2]

11 **(a)** Write 0.000 084 5 in standard form.

..... [1]

(b) $p = 2.7 \times 10^{11}$ $q = 9 \times 10^{12}$

Evaluate the following.
Give each answer in standard form.

(i) $p + q$

..... [1]

(ii) $p \div q$

..... [2]

12 The rth term of a sequence, u_r, is given by $u_r = 3r + 2$.

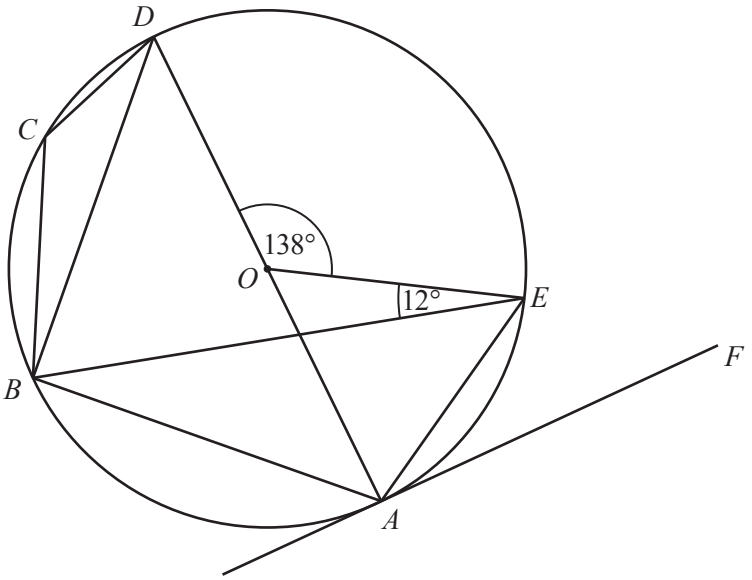
(a) Find the third term, u_3, in this sequence.

..... [1]

(b) Given that $u_k = 50$, find the value of k.

$k =$ ..... [1]

13



NOT TO SCALE

A, B, C, D and E are points on the circumference of a circle, centre O.
Tangent AF touches the circle at A.
O is the midpoint of AD.
$D\hat{O}E = 138°$ and $B\hat{E}O = 12°$.

(a) Find $E\hat{A}D$.

$E\hat{A}D =$ ..... [1]

(b) Find $E\hat{A}F$.

$E\hat{A}F =$ ..... [1]

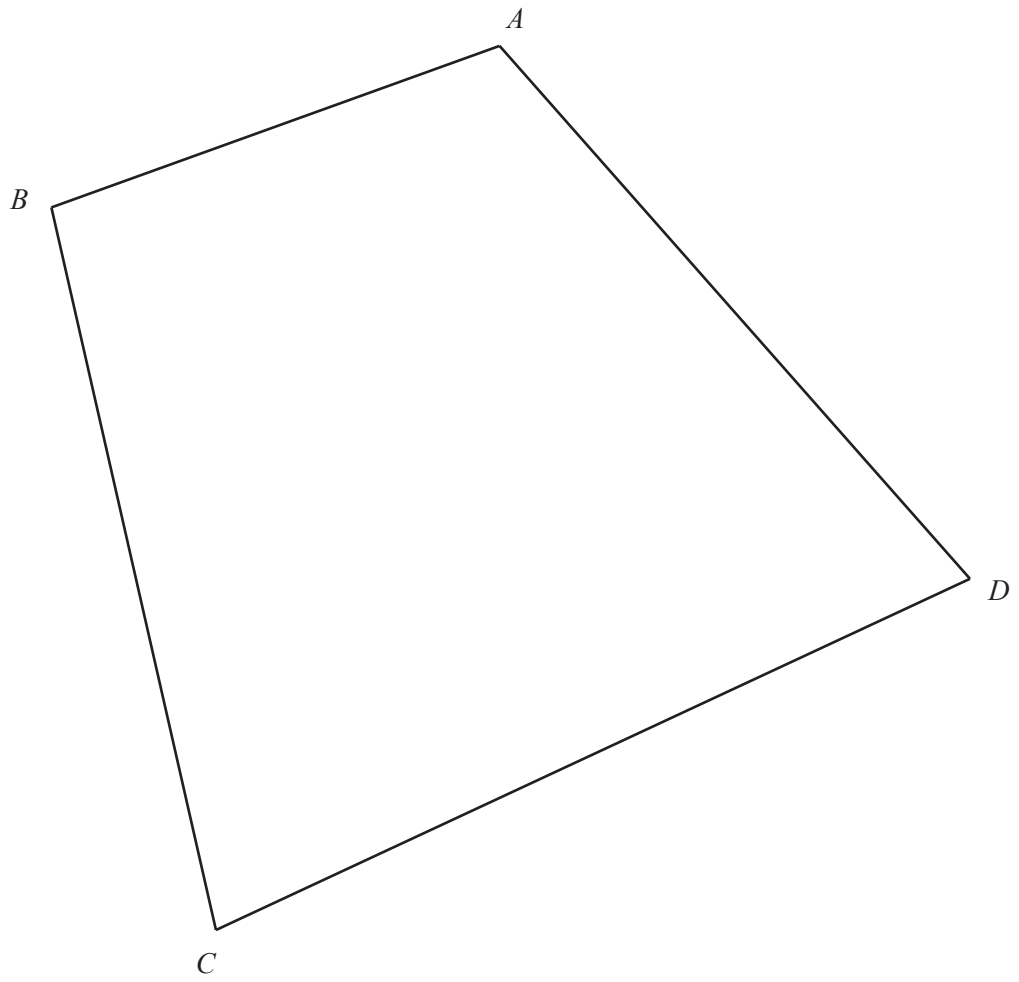
(c) Find $B\hat{E}A$.

$B\hat{E}A =$ ..... [1]

(d) Find $B\hat{C}D$.

$B\hat{C}D =$ ..... [2]

14 The diagram shows the plan of a garden, *ABCD*.



(a) **Use a straight edge and compasses only** to construct the locus of points inside *ABCD* that are

(i) equidistant from *A* and *B*, [2]

(ii) equidistant from *CD* and *AD*. [2]

(b) Stefan wants to plant a tree in the garden.

He wants the tree to be

- nearer to *A* than to *B*
  and
- nearer to *CD* than to *AD*.

Shade the region inside the garden where Stefan can plant the tree. [1]

15 $\mathbf{T} = \begin{pmatrix} 2 & 7 \\ 1 & 5 \end{pmatrix}$

Find $\mathbf{T}^{-1}$.

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

16 $c = \dfrac{3b^2 - 2a}{5}$

Rearrange the formula to make b the subject.

$b =$ ..... [3]

17 A line segment, AB, joins A (3, 2) to B (−1, 10).

(a) Find the coordinates of the midpoint of AB.

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

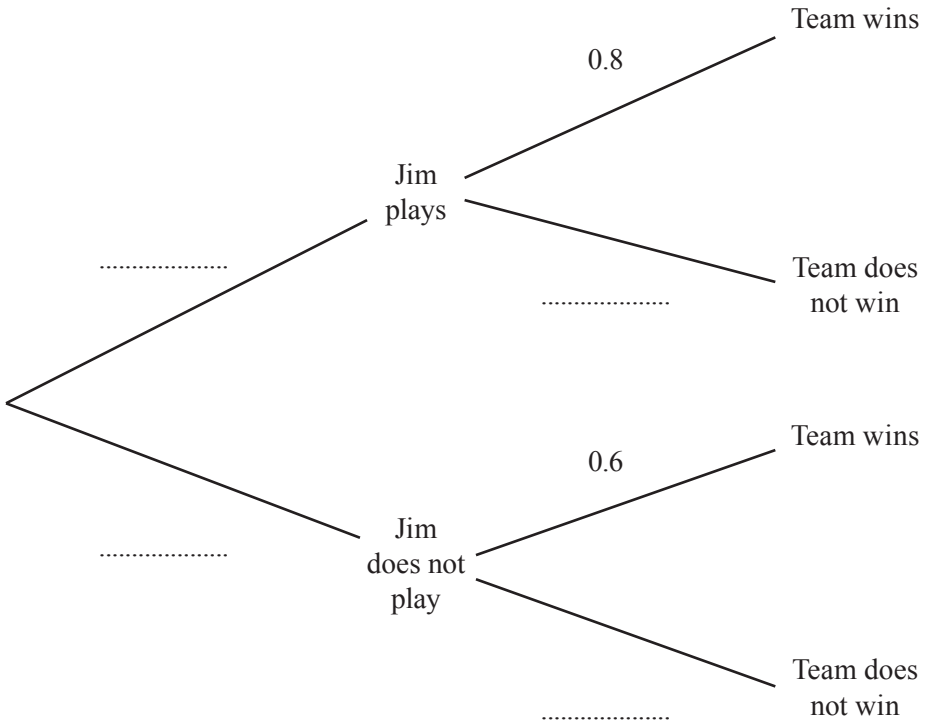
(b) Find the equation of the perpendicular bisector of AB.

..... [4]

18 Jim plays for his local football team.
The probability that Jim plays in the next match is 0.7 .

If Jim plays in the match, the probability of his team winning is 0.8 .
If Jim does not play in the match, the probability of his team winning is 0.6 .

(a) Complete the tree diagram.

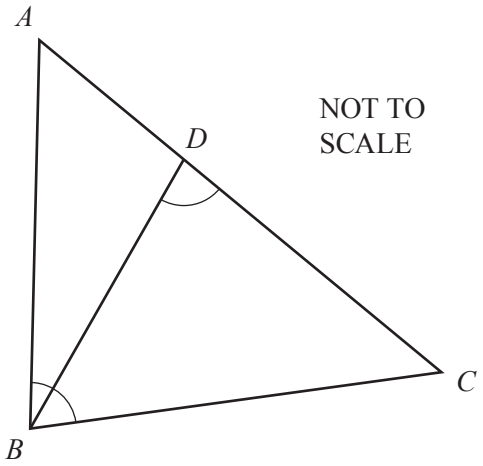


[2]

(b) Calculate the probability that Jim's team wins their next match.

..... [2]

19



The diagram shows triangle *ABC*.
D is a point on *AC* such that angle *BDC* = angle *ABC*.

(a) Explain why triangle *BDC* is similar to triangle *ABC*.
Give a reason for each statement you make.

.....

.....

.....

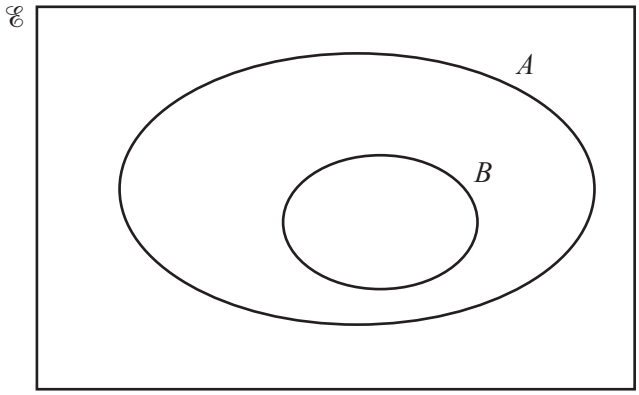
..... [2]

(b) $AC = 10\,\text{cm}$, $BC = 8\,\text{cm}$ and $BD = 6\,\text{cm}$.

Calculate *AB*.

AB = ... cm [2]

20 **(a)** On the Venn diagram, shade the region represented by $B' \cap A$.

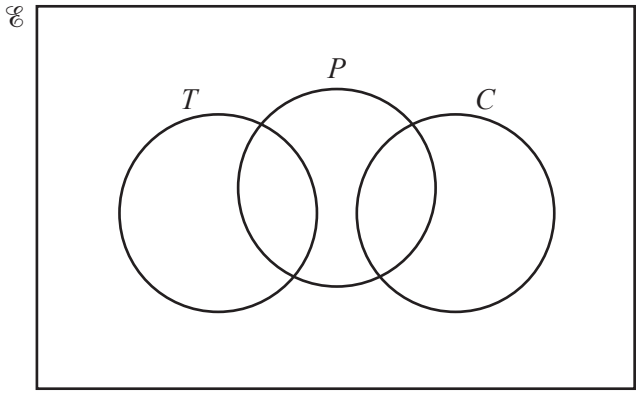


[1]

(b) Here is some information about 100 people who visit a café.

32 drink coffee (C)
40 drink tea (T)
50 eat a pastry (P)
18 drink coffee and eat a pastry
21 drink tea and eat a pastry

(i) Complete the Venn diagram to show this information for the 100 people.

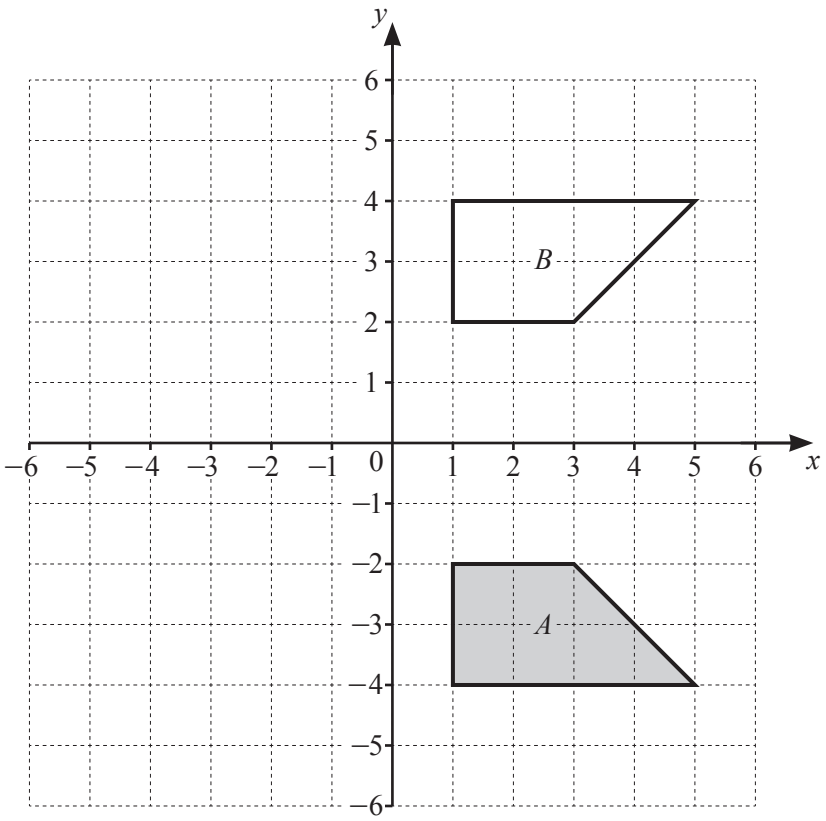


[2]

(ii) Find $n(T \cup P \cup C)'$.

..... [1]

21



Shapes A and B are drawn on the grid.

(a) Draw the image of shape A after a translation with vector $\begin{pmatrix} -4 \\ 1 \end{pmatrix}$. [1]

(b) Draw the image of shape A after an enlargement with scale factor $-\frac{1}{2}$ and centre (1, 0). [2]

(c) Shape A is mapped onto shape B by the **single** transformation P.

(i) Describe fully the transformation P.

..... [2]

(ii) Find the matrix representing transformation P.

$\begin{pmatrix} \quad & \quad \\ \quad & \quad \end{pmatrix}$ [1]

Question 22 and 23 are printed on the next page

22 Solve the simultaneous equations.
Show your working.

$$2x + 3y = 4$$
$$3x + 2y = 11$$

$x =$ .....

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

23 Solve the equation $(2x + 1)(x + 4) = 22$.

$x =$ ..... or $x =$ ..... [4]

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