

CANDIDATE
NAME

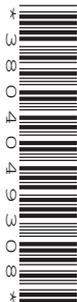
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CENTRE
NUMBER

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CANDIDATE
NUMBER

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MATHEMATICS

0626/06

Paper 6 (Extended)

October/November 2019

2 hours

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 all 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.

Electronic calculators should be used.

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.

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.

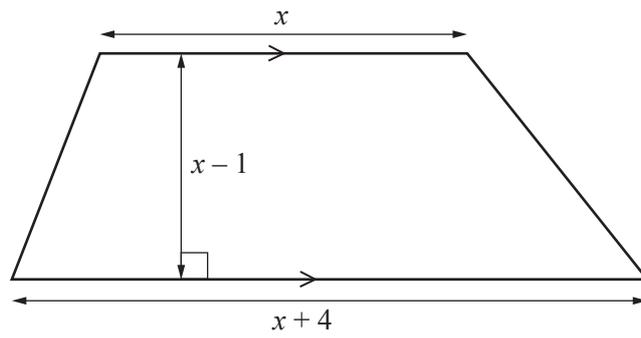
The total of the marks for this paper is 96.

This syllabus is regulated for use in England as a Cambridge International Level 1/Level 2 (9–1) Certificate.

This document consists of **19** printed pages and **1** blank page.



1 In this question all lengths are in centimetres.



NOT TO
SCALE

The area of this trapezium is 108 cm^2 .

(a) Show that $x^2 + x - 110 = 0$.

[4]

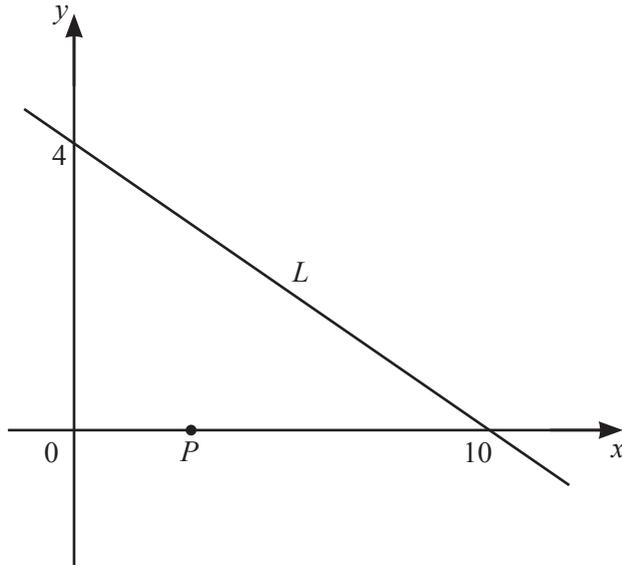
(b) Solve by factorisation $x^2 + x - 110 = 0$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

(c) Work out the perpendicular height of the trapezium.

$\dots\dots\dots$ cm [1]

2



NOT TO
SCALE

The diagram shows a straight line L .
The line crosses the axes at $(10, 0)$ and $(0, 4)$.

(a) Find the equation of line L .

..... [3]

(b) (i) Calculate the size of the acute angle that line L makes with the x -axis.

..... [2]

(ii) The point P has co-ordinates $(3, 0)$.

Calculate the shortest distance from point P to line L .

..... [3]

- 3 (a) Vladimir invested some money at a rate of 3% per year simple interest. After one year he has £642.72.

Work out how much money he invested.

£ [3]

- (b) On January 1st 2016 Maike changed £1000 to euros (€).
On January 1st 2017 she changed these euros (€) back to pounds (£).

The exchange rate on January 1st 2016 was £1 = €1.360.

The exchange rate on January 1st 2017 was £1 = €1.174.

Calculate the percentage increase in the value of her money for the year.
Give your answer correct to 1 decimal place.

.....% [4]

- (c) Albert invests £400 at a rate of 2% per year compound interest.
On the same day, Ximena invests £390 at a rate of 2.5% per year compound interest.

Work out the number of whole years needed for the value of Ximena's investment to be greater than the value of Albert's investment.

You must show working to support your answer.

..... [4]

- (d) Johan invests in an account that pays a rate of 4% compound interest per year. The account has a yearly charge of £20, which is deducted at the end of each year.
- (i) The iterative formula $u_{r+1} = 1.04 \times u_r - 20$ can be used to calculate the value of Johan's investment in pounds at the end of each year.
 u_r is the value of Johan's investment at the end of year r .

Given that $u_0 = 600$, find u_3 .
 Give your answer correct to the nearest penny.

$$u_3 = \dots\dots\dots [3]$$

- (ii) Complete this statement.

A person should not invest less than £ in this account
 because
 [2]

- 4 (a) Kuda constructs a regular polygon with exterior angles of 12° .

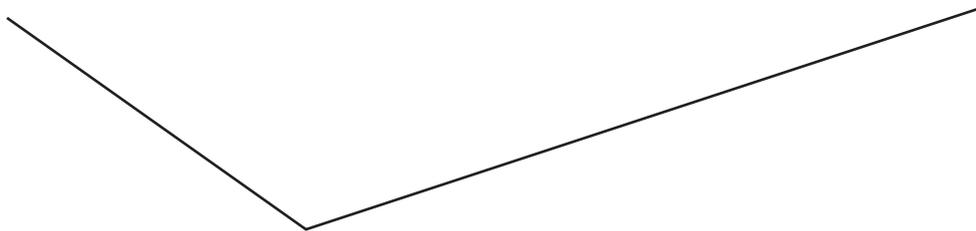
How many sides does Kuda's polygon have?

..... [2]

- (b) Use a straight edge and compasses only for this question.
You must show all your construction arcs.

- (i) Here are two sides of a parallelogram.

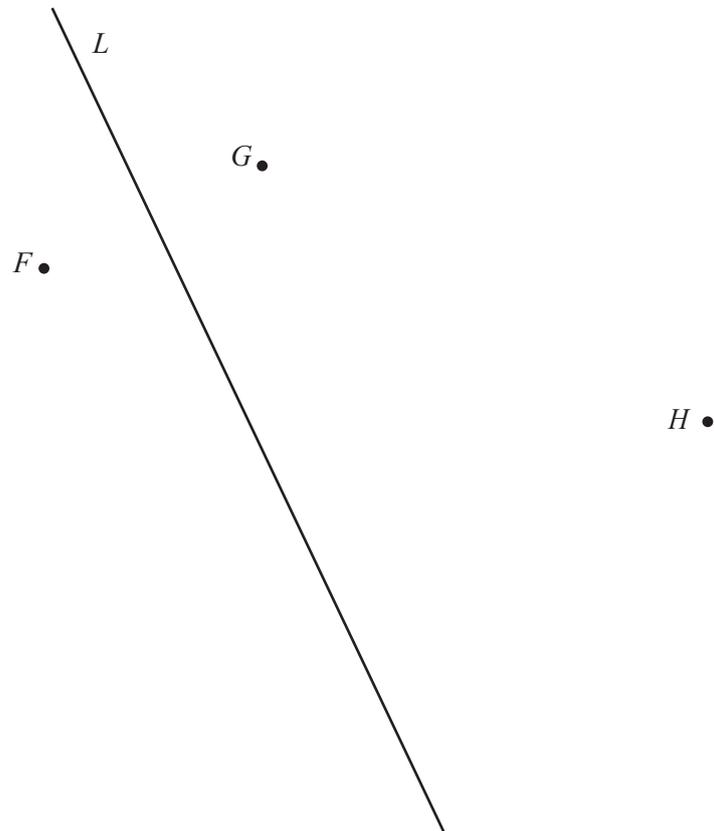
Construct the parallelogram.



[2]

(ii) Line L is the perpendicular bisector of FG .

Construct the circle that passes through the points F , G and H .

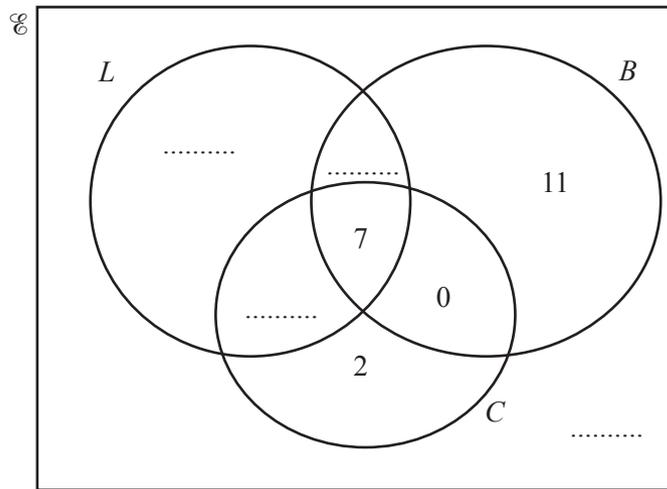


[3]

5 (a) Some children are asked which vegetables they like from leeks (L), beans (B) and carrots (C).

- 11 children like both leeks and beans
- 9 children like leeks but do not like carrots
- $n(L) = 17$
- $\frac{1}{4}$ of the children asked like carrots

(i) Complete the Venn diagram.



[3]

(ii) Work out the number of children who like at least two of the vegetables.

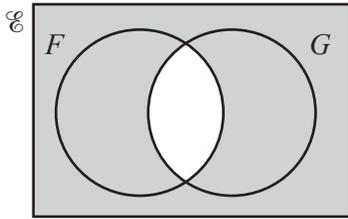
..... [1]

(iii) Find $n(L' \cap (B \cup C))$.

..... [1]

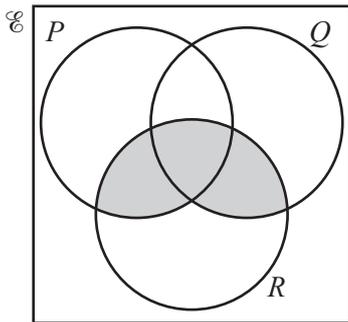
(b) Use set notation to describe the shaded region in each Venn diagram.

(i)



..... [1]

(ii)



..... [1]

6 Nathan bakes x chocolate cakes and y fruit cakes.

He wants to bake

- at least 4 chocolate cakes
- at least 2 fruit cakes
- a total of at least 9 cakes.

(a) This information can be represented by three inequalities.

Write down these inequalities.
The first one has been done for you.

$x \geq 4$

.....

.....

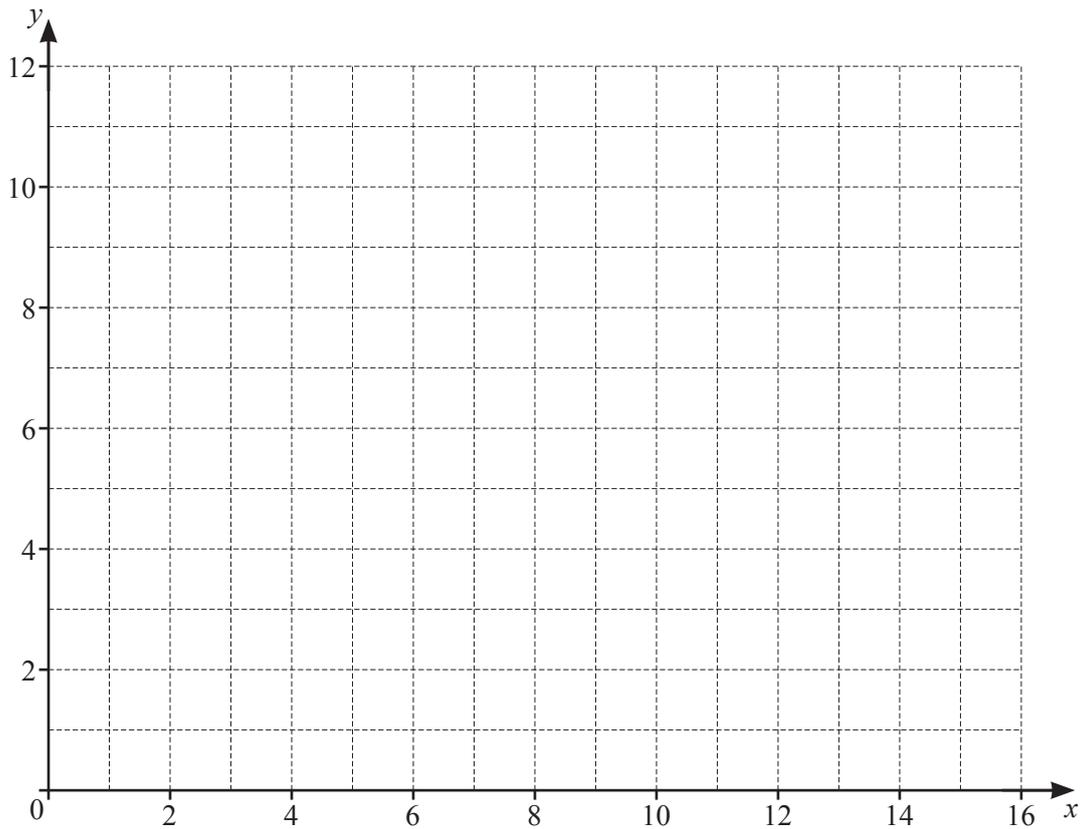
..... [2]

(b) A chocolate cake uses 400 g of flour.
A fruit cake uses 700 g of flour.
Nathan has 5600 g of flour.

Write down another inequality in x and y to show this information.

..... [1]

(c) Draw four lines on the grid to show your inequalities and shade the **unwanted** regions.



[6]

(d) Find the greatest number of cakes Nathan can bake.

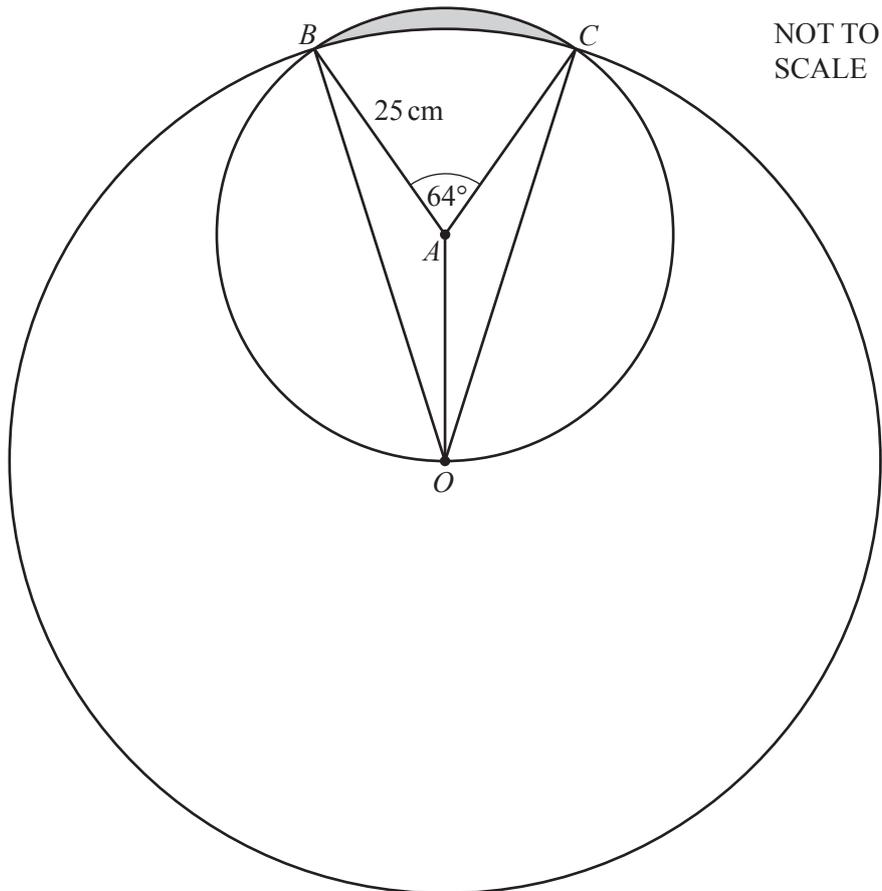
..... [1]

(e) Nathan makes a profit of £1.50 for each chocolate cake and £4 for each fruit cake he bakes. He wants to maximise his profit.

Find the number of each type of cake he should bake and the profit he makes.

Nathan should bake chocolate cakes and fruit cakes.

Nathan's maximum profit is £ [2]



The diagram shows two intersecting circles.

The large circle has centre O and passes through points B and C .

The small circle has centre A , radius 25 cm and passes through points B , C and O .

Angle $BAC = 64^\circ$.

Triangles OAB and OAC are congruent.

(a) For the small circle, calculate the area of sector ABC .

.....cm² [2]

(b) Calculate OB , the radius of the large circle.

$OB = \dots\dots\dots$ cm [4]

(c) Calculate the area of triangle AOB .

$\dots\dots\dots$ cm² [2]

(d) Calculate the area of the shaded region.

$\dots\dots\dots$ cm² [4]

8 In a survey, 250 commuters were asked how much money they spent on public transport in 2018.

(a) The data was collected at a train station one Monday between 1 pm and 7 pm.

Give two limitations in the way the data was collected and suggest an improvement for each.

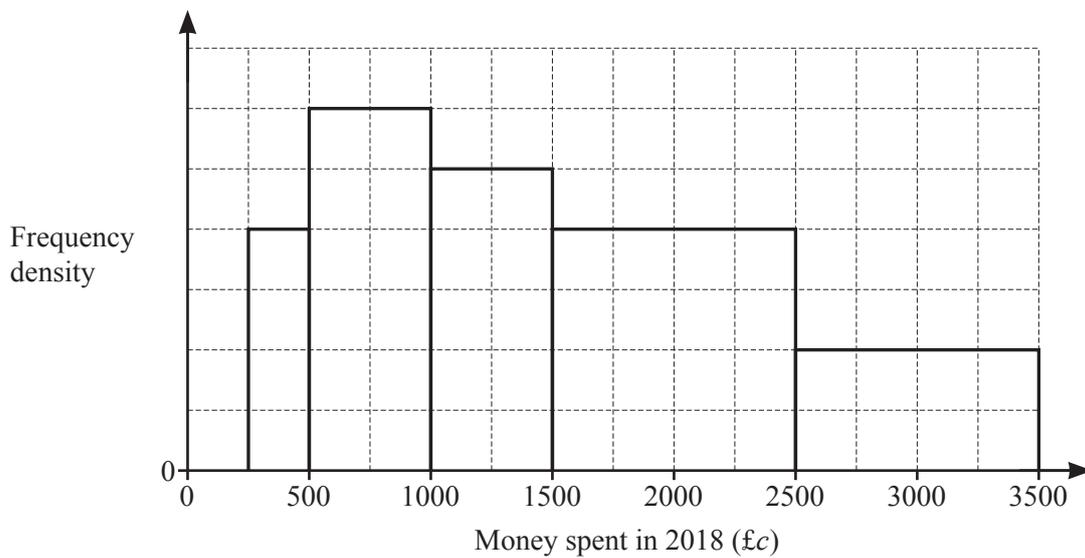
1. Limitation

Improvement

2. Limitation

Improvement [2]

(b) The results from the survey are shown in the histogram.



There were 40 commuters who spent between £2500 and £3500.

Complete the table.

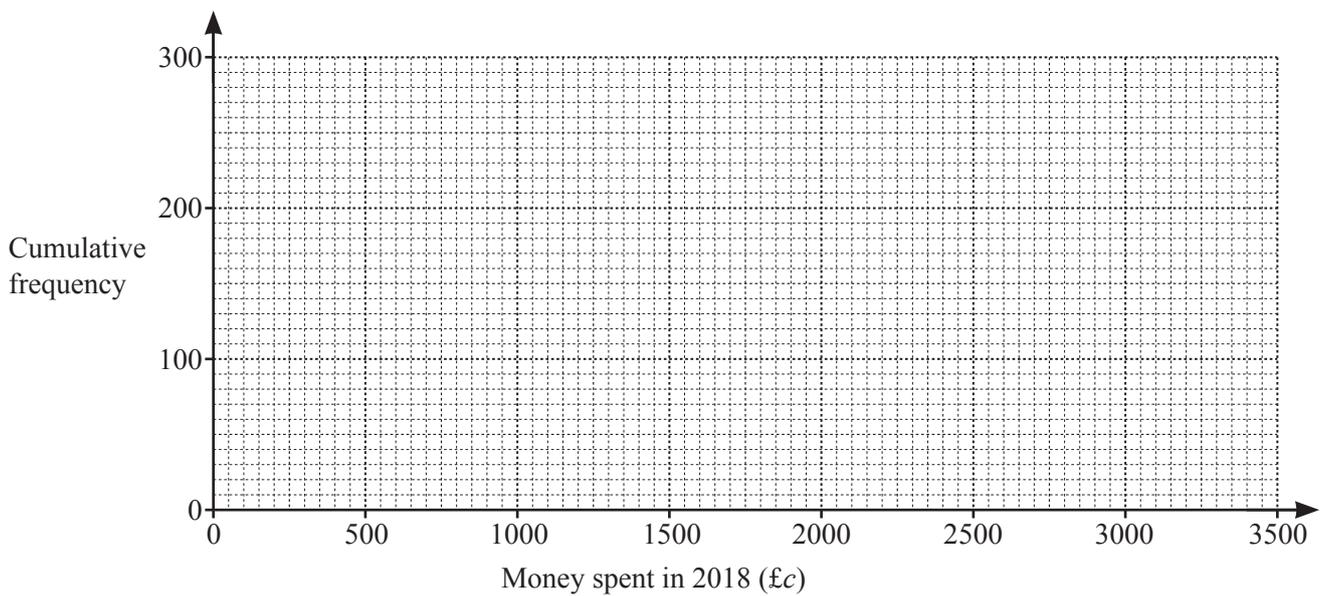
Money spent in 2018 (£c)	Frequency
$250 \leq c < 500$	
$500 \leq c < 1000$	
$1000 \leq c < 1500$	
$1500 \leq c < 2500$	
$2500 \leq c < 3500$	40
Total	250

[2]

(c) Calculate an estimate for the mean amount of money spent on public transport by these commuters.

£ [4]

(d) (i) On the grid, draw a cumulative frequency diagram to show the data from the survey.



[4]

(ii) Use your cumulative frequency diagram to estimate the inter-quartile range.

£ [2]

9 A curve has equation $y = x^3 - 3x^2$.

(a) Find $\frac{dy}{dx}$.

$$\frac{dy}{dx} = \dots\dots\dots [2]$$

(b) (i) Find the co-ordinates of the two turning points of the curve.

$$(\dots\dots\dots, \dots\dots\dots) \text{ and } (\dots\dots\dots, \dots\dots\dots) [4]$$

(ii) Determine whether each turning point is a maximum or a minimum.
Show clearly how you decide.

[3]

- (c) Work out the exact values of x where the curve has gradient 6.
Give your answers in their simplest form.

$x = \dots\dots\dots$ and $x = \dots\dots\dots$ [3]

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