Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education (9–1)

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

0631195231

MATHEMATICS **0626/04**

Paper 4 (Extended) **October/November 2017**

1 hour 30 minutes

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 or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
CALCULATORS MAY NOT BE USED IN THIS PAPER.
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.

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 84.

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

This document consists of **15** printed pages and **1** blank page.

CAMBRIDGE International Examinations

1 A straight line passes through the point (0, 3) and the point (2, 11).

(a) Work out the gradient of this line.

..... [2]

(b) Write down the equation of this line.

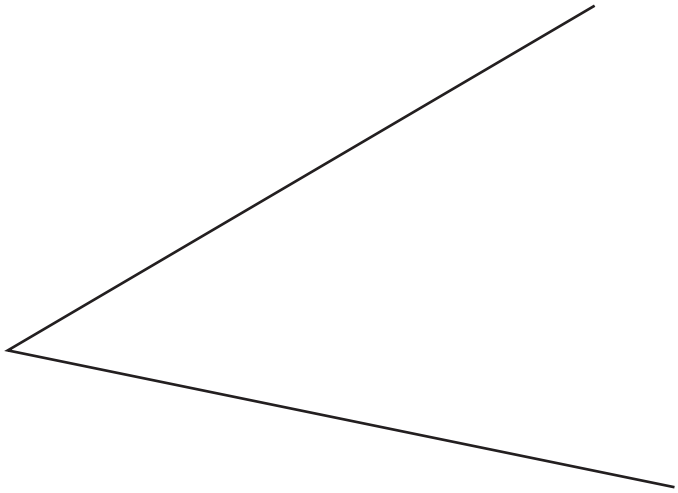
$y =$ ..... [1]

2 One of the angles in a triangle is twice as big as the smallest angle.
The third angle in the triangle is 40° bigger than the smallest angle.

Work out the sizes of the three angles in the triangle.

.....°, ...°, ...° [4]

3 Construct the bisector of this acute angle.
Use a straight edge and compasses only.
Leave in all your construction arcs.



[2]

4 $Q = 2^n - 1$

(a) Work out the value of Q when $n = 3$.

$Q =$ ..... [1]

(b) Q is a prime number for some values of n.

Find the values of Q that are prime when $n = 2$, 3, 4 or 5.

..... [2]

(c) When $n = 6$, Q is not a prime number.

Explain how you know this value of Q is not prime.

.....

..... [1]

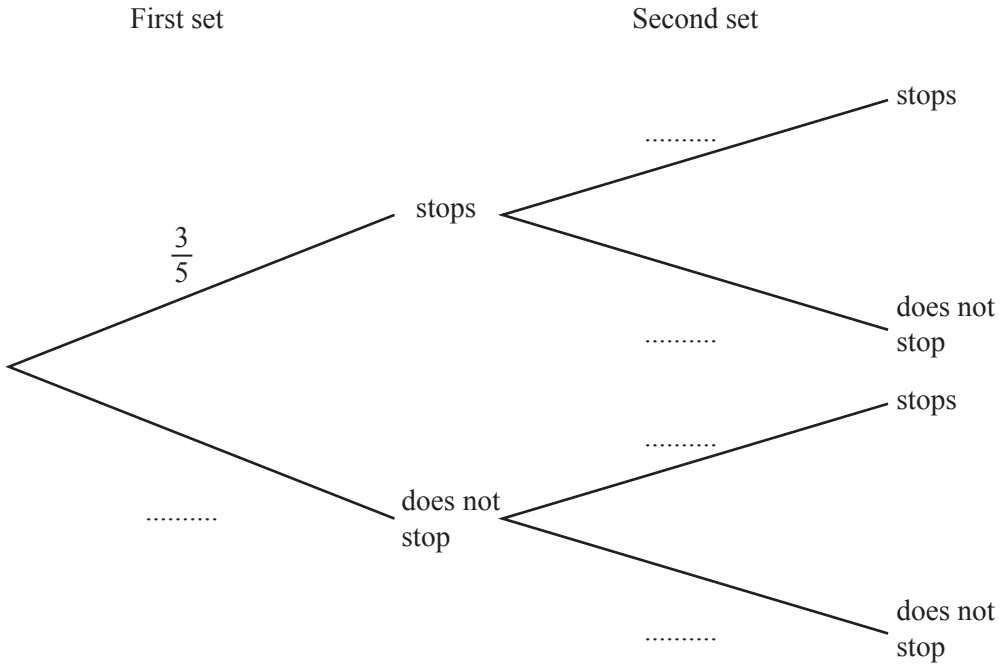
5 Ewan travels to work by car.
He goes through two sets of traffic lights on his journey.

The probability that he stops at the first set of traffic lights is $\frac{3}{5}$.

The probability that he stops at the second set of traffic lights is $\frac{4}{7}$.

These probabilities are independent.

(a) Complete the tree diagram.



[2]

(b) Work out the probability that Ewan stops at **neither** set of traffic lights.

..... [2]

6 **(a)** Factorise $x^2 - 3x - 18$.

..... [2]

(b) Solve $x^2 - 3x - 18 = 0$.

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

7 Sophie drives 125 miles from Adton to Berham at an average speed of 50 miles per hour.
She then drives 90 miles from Berham to Chand.
She does not stop and her whole journey takes 4 hours.

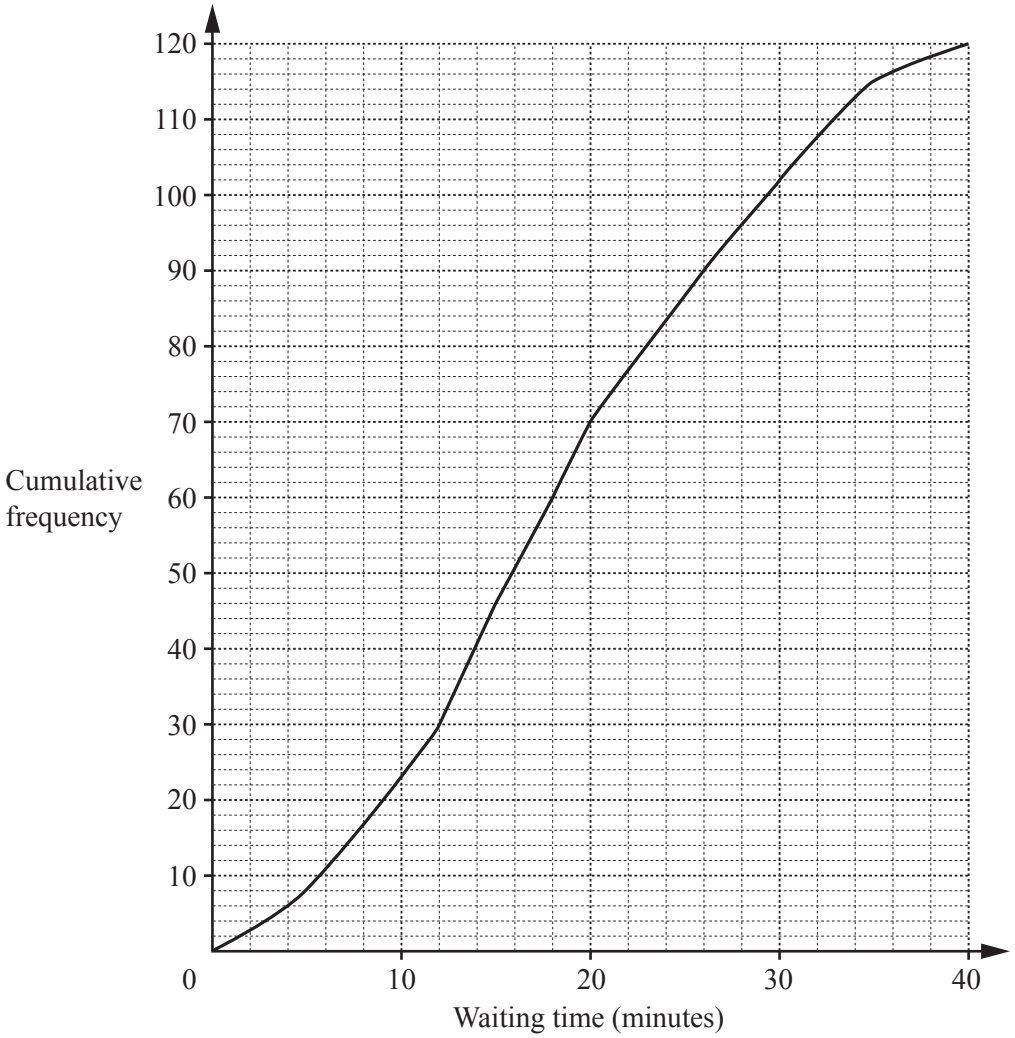
What is her average speed driving from Berham to Chand?

..... mph [4]

8 Show that $(x+7)(x-4)+3x(x-1)$ simplifies to $4(x^2-7)$.

[3]

9



This cumulative frequency diagram summarises the waiting times of 120 patients in a doctor's surgery.

(a) Use the diagram to estimate

(i) the median waiting time,

..... minutes [1]

(ii) the inter-quartile range.

..... minutes [2]

(b) Use the diagram to estimate the percentage of patients who waited longer than 30 minutes.

.....% [3]

10 **(a)** Simplify.

$$9k^2 \div 3k^{-5}$$

..... [1]

(b) Evaluate.

$$\left(\frac{4}{25}\right)^{-\frac{1}{2}}$$

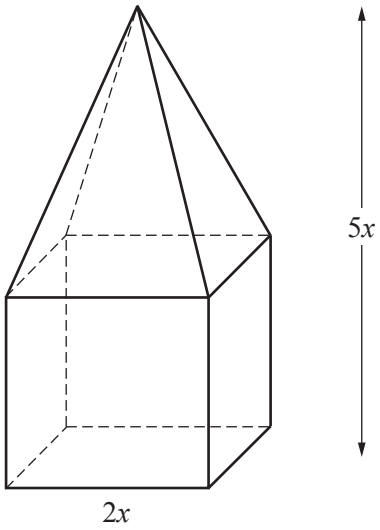
..... [2]

(c) $27^x = 3$

Find the value of x.

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

11 In this question all lengths are in centimetres.



NOT TO SCALE

A solid shape consists of a cube with a pyramid on top.
The cube has sides of length $2x$.

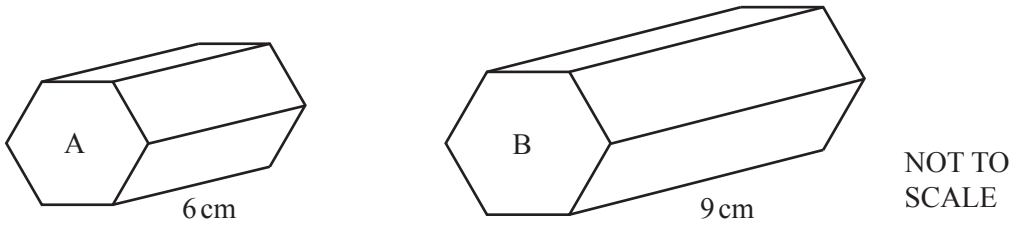
The base of the pyramid is a square with sides of length $2x$.
The vertex at the top of the pyramid is $5x$ above the base of the cube.

Find an expression, in terms of x, for the volume of the solid.
Give your answer in its simplest form.

[The volume, V, of a pyramid with base area A and height h is $V = \frac{1}{3}Ah$.]

.....cm^3 [4]

12



These are two mathematically similar hexagonal prisms.

Prism A has length 6 cm and volume 80 cm^3.
Prism B has length 9 cm.

Calculate the volume of prism B.

.....cm^3 [3]

13 Express $0.\dot{7}\dot{8}$ as a fraction in its simplest form.

..... [3]

14 A town planner uses this formula to predict the population, P, of a town after 2017.

$$P = 36\,700 \times 1.06^n$$

where n is the number of years after 2017 and $0 \leqslant n \leqslant 5$.

(a) For how many years is the formula used?

..... [1]

(b) What is the population of the town in 2017?

..... [1]

(c) By what percentage is the population expected to grow each year?

.....% [1]

15

$$\mathbf{A} = \begin{pmatrix} 4 & 3 \\ 6 & 7 \end{pmatrix}$$

(a) Find $3\mathbf{A}$.

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

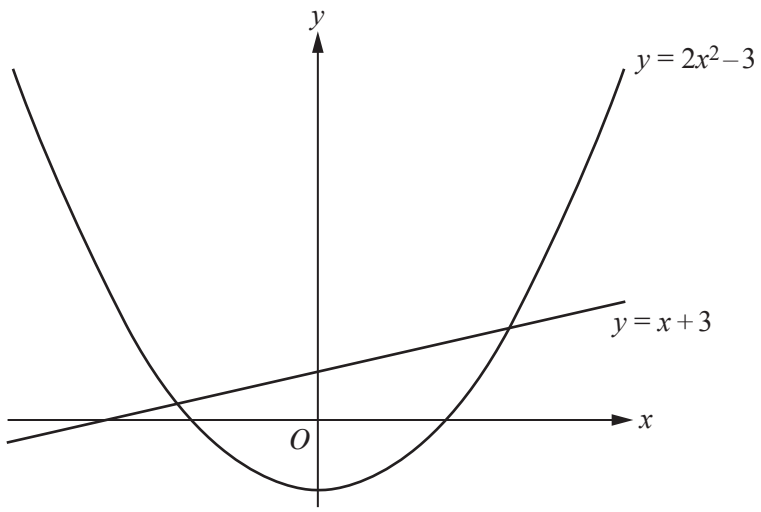
(b) Work out $|\mathbf{A}|$.

..... [1]

(c) Find $\mathbf{A}^{-1}$.

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

16 This is a sketch of the graphs of $y = 2x^2 - 3$ and $y = x + 3$.



Work out the co-ordinates of the points of intersection of $y = 2x^2 - 3$ and $y = x + 3$.

(..... , ...) and (..... , ...) [5]

17 Millie makes lemon cakes and chocolate cakes to sell.
A lemon cake requires 250 g of flour and a chocolate cake requires 375 g of flour.
Millie has 6 kg of flour.

Millie makes x lemon cakes and y chocolate cakes.

(a) Show that $2x + 3y \leqslant 48$.

[2]

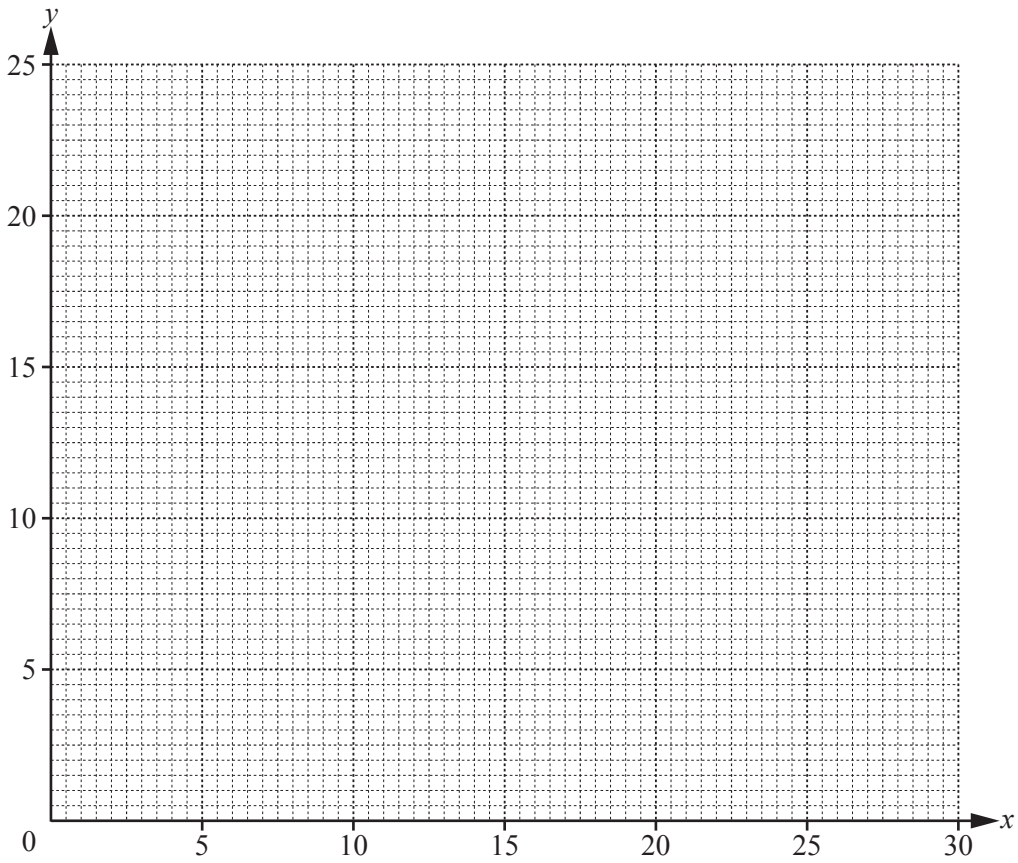
(b) The maximum number of cakes that she can make is 20.
She must make at least 3 chocolate cakes.

Write down two further inequalities involving x and y.

.....

..... [2]

(c) Represent the three inequalities on this grid.
Shade the regions that do **not** satisfy the inequalities.



[4]

(d) Each lemon cake sells for a profit of £5.
Each chocolate cake sells for a profit of £7.

What is the greatest profit that Millie can make?

£ ..... [2]

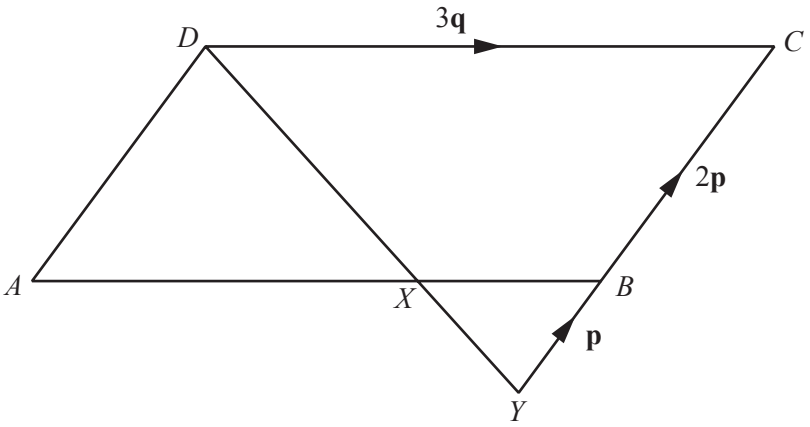
18 $(x-g)(2x^2+x-15)=(x^2-9)(2x+h)$

Find the value of g and the value of h.

g = ...

h = ... [4]

19



NOT TO SCALE

ABCD is a parallelogram.

$\overrightarrow{DC} = 3\mathbf{q}$, $\overrightarrow{BC} = 2\mathbf{p}$ and $\overrightarrow{YB} = \mathbf{p}$.
X is the point on *AB* such that $AX : XB = 2 : 1$.

(a) Find $\overrightarrow{DX}$ in terms of **p** and **q**.
Give your answer in its simplest form.

$\overrightarrow{DX}$ = ... [3]

(b) Show that *DXY* is a straight line.

[2]

20 $\sin 63° = 0.89$, correct to 2 decimal places.

Use this result to solve $\sin x = -0.89$ for $0° \leqslant x \leqslant 360°$.

..... [3]

21 Show that $\frac{2}{\sqrt{27}} + \frac{1}{\sqrt{3}}$ can be written as $\frac{m\sqrt{3}}{n}$, where m and n are integers to be found.

[4]

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