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

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

MATHEMATICS 0626/03

Paper 3 (Core) **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.

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1 Work out.

    (a) $77 + 245$

.... [1]

    (b) $-153 + 216$

.... [1]

2 **(a)** Measure the length of this line in centimetres.
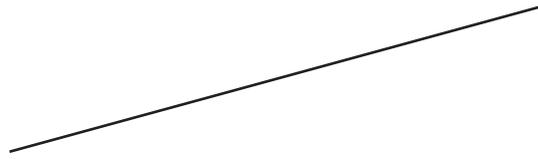
.... cm [1]

(b) **(i)** Measure the size of this angle in degrees.
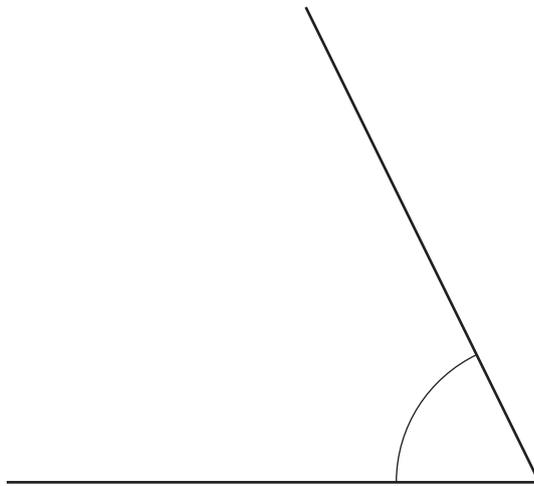
....° [1]

(ii) Circle the word in this list that describes the angle in **part (b)(i)**.

Right angle   Obtuse   Acute   Reflex   Congruent

[1]

3 (a) Find a common multiple of 12 and 15.

.... [1]

(b) Find a common factor of 12 and 15.

.... [1]

4 Complete this table.
The first row is done for you.

Fraction		Decimal		Percentage
$\frac{1}{2}$	=	0.5	=	50%
$\frac{1}{4}$	=	....	=	...........................%
....	=	0.7	=	...........................%
....	=	....	=	3%

[3]

5 Write down the most appropriate metric unit to measure the following.

(a) The mass of a large dog.

.... [1]

(b) The area of a piece of A4 file paper.

.... [1]

6   **Use a ruler and compasses only in this question.**
    Leave in all your construction arcs.

A small field is in the shape of a triangle with sides of length 30 m, 20 m and 35 m.

Construct an accurate scale drawing of the field.
Use a scale of 1 cm to 5 m.
One line has been drawn for you.

Scale: 1 cm to 5 m

[3]

7 **(a)** Simplify.

$$3r - 2p + 6p - 8r$$

.... [2]

(b) This is part of Pedro's homework.

Explain how he could improve each answer.

Question	Pedro's answer	How could Pedro improve his answer?
$4k \times 3k$	$12kk$	
$6p - 5p$	$1p$	

[2]

8 Work out.

$$17 \times 3.8$$

.... [3]

9 Angelique records the colour of each car in her school car park.
Her results are shown in the table.

Car colour	Frequency
Grey	37
White	9
Black	6
Blue	5
Red	3
Other	8

(a) Work out the total number of cars in the school car park.

.... [1]

(b) Angelique says that more than half of the teachers at her school have grey cars.

Give a reason why she might be wrong.

....

.... [1]

(c) Angelique selects a car at random from the school car park.

(i) What is the probability that it is white?

.... [1]

(ii) What is the probability that it is grey or blue?
Give your answer as a fraction in its simplest form.

.... [2]

10 Max uses $\frac{2}{3}$ pint of milk each day.

He buys milk in 2-pint containers.

How many containers does he need to buy for one week?

.... [2]

11 Points A and B are marked on the grid.
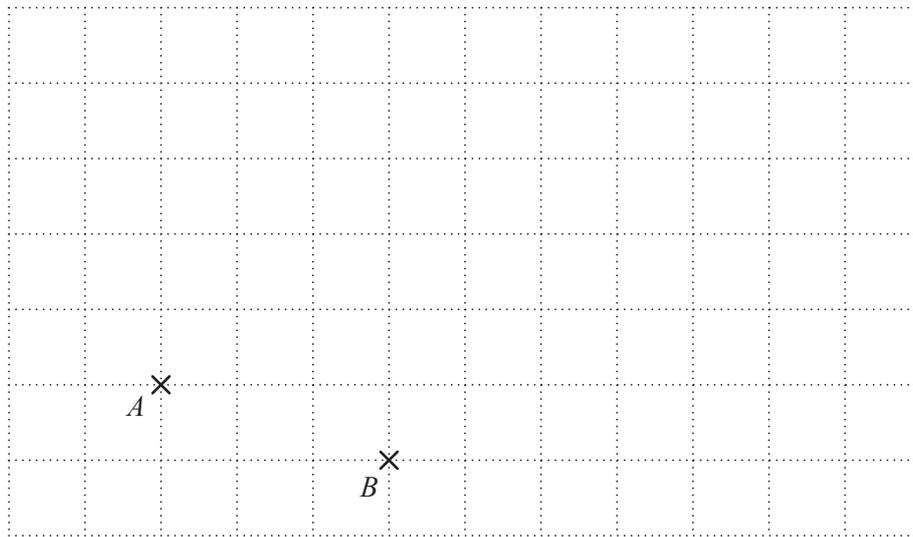
(a) Write $\overrightarrow{AB}$ as a column vector.

$$\overrightarrow{AB} = \begin{pmatrix} & \\ & \end{pmatrix} \text{[1]}$$

(b) Another vector, **p**, can be drawn on the grid.

Vector **p** is parallel to $\overrightarrow{AB}$.

What is the longest vector **p** that can be drawn on this grid?
Write your answer as a column vector.

$$\mathbf{p} = \begin{pmatrix} & \\ & \end{pmatrix} \text{[2]}$$

12 Jane wins £80 in a competition.
She gives 60% of this money to her son Nathan.
Nathan gives 20% of his share to charity.

Work out how much Nathan gives to charity.

£.. [4]

13 Work out the value of $5x^2$ when $x = -3$.

.... [2]

14 Write each number correct to 2 significant figures.

(a) 27 469

.... [1]

(b) 0.059 84

.... [1]

15 Lorenzo is asked to work out $2 + 4 \times 5^2 - 3$.
Here is his working.

$$2 + 4 = 6$$

$$6 \times 5 = 30$$

$$30^2 = 600$$

$$600 - 3 = 597$$

(a) Write down **two** errors that he made in his working.

1 ....

....

2 ....

.... [2]

(b) Work out the correct answer to the calculation $2 + 4 \times 5^2 - 3$.

.... [2]

16 Work out.

$$\frac{2}{3} \times \frac{1}{8}$$

Give your answer in its simplest form.

.... [2]

17 A group of sixth form students do a maths test and a physics test.
Their results are given in the table.

Maths	25	41	50	64	65	70	77	86	93
Physics	12	23	38	38	53	62	94	75	80

The results for the first four students are plotted on the scatter diagram.
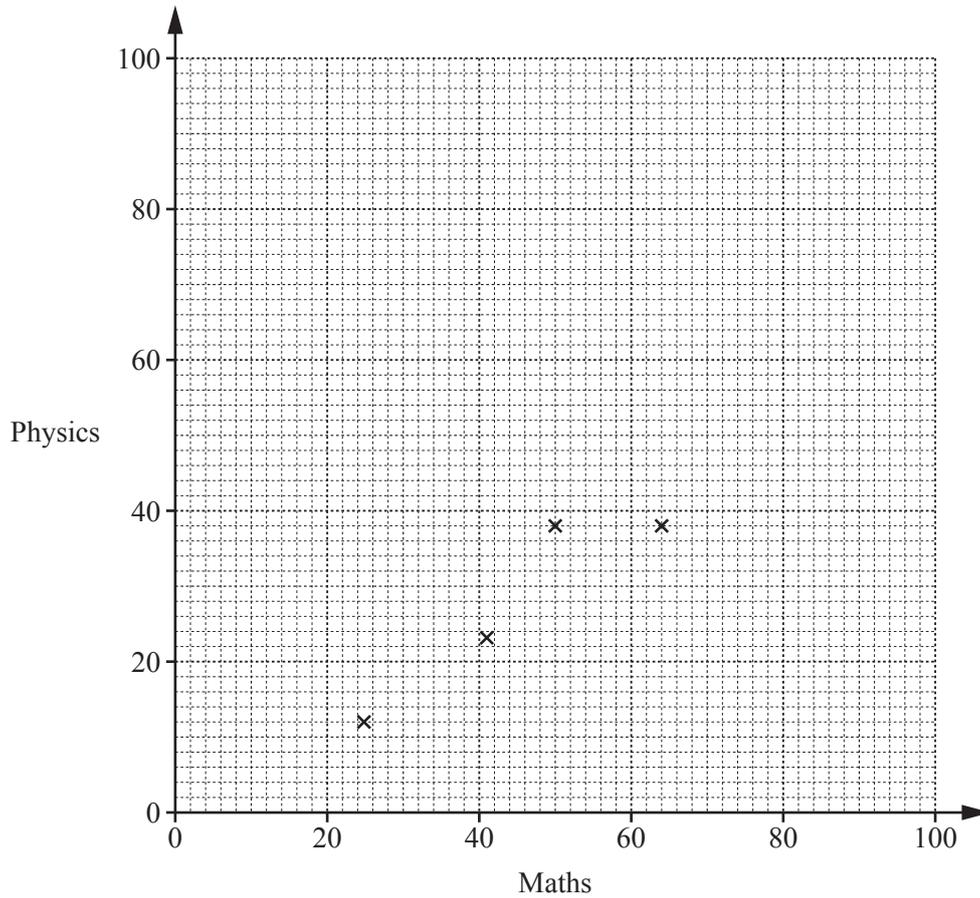
(a) Complete the scatter diagram. [2]

(b) What type of correlation is shown on the scatter diagram?

.... [1]

18 At a museum the cost of an adult ticket is £8 and the cost of a child ticket is £5.

One day the museum sells a adult tickets and 20 child tickets.
On that day, the museum takes £380 from ticket sales.

(a) Write down an equation, in terms of a, for the amount of money the museum takes on that day.

.... [2]

(b) Find the number of adult tickets sold.

.... [2]

19 £288 is divided in the ratio 3 : 4 : 5.

Find the difference, in pounds, between the largest share and the smallest share.

£ .... [3]

20 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]

21 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]

22 Construct the bisector of this acute angle.
Use a straight edge and compasses only.
Leave in all your construction arcs.
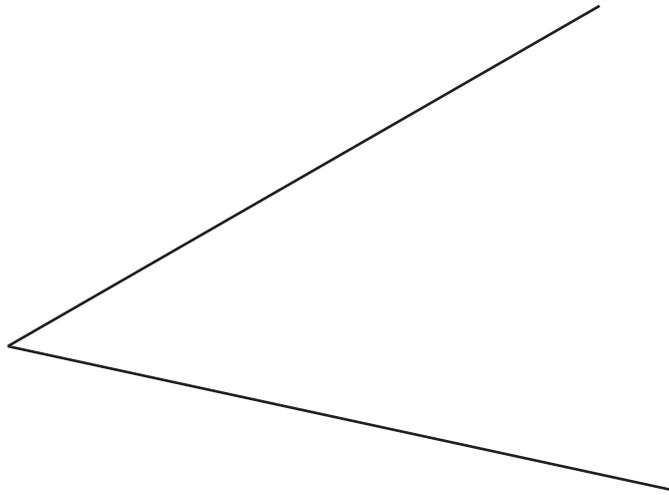
[2]

23 $Q = 2^n - 1$

(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]

24 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.

First set   Second set

[2]

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

.... [2]

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

.... [2]

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

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

Questions 26, 27 and 28 are printed on the next page.

 [Turn over

26 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]

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

[3]

28 Simplify.

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

.... [1]