

CANDIDATE  
NAME

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CENTRE  
NUMBER

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**MATHEMATICS**

Paper 2 (Extended)

**0626/02**

**May/June 2017**

**1 hour**

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  $\pi$ , 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 60.

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

This document consists of **12** printed pages.

- 1 The table shows the relative frequency of the medals awarded in a national mathematics competition.

| Medal              | None | Bronze | Silver | Gold |
|--------------------|------|--------|--------|------|
| Relative frequency | 0.35 | 0.4    |        | 0.1  |

- (a) Complete the table. [2]

- (b) 120 students from one school entered the competition.

Work out the expected number of bronze medals awarded to these students.

..... [1]

- 2 Simplify.

(a)  $m^0 \times m^3$

..... [1]

(b)  $(y^4)^{-2}$

..... [1]

(c)  $\frac{3x^6y^4}{21x}$

..... [2]

- 3 Write down an irrational number between 6 and 7.

..... [1]

4 Calculate.

$$\frac{\sqrt{7.4^3 + 562}}{\tan 88^\circ - 25}$$

Give your answer correct to 3 decimal places.

..... [2]

5 The length,  $l$  metres, of a piece of rope is 13.2 metres correct to 1 decimal place.

(a) Complete the following statement about  $l$ .

.....  $\leq l <$  ..... [2]

(b) A water wheel has radius 2.1 metres.

Show that the rope may not be long enough to fit around the circumference of the wheel.

[3]

- 6 Asim takes 45 minutes to travel along a road.  
On a map, the road measures 8.4 cm.  
The scale of the map is 1:150 000.

(a) Work out Asim's average speed in kilometres per hour.

..... km/h [4]

(b) Rosie says:

At that speed, Asim cannot be driving a car.

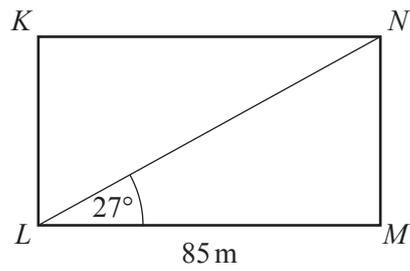
Comment on Rosie's statement.

.....  
..... [1]

- 7 The number 2017 can be written as the sum of two square numbers.  
One of the square numbers is less than 100.

Complete the sum.

2017 = ..... + ..... [2]



NOT TO  
SCALE

The diagram shows a rectangle  $KLMN$ .

(a) Calculate  $LN$ .

$LN = \dots\dots\dots$  m [3]

(b) Calculate the shortest distance from  $M$  to the line  $LN$ .

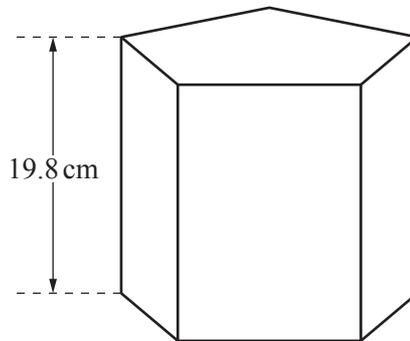
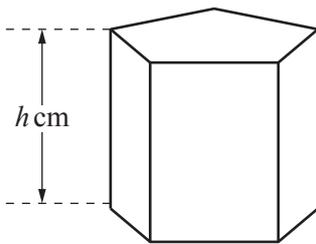
$\dots\dots\dots$  m [3]

- 9 An airline reduces its baggage allowance by 15%.  
The new baggage allowance is 34 kg.

Work out the original baggage allowance.

..... kg [3]

10



NOT TO  
SCALE

Two solids are mathematically similar.

The volume of the small solid is  $1500 \text{ cm}^3$ .

The volume of the large solid is  $2592 \text{ cm}^3$ .

The height of the small solid is  $h \text{ cm}$ .

The height of the large solid is  $19.8 \text{ cm}$ .

Calculate the value of  $h$ .

$h =$  ..... [3]

- 11 The table shows some information about the students in a school.

| Year  | Girls | Boys | Total |
|-------|-------|------|-------|
| 9     | 58    | 46   | 104   |
| 10    | 50    | 38   | 88    |
| 11    | 54    | 62   | 116   |
| Total | 162   | 146  | 308   |

The Head Teacher of the school carries out a survey of his students. He takes a stratified sample of 50 of these students.

Work out how many Year 11 girls he should include in the sample.

..... [2]

- 12  $w$  is inversely proportional to the cube of  $t$ .  
 $w = 50$  when  $t = 2$ .

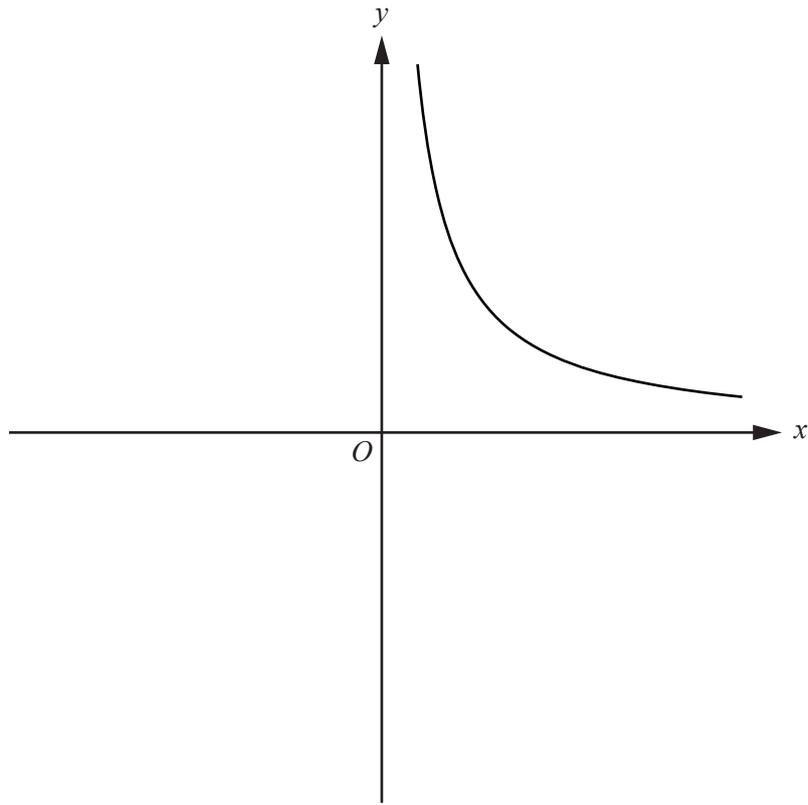
(a) Find  $w$  when  $t = 5$ .

$w =$  ..... [3]

(b) Find  $t$  when  $w = 0.4$ .

$t =$  ..... [1]

- 13 (a) This is part of a **sketch** graph of  $y = \frac{1}{x}$ .



On the axes above, complete the **sketch** graph of  $y = \frac{1}{x}$ . [1]

- (b) Write down the equations of the asymptotes of the graph of  $y = \frac{1}{x}$ .

..... [2]

14  $f(x) = 3x - 2$

(a) Work out  $ff(5)$ .

..... [2]

(b) Find  $f^{-1}(x)$ .

$f^{-1}(x) =$  ..... [2]

(c) Simplify  $ff^{-1}(x)$ .

$ff^{-1}(x) =$  ..... [1]

15 Rachael has drawn the graph of  $y = x^2 - 2x + 6$ .

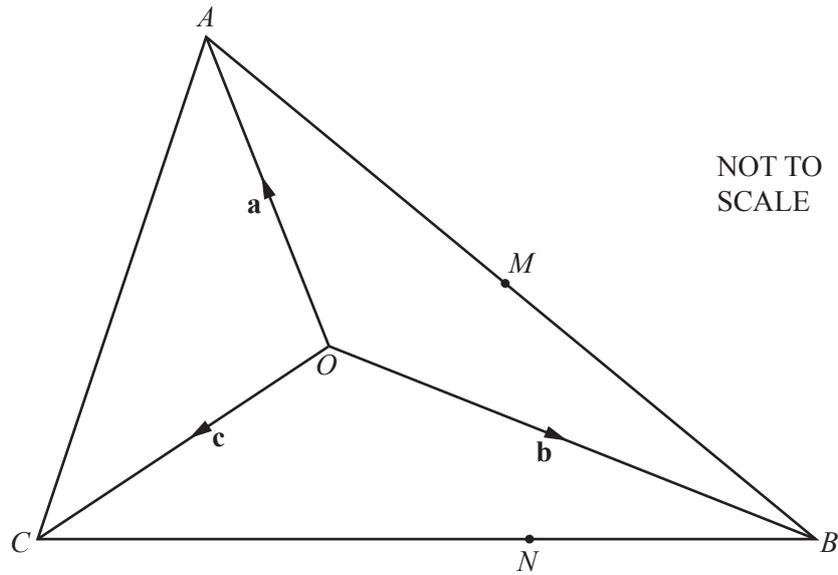
Write down the equation of the line she should draw on her graph to solve  $x^2 - 5x + 6 = 0$ .

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

16 The area of an equilateral triangle is  $25 \text{ cm}^2$ .

Find the perimeter of this triangle.

..... cm [3]



The point  $O$  lies inside the triangle  $ABC$ .

$$\overrightarrow{OA} = \mathbf{a}, \overrightarrow{OB} = \mathbf{b} \text{ and } \overrightarrow{OC} = \mathbf{c}.$$

$M$  is the midpoint of  $AB$ .

$$BN = \frac{1}{2}NC.$$

Find  $\overrightarrow{MN}$  in terms of  $\mathbf{a}$ ,  $\mathbf{b}$  and  $\mathbf{c}$ .

Give your answer in its simplest form.

$$\overrightarrow{MN} = \dots\dots\dots [4]$$

**Question 18 is printed on the next page.**

18 Make  $x$  the subject of this formula.

$$k = \frac{x^2}{2x - t}$$

Give your answer in its simplest form.

..... [4]

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