Cambridge IGCSE

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

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

0625471176

MATHEMATICS **0626/02**

Paper 2 (Extended) **May/June 2018**

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 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 60.

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

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

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CAMBRIDGE International Examinations

1 Hilda is carrying out a health survey.
She stands outside a health food store and surveys 12 people as they leave the store.

Give **one** reason why her results may not be reliable.

.....

..... [1]

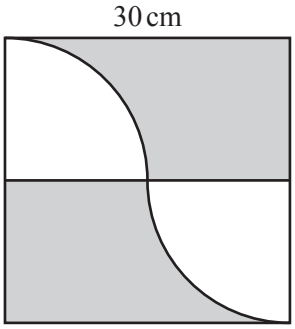
2 A suitcase has a mass of 21 kg, correct to the nearest kilogram.

Write down the lower bound and the upper bound of the mass of this suitcase.

lower bound ..... kg

upper bound ..... kg [2]

3 The diagram shows a pattern made from a square of side 30 cm and two identical quarter circles.

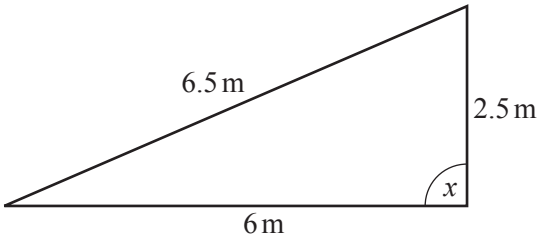


NOT TO SCALE

Calculate the shaded area.

..... cm^2 [3]

4 The diagram shows a flower bed that David has made.



NOT TO SCALE

David says:

Angle x is a right angle.

Show that David is correct.

[2]

5 Factorise fully $3a^2 - 21ab$.

..... [2]

6 The members of Dolphin Swim Club and Shark Swim Club each complete as many lengths of the same pool as they can.
The stem and leaf diagrams show the results.

Dolphin Swim Club

2	6	8	9	9	
3	0	2	2	3	
4	2	3			
5					
6	9				

Shark Swim Club

2	5	7	7	8	
3	1	1	4	9	9
4	0	3	3	5	

Key: 6 | 9 represents 69 lengths

(a) Explain why the mean number of lengths should not be used to compare the swim clubs.

.....

..... [1]

(b) The median number of lengths completed by Shark Swim Club is 34.

Compare the average number of lengths completed by the two clubs.

.....

..... [2]

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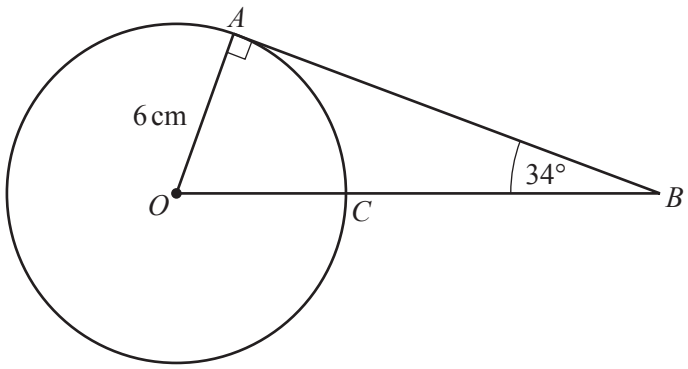

NOT TO SCALE

The diagram shows a circle centre O and radius 6 cm.
The line AB is a tangent to the circle at A.
The point C is where the line OB crosses the circumference of the circle.
Angle $ABO = 34°$.

(a) Explain why the radius OA is the shortest distance from O to the tangent AB.

..... [1]

(b) **(i)** Calculate the length of OB.

$OB =$ ..... cm [3]

(ii) Work out the length of BC.

$BC =$ ..... cm [1]

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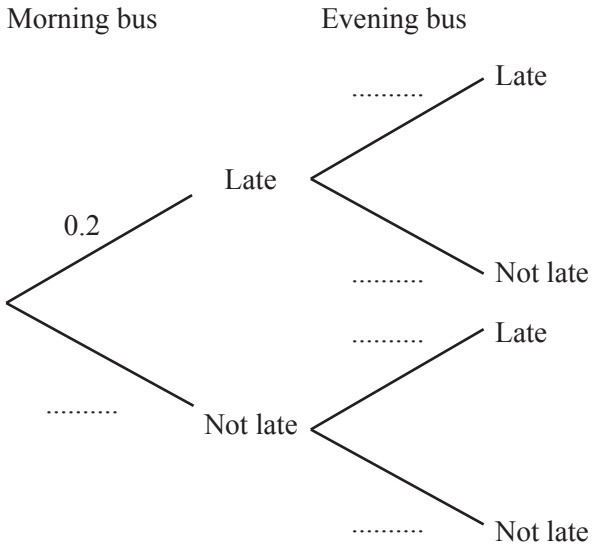
8 Renata goes to work by bus in the morning and goes home by bus in the evening.
The probability that the morning bus is late is 0.2 .

When the morning bus is late, the probability that the evening bus is late is 0.6 .
When the morning bus is not late, the probability that the evening bus is late is 0.1 .

(a) Complete the tree diagram.



[2]

(b) Find the probability that both buses are late.

..... [2]

9 Make t the subject of this formula.

$$s = \frac{t+r}{p}$$

..... [2]

10 Calculate $\sqrt[3]{\frac{512}{81^{0.75}}}$.

..... [1]

11 The population, P, of a species of insect, t years after 1st January 2000, is given by the formula

$$P = 43200 \times 0.85^t.$$

(a) Jan says:

The multiplier is 0.85, so the population is decreasing by 85% each year.

Is Jan correct?
Explain how you know.

..... because .....

..... [1]

(b) Find the population on 1st January 2018.

..... [2]

(c) Find the number of whole years it takes for the population to fall below 20 000.

..... [2]

12 $\mathscr{E}$ = {two-digit positive integers}

A = {factors of 64}

$B = \{x: 10 \leqslant x \leqslant 50\}$

C = {square numbers}

(a) Write $50 \in B$ in words.

..... [1]

(b) Find $A \cap B \cap C$.

{ ..... } [1]

(c) Find $\mathrm{n}(B \cup C)$.

..... [2]

13 There are 1067 students in Lena's school.
The table shows information about the number of students in each year.

	Girls	Boys
Year 7	80	120
Year 8	95	102
Year 9	112	90
Year 10	113	115
Year 11	105	135

Lena carries out a survey and takes a sample of 100 of these students, stratified by gender and by school year.

Work out the number of Year 9 boys that Lena samples in her survey.

..... [2]

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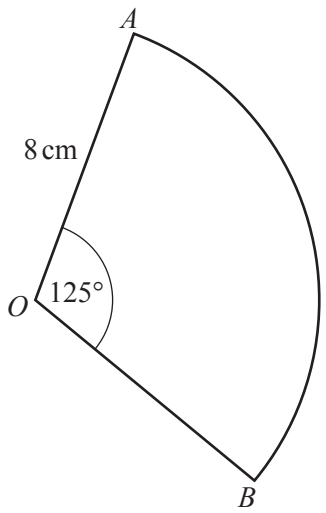

NOT TO SCALE

AOB is a sector of a circle with centre *O* and radius 8 cm.
Angle *AOB* = 125°.

Find the perimeter of the sector *AOB*.

..... cm [3]

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[Turn over

15 Solve the simultaneous equations.
Show all your working and give your answers in exact form.

$$\left(\sqrt{2}\right)x + y = 2\sqrt{2}$$
$$x - \left(\sqrt{2}\right)y = 14$$

$x =$ .....

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

16 The equation $3x^2 + ax - 10 = 0$ can be written as $(x - b)(cx + 2) = 0$.

(a) Find the value of each of the constants a, b and c.

$a =$ ..... $b =$ ..... $c =$ ..... [3]

(b) Hence solve the equation.

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

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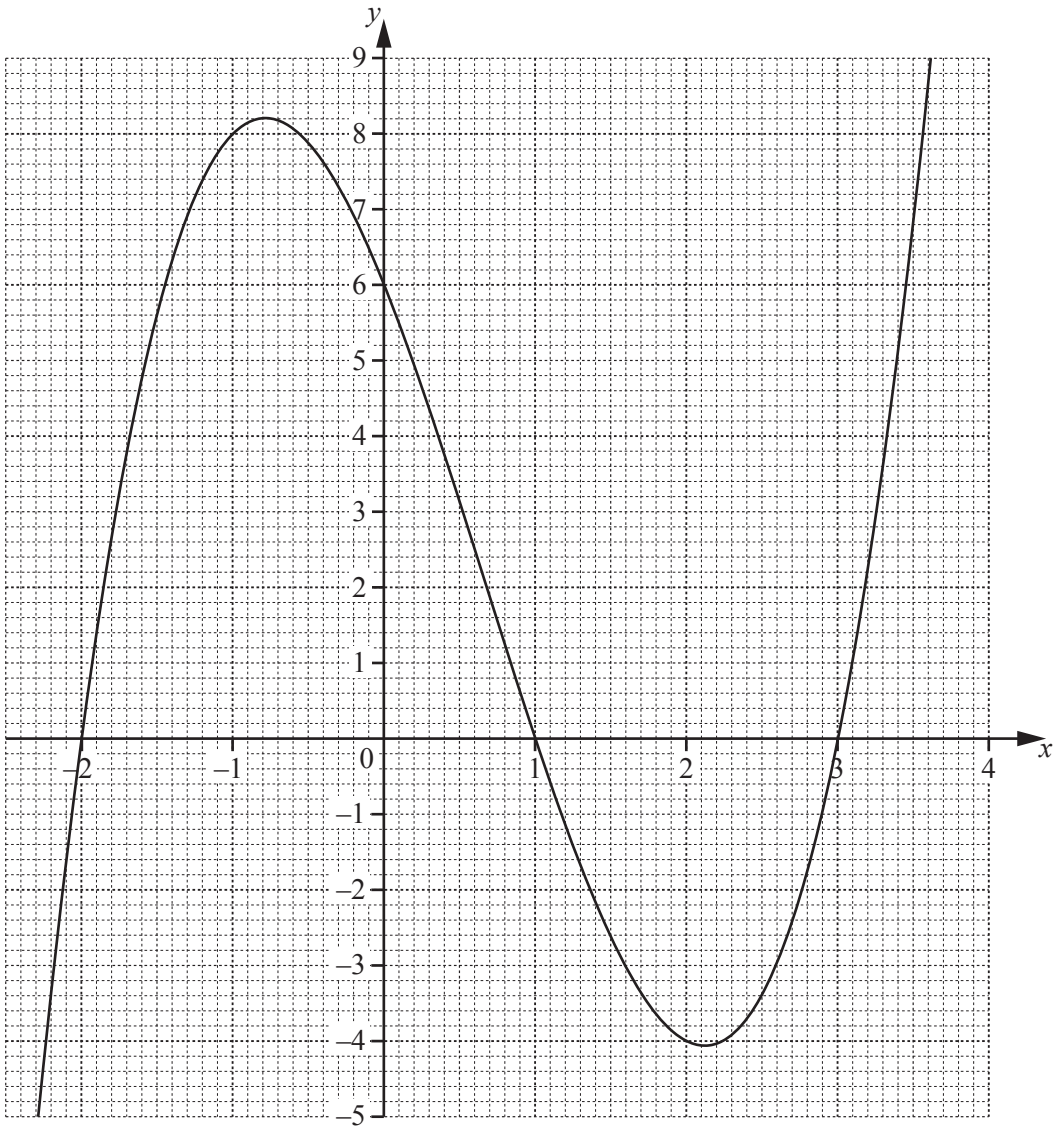


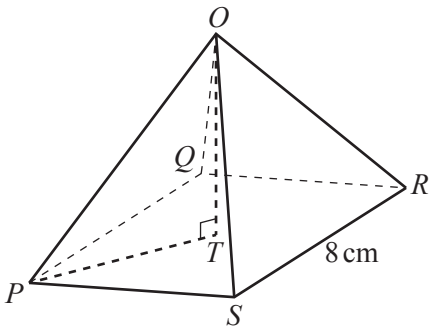
The diagram shows the graph of $y = x^3 - 2x^2 - 5x + 6$.

Use the graph to solve the equation $x^3 - 2x^2 - 6x + 3 = 0$.

..... [3]

18

NOT TO SCALE



OPQRS is a square-based pyramid with base of side 8 cm.
T is the centre of the base, with angle *OTP* = 90°, and the height of the pyramid, *OT*, is 12 cm.

Calculate angle *OPT*.

Angle *OPT* = ... [4]

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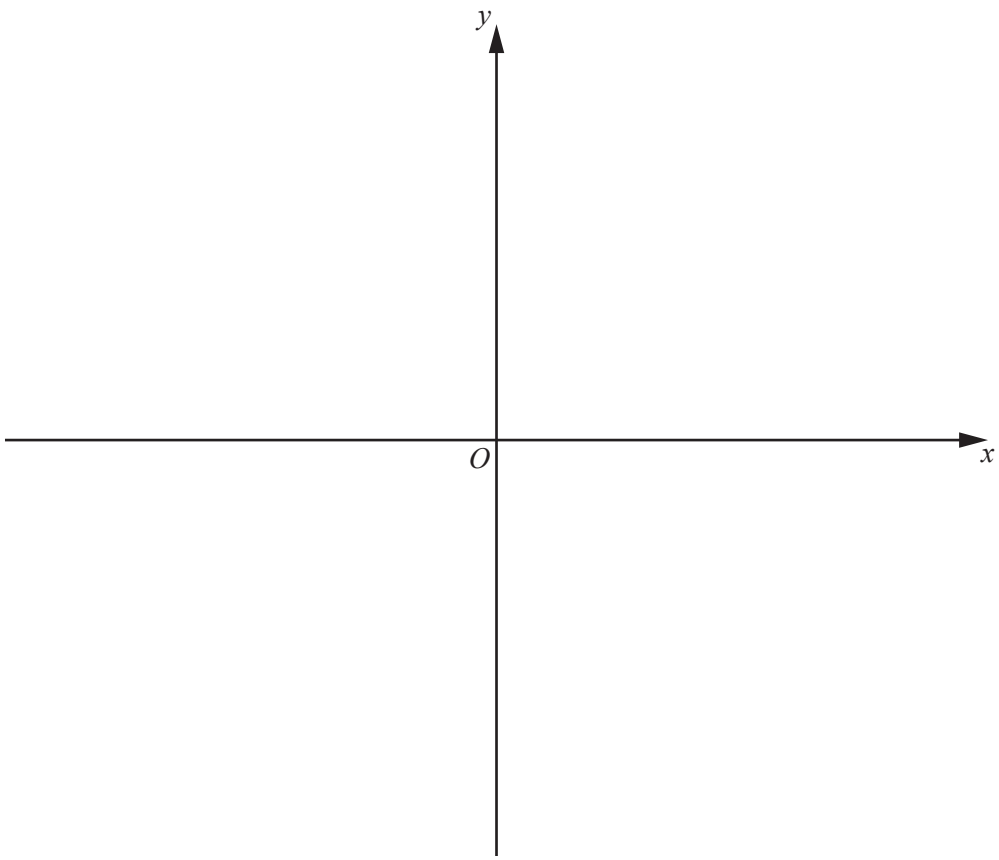
19 $f(x) = 5^x$

On the axes below, sketch the graph of $y = f(x)$.
Label the co-ordinates of any point where your curve cuts the axes and state the equation of the asymptote.



Equation of asymptote ..... [3]

Question 20 is printed on the next page.

20 $\mathrm{p}(x) = x^3 + 7x - 5$

The iterative formula

$$x_{n+1} = \frac{5}{x_n^{\,2} + 7}$$

with $x_1 = 0.6$ may be used to find a solution of $\mathrm{p}(x) = 0$.

(a) Find the values of x_2, x_3, x_4 and x_5.
Give each value correct to 6 decimal places.

x_2 = ...

x_3 = ...

x_4 = ...

x_5 = ... [2]

(b) Marco says:

I can be certain that this solution is 0.67 correct to 2 decimal places.

Is Marco correct?
Explain how you decide.

..... because .....

..... [1]

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