Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/31**

Paper 3 (Core) **May/June 2018**

1 hour 45 minutes

Candidates answer on the Question Paper.

Additional Materials: Geometrical Instruments
Graphics Calculator

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.
Do not use staples, paper clips, glue or correction fluid.
You may use an HB pencil for any diagrams or graphs.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** the questions.
Unless instructed otherwise, give your answers exactly or correct to three significant figures as appropriate.
Answers in degrees should be given to one decimal place.
For π, use your calculator value.
You must show all the relevant working to gain full marks and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 96.

Formula List

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle, radius r.	$A = \pi r^2$
Circumference, C, of circle, radius r.	$C = 2\pi r$
Curved surface area, A, of cylinder of radius r, height h.	$A = 2\pi rh$
Curved surface area, A, of cone of radius r, sloping edge l.	$A = \pi rl$
Curved surface area, A, of sphere of radius r.	$A = 4\pi r^2$
Volume, V, of prism, cross-sectional area A, length l.	$V = Al$
Volume, V, of pyramid, base area A, height h.	$V = \frac{1}{3}Ah$
Volume, V, of cylinder of radius r, height h.	$V = \pi r^2 h$
Volume, V, of cone of radius r, height h.	$V = \frac{1}{3}\pi r^2 h$
Volume, V, of sphere of radius r.	$V = \frac{4}{3}\pi r^3$

Answer **all** the questions.

1 **(a)** Work out.

(i) $16.4 - 23.8$

..... [1]

(ii) $5.2 - 3 \times 4.1$

..... [1]

(b) **(i)** Work out $\sqrt{14.2}$.

..... [1]

(ii) Write 64% as a fraction in its lowest terms.

..... [2]

(c) Write the following in order of size, starting with the smallest.

$\frac{5}{9}$ 0.55 55.5%

..... < ..... < ..... [1]
smallest

(d) **(i)** Write 2076 in words.

..... [1]

(ii) Write two million, five hundred and fifty thousand and two as a number.

..... [1]

2 **(a)** A pack of 200 cards is 80 mm thick.

Find the thickness of 1 card.

..... mm [1]

(b) Write 358.297

(i) correct to 1 decimal place,

..... [1]

(ii) correct to 3 significant figures,

..... [1]

(iii) correct to the nearest 10.

..... [1]

(c) Work out 59% of $348.

$ ..... [2]

(d) Divide 630 in the ratio 8 : 13.

..... : ..... [2]

3

Food	Number of calories
1 bread roll	78
1 bagel	69
1 tomato	3
1 slice of chicken	60
1 slice of cheese	69
1 lettuce leaf	1
1 apple	53

(a) For lunch, Clint has 1 bread roll, 1 lettuce leaf, 1 tomato, 2 slices of chicken and 1 apple.

Work out the total number of calories in Clint's lunch.

..... [2]

(b) Work out your answer to **part (a)** as a percentage of 2500.

.....% [1]

(c) A bagel costs \$0.65 .

Find the greatest number of these bagels that Clint can buy with \$10.
How much change does he receive?

..... bagels

change = \$ ..... [3]

4 **(a)** Find the lowest common multiple (LCM) of 7 and 8.

..... [2]

(b) Find the highest common factor (HCF) of 18 and 48.

..... [2]

(c) Jovana invested some money at a rate of 3% per year simple interest.
At the end of 4 years the interest is $78.

Work out the amount that she invested.

$ ..... [3]

(d) Isabelle invests $800 at a rate of 3.2% per year compound interest.

Work out the value of the investment at the end of 2 years.

$ ..... [3]

(e) Change 8 kilometres per hour to metres per minute.

..... metres per minute [2]

5 Merel counts the number of three-letter words on every page of a book.
Her results are shown in the table.

Number of three-letter words on a page	5	7	8	12	13	16
Number of pages (frequency)	10	16	15	13	9	6

(a) Find the total number of pages in the book.

..... [1]

(b) Write down the mode.

..... [1]

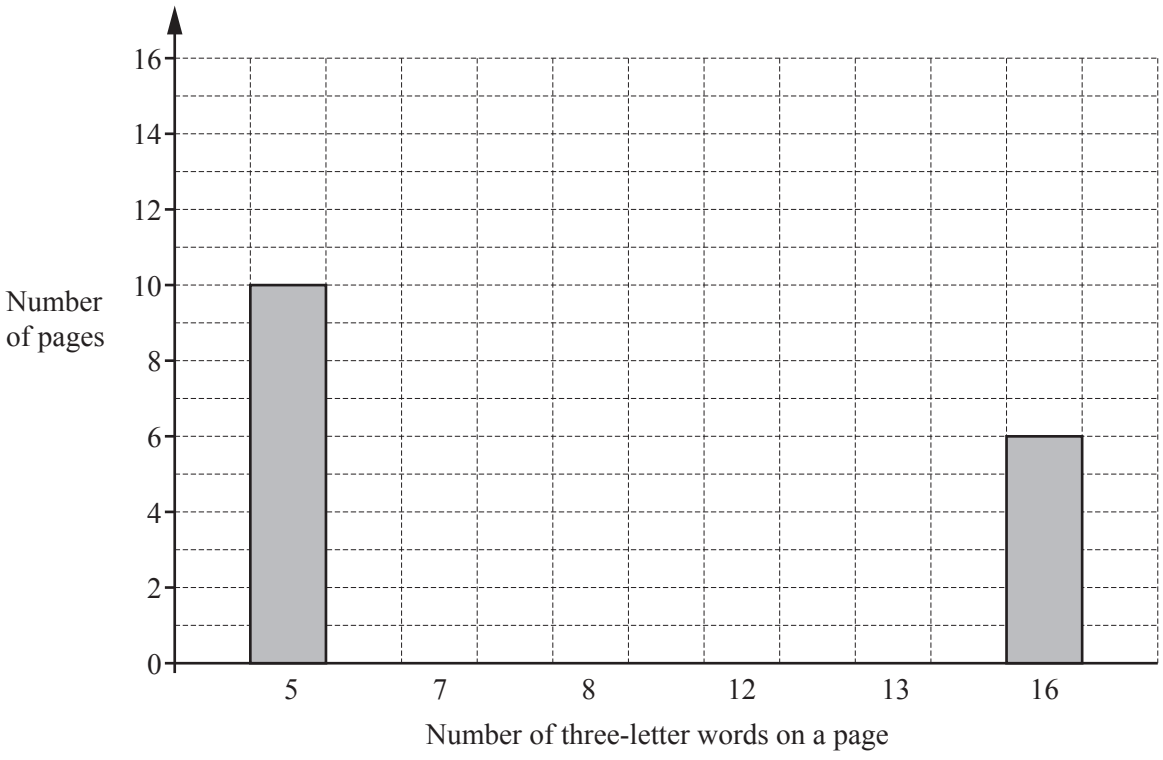
(c) Find the median.

..... [1]

(d) Find the mean.

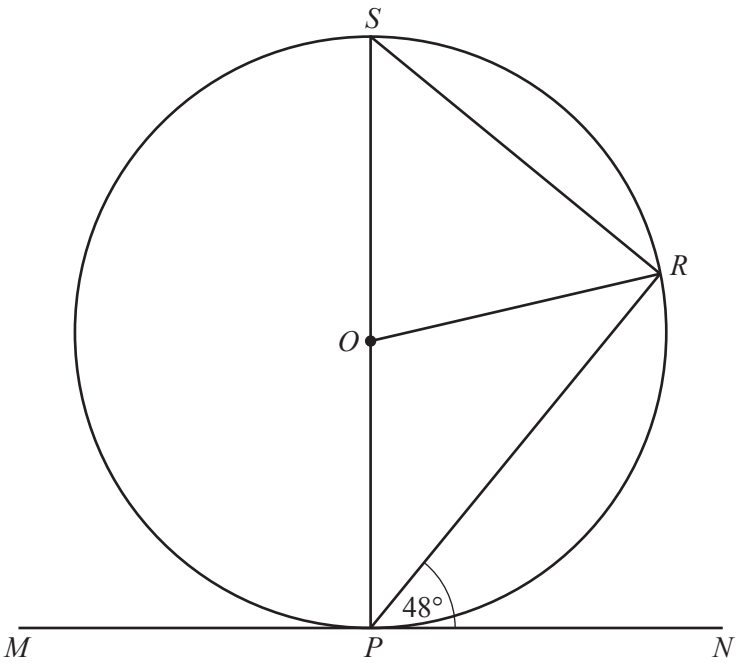
..... [2]

(e) Use the information in the table to complete the bar chart.



[2]

6



NOT TO SCALE

P, *R* and *S* lie on a circle, centre *O*.

MPN is a tangent to the circle at *P* and angle *RPN* = 48°.

(a) Find the size of

(i) angle *OPR*,

Angle *OPR* = ... [1]

(ii) angle *ORP*,

Angle *ORP* = ... [1]

(iii) angle *POR*,

Angle *POR* = ... [1]

(iv) angle *SOR*,

Angle *SOR* = ... [1]

(v) angle *SRP*,

Angle *SRP* = ... [1]

(vi) angle *OSR*.

Angle *OSR* = ... [2]

(b) $OP = 3$ cm.

Find

(i) the circumference of the circle,

..... cm [2]

(ii) the length of the minor arc SR,

..... cm [2]

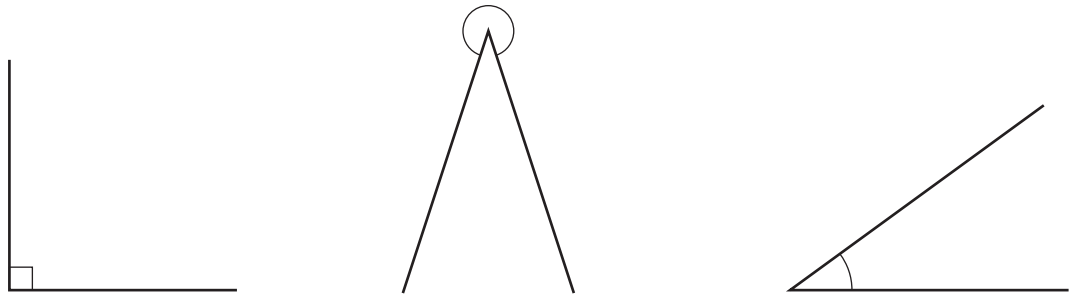
(iii) the area of the circle,

..... cm^2 [2]

(iv) the area of the minor sector SOR.

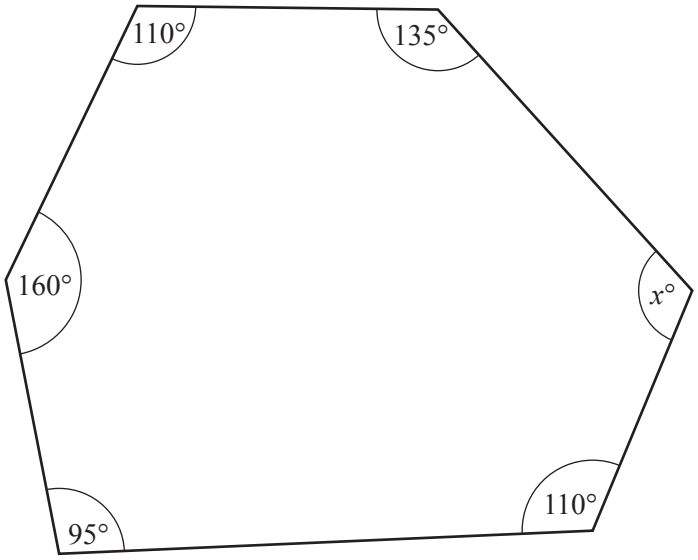
..... cm^2 [2]

7 **(a)** Complete the mathematical name of each of these angles.



..... angle ..... angle ..... angle [3]

(b)



NOT TO SCALE

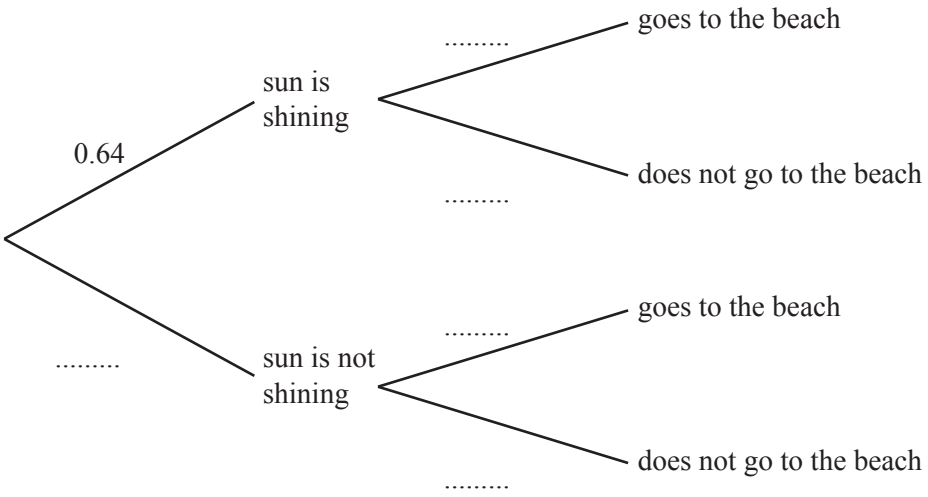
The diagram shows a hexagon.

Find the value of x.

$x =$ ..... [3]

8 **(a)** On any day, the probability that the sun will shine is 0.64 .
If the sun is shining, the probability that Mees goes to the beach is 0.82 .
If the sun is not shining, the probability that Mees goes to the beach is 0.15 .

(i) Complete the tree diagram.



[3]

(ii) Find the probability that the sun is shining and Mees does not go to the beach.

..... [2]

(b) On any day in June, the probability that it does **not** rain is 0.7 .
There are 30 days in June.

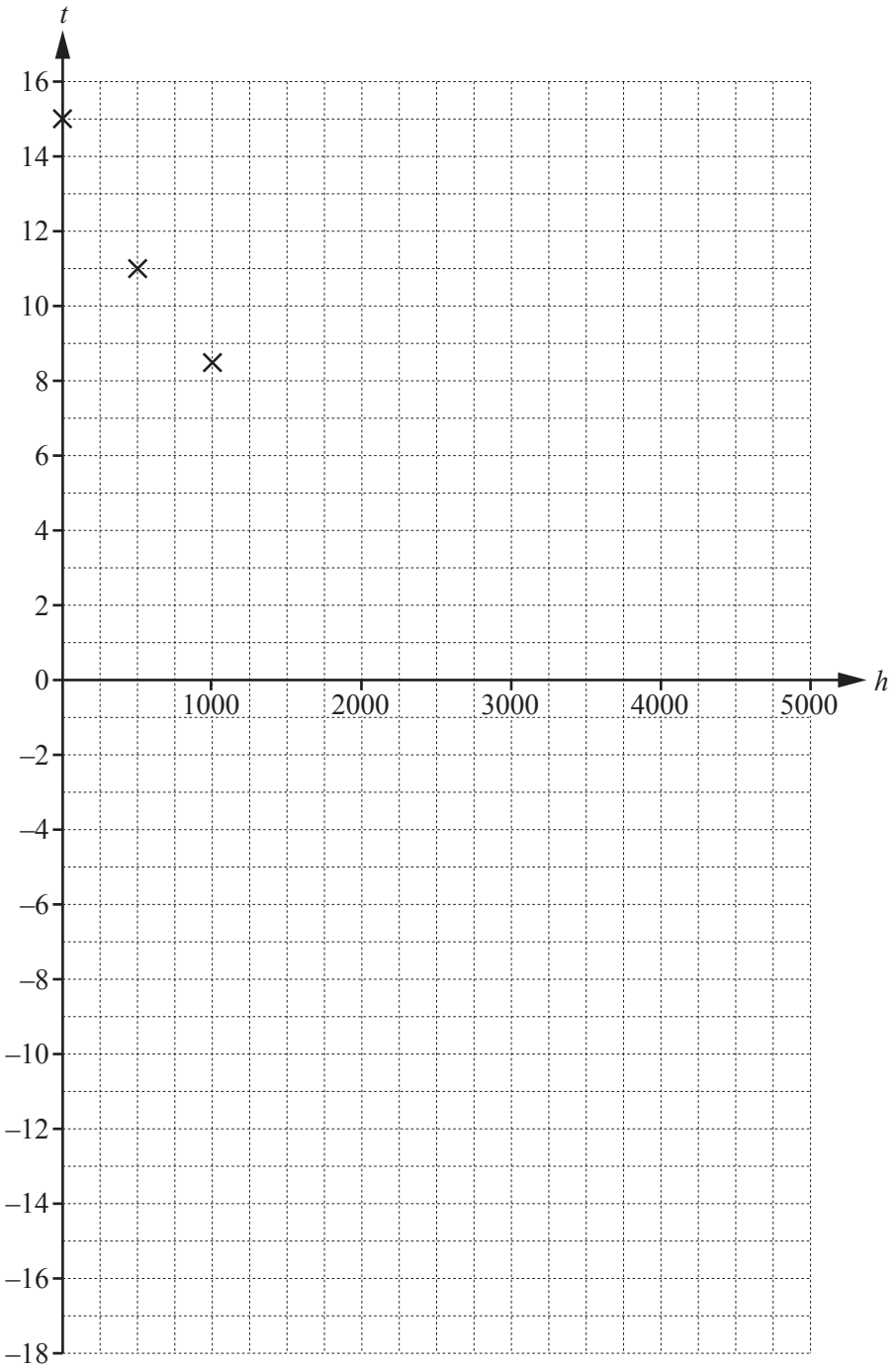
Find the number of days that it is expected to rain in June.

..... [2]

9 A scientist measures the temperature at seven different heights above sea level.
The table shows her results.

Height above sea level (h metres)	0	500	1000	1500	2500	3000	5000
Temperature (t °C)	15	11	8.5	5	−1	−5	−17

(a) Complete the scatter diagram.
The first three points have been plotted for you.



[2]

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

..... [1]

(c) Find

(i) the mean height,

..... m [1]

(ii) the mean temperature.

..... °C [1]

(d) **(i)** Plot the mean point on the scatter diagram. [1]

(ii) On the scatter diagram, draw a line of best fit. [2]

(iii) Use your line of best fit to estimate the temperature at a height of 4000 m.

..... °C [1]

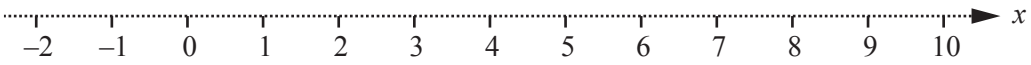
[Turn over

10 **(a)** **(i)** Solve.

$$2x - 3 < 15$$

..... [2]

(ii) Show your answer to **part (a)(i)** on this number line.



[1]

(b) Solve.

$$3x + 5 = 4x - 3$$

$x =$ ..... [2]

(c) Expand the brackets and simplify.

$$(2x - 1)(x + 3)$$

..... [2]

(d) Simplify fully.

(i) $r^2 \times r^3$

..... [1]

(ii) $\dfrac{r^8}{r^2}$

..... [1]

11

$f(x) = -2x^2 + 12x - 10$

(a) On the diagram, sketch the graph of $y = f(x)$ for $0 \leqslant x \leqslant 6$. [2]

(b) Find the co-ordinates of the points where the graph crosses the x-axis.

(..... , ...) and (..... , ...) [2]

(c) Find the co-ordinates of the local maximum.

(..... , ...) [1]

(d) (i) On the same diagram, draw the line $y = x - 2$. [2]

(ii) Solve.

$$-2x^2 + 12x - 10 = x - 2$$

$x =$ ..... or $x =$ ..... [2]

BLANK PAGE