Cambridge Assessment International Education

Cambridge IGCSE™ (9–1)

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

MATHEMATICS **0980/31**

Paper 3 (Core) **October/November 2020**

2 hours

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 104.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Blank pages are indicated.

[Turn over

1 Sean is the manager of a museum.

(a) He buys a Chinese pot costing 1200 yuan.
The exchange rate is \$1 = 6.4 yuan.

Work out the cost of this pot in dollars.

\$ ..... [1]

(b) Sean records the maximum and minimum temperatures, in °C, at the museum.
Some of the results for one week are shown in the table.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Maximum temperature (°C)	8	12	15	14	11	7	4
Minimum temperature (°C)	−5	−2	−4	−1	3		

(i) Find the difference between the maximum temperature and the minimum temperature on Wednesday.

..... °C [1]

(ii) The minimum temperature on Saturday was 2 °C higher than the minimum temperature on Monday.

Find the minimum temperature on Saturday.

..... °C [1]

(iii) In this week the range of temperatures was 23 °C.

Find the minimum temperature on Sunday.

..... °C [1]

(c) These are the opening times for the museum.

Monday to Friday	09 00 to 17 00
Saturday and Sunday	10 00 to 16 00

During opening hours the museum has 4 security guards working.
Each guard works a maximum of 30 hours each week.

Work out the smallest number of guards needed each week.

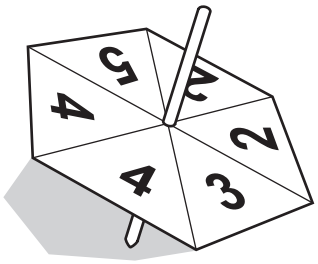
..... [4]

(d) The entry price to the museum is $18.
This price is increased by 28%.

Find the increased entry price.

$ ..... [2]

2 **(a)** Jian has a fair spinner in the shape of a regular hexagon.
The spinner is numbered 2, 2, 3, 4, 4, 5.



Jian spins the spinner.

Find the probability that the spinner lands on

(i) an even number,

..... [1]

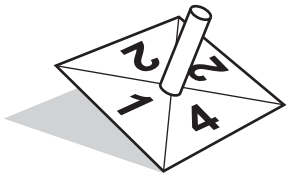
(ii) a number less than 6,

..... [1]

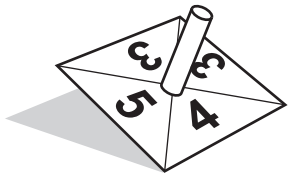
(iii) the number 1.

..... [1]

(b) Mei has two fair square spinners, A and B.
Spinner A is numbered 1, 2, 2, 4 and spinner B is numbered 3, 3, 4, 5.



Spinner A



Spinner B

She spins both spinners and adds the two numbers.

(i) Complete the table to show all the possible outcomes.

A \ B	3	3	4	5
1	4	4		
2	5	5	6	7
2	5	5	6	7
4	7	7		

[2]

(ii) Use the table to write down the probability that the total is

(a) 5,

..... [1]

(b) more than 5.

..... [1]

(c) Ning has a spinner numbered 1 to 6.
She spins it 50 times and her results are shown in the table.

Number on spinner	Frequency
1	15
2	12
3	9
4	5
5	2
6	7

(i) Write down the mode.

..... [1]

(ii) Find the median.

..... [1]

(iii) Work out the mean.

..... [3]

[Turn over

3 **(a)**

8 15 18 33 39 41 51 57 60 81

From this list, write down

(i) a factor of 54,

..... [1]

(ii) a multiple of 19,

..... [1]

(iii) a prime number.

..... [1]

(b) Write down the reciprocal of 64.

..... [1]

(c) **(i)** Write 4.81×10^{-3} as an ordinary number.

..... [1]

(ii) Write 75 000 in standard form.

..... [1]

(iii) Calculate $\dfrac{6.3 \times 10^{2}}{7 \times 10^{-3}}$.

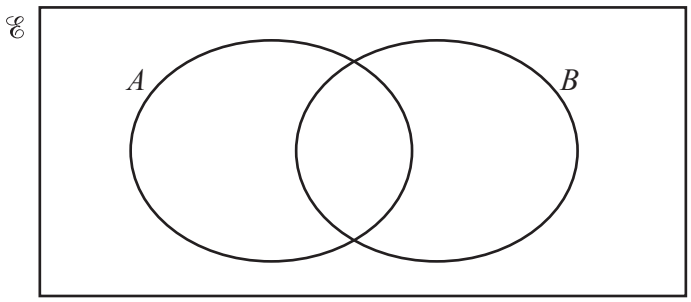
Write your answer in standard form.

..... [2]

(d) (i)

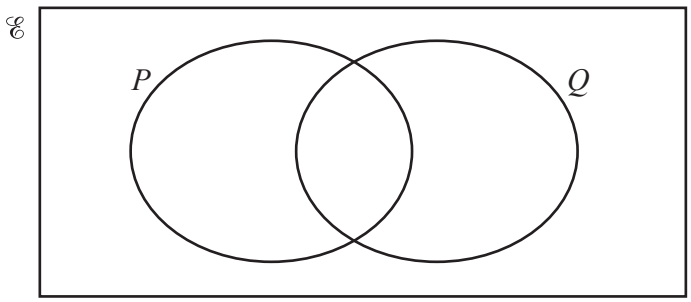
$\mathscr{E} = \{2, 4, 8, 16, 32, 64\}$
$A = \{\text{square numbers}\}$
$B = \{\text{cube numbers}\}$

Use this information to complete the Venn diagram.



[2]

(ii) On this Venn diagram, shade the region $P \cup Q$.



[1]

[Turn over

4 **(a)** Simplify.

$6a - 3b + 2a - 4b$

..... [2]

(b) Expand.

$5(x - 3)$

..... [1]

(c) Solve these equations.

(i) $\frac{x}{3} = 18$

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

(ii) $5x + 18 = 8$

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

(iii) $12x - 3 = 4x + 21$

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

(d) $6^{10} \times 6^{x} = 6^{2}$

Find the value of x.

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

(e) The Fraser family and the Singh family go to the cinema.
The Fraser family buys 6 adult tickets and 2 child tickets for $124.
The Singh family buys 3 adult tickets and 5 child tickets for $100.

Find the price of an adult ticket and the price of a child ticket.

Adult ticket $ .....

Child ticket $ ..... [5]

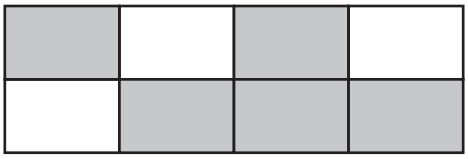
5 **(a)** Write one hundred and twenty thousand and twenty in figures.

..... [1]

(b) Find the value of $\sqrt{3481}$.

..... [1]

(c)



(i) Write down the fraction of the rectangle that is shaded.

..... [1]

(ii) Find the percentage of the rectangle that is **not** shaded.

.....% [1]

(d) Write these numbers in order, starting with the smallest.

$$27\% \qquad \frac{5}{17} \qquad 0.268 \qquad \frac{7}{29}$$

..... < ..... < ..... < ..... [2]

smallest

(e) Write 0.3728 correct to 1 decimal place.

..... [1]

(f) Write down the value of 19^0.

..... [1]

(g) The height, h metres, of a tower is 128 m, correct to the nearest metre.

Complete the statement about the value of h.

..... $\leqslant h <$ ..... [2]

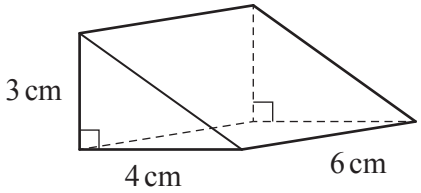
(h) Find the highest common factor (HCF) of 126 and 180.

..... [2]

(i) Write down an irrational number with a value between 6 and 7.

..... [1]

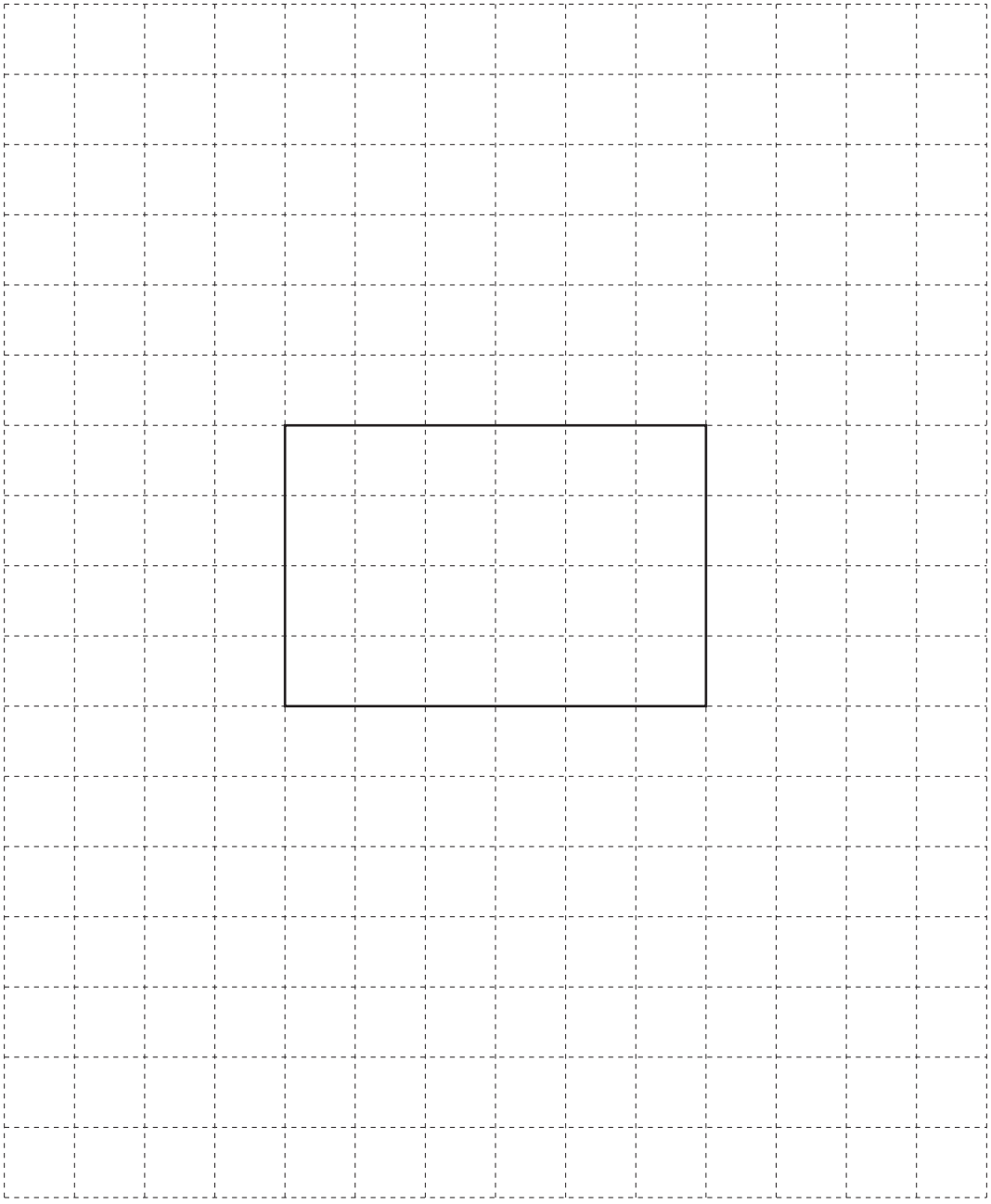
6



NOT TO SCALE

The diagram shows a right-angled triangular prism.

(a) On the 1 cm^2 grid, complete the net of the prism.
One face has been drawn for you.



[3]

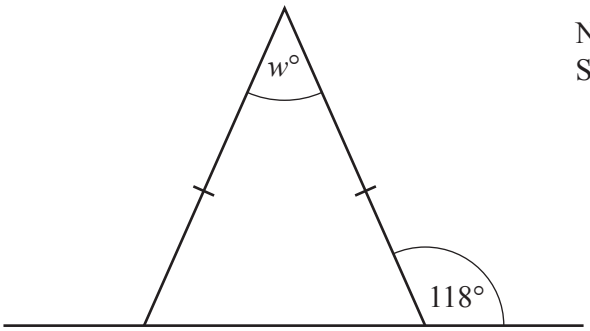
(b) Work out the surface area of the prism.

..... cm^2 [3]

(c) Work out the volume of the prism.

..... cm^3 [2]

7 **(a)**



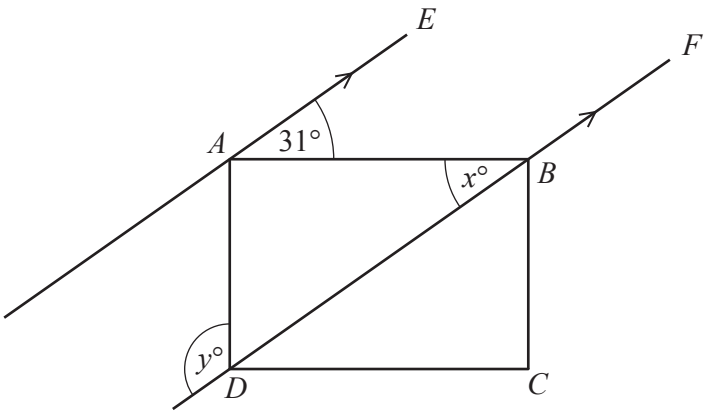
NOT TO SCALE

The diagram shows an isosceles triangle and a straight line.

Work out the value of w.

$w =$ ..... [2]

(b)



NOT TO SCALE

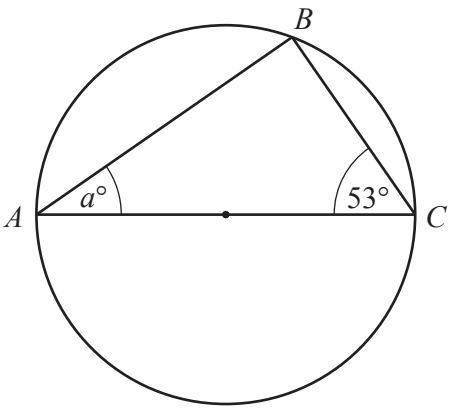
$ABCD$ is a rectangle.
AE is parallel to DBF.

Find the value of x and the value of y.

$x =$ .....

$y =$ ..... [2]

(c)



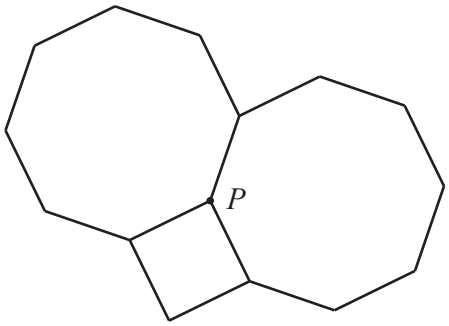
NOT TO SCALE

A, B and C are points on a circle.
AC is a diameter of the circle.

Find the value of a.

$a =$ ..... [2]

(d)



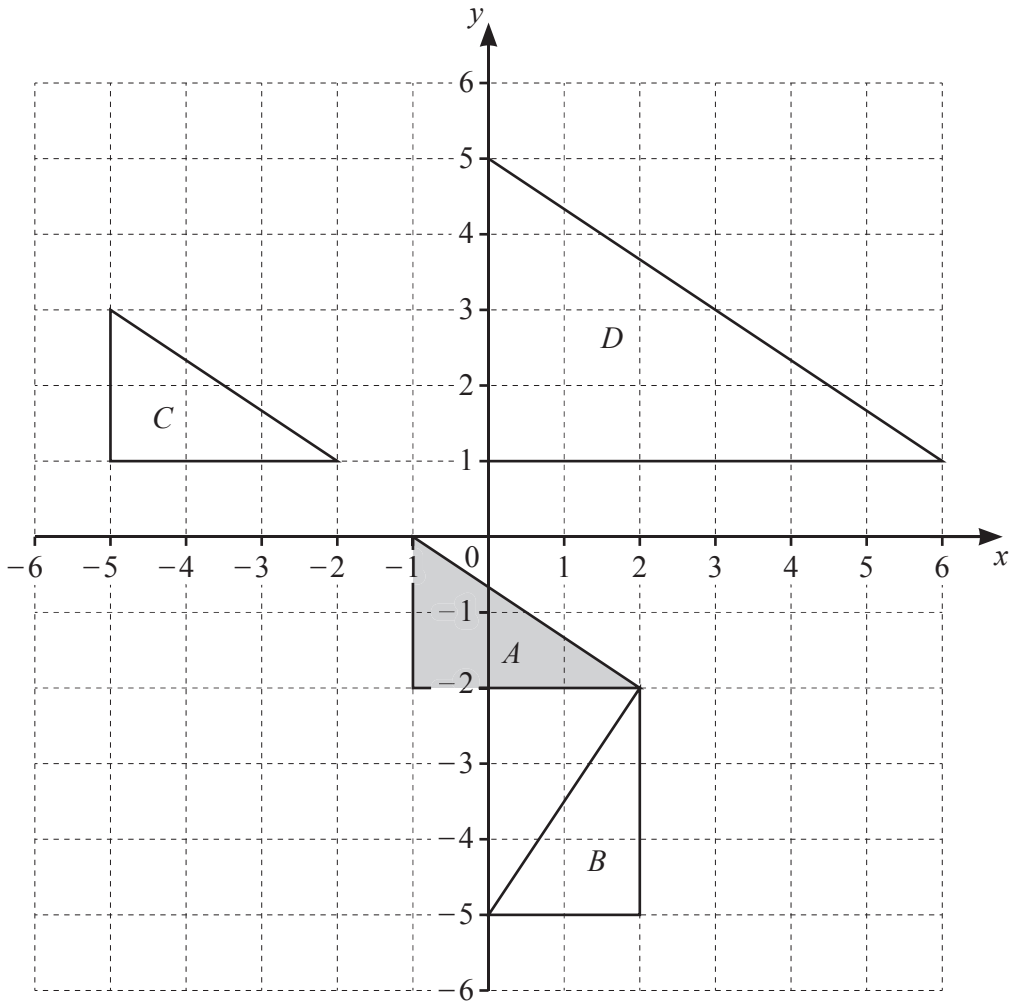
NOT TO SCALE

Two regular octagons and a square meet at point P.

Show, by calculation, that the three interior angles at P add up to 360°.

[3]

8



(a) Describe fully the **single** transformation that maps

(i) triangle A onto triangle B,

.....

..... [3]

(ii) triangle A onto triangle C,

.....

..... [2]

(iii) triangle A onto triangle D.

.....

..... [3]

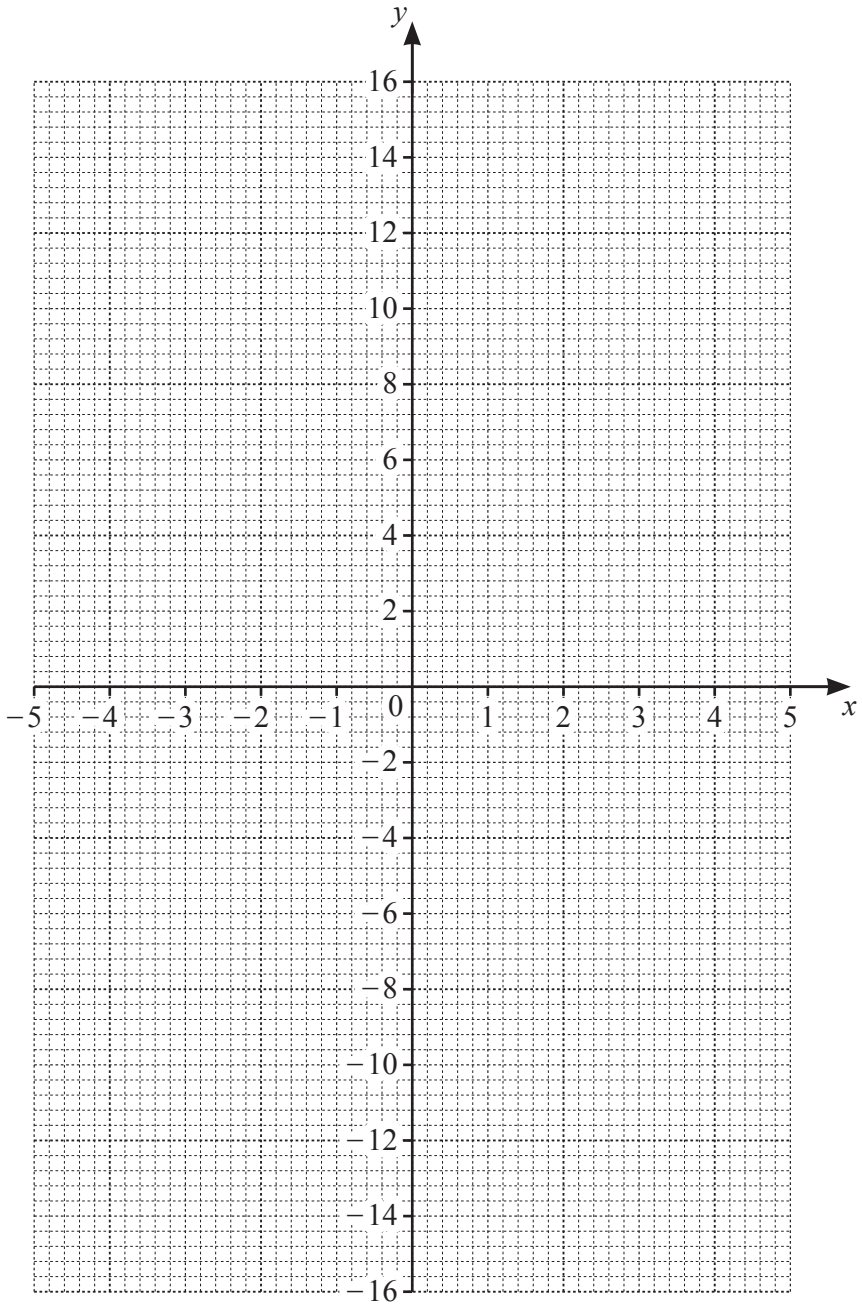
(b) On the grid, draw the image of triangle A after a reflection in the line $x = -2$. [2]

9 **(a)** Complete the table of values for $y = \frac{15}{x}$.

x	-5	-3	-2	-1		1	2	3	5
y				-15		15			

[3]

(b) On the grid, draw the graph of $y = \frac{15}{x}$ for $-5 \leqslant x \leqslant -1$ and $1 \leqslant x \leqslant 5$.



[4]

(c) On the grid, draw the line $y = 6$. [1]

(d) Use your graph to solve $\frac{15}{x} = 6$.

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

10 **(a)** These are the first four terms of a sequence.

8 15 22 29

(i) Write down the next term.

..... [1]

(ii) Write down the term to term rule for continuing this sequence.

..... [1]

(iii) Find an expression for the nth term.

..... [2]

(b) Find the next term in each of these sequences.

(i) 18, 21, 26, 33, 42, …

..... [1]

(ii) 18, 20, 24, 32, 48, …

..... [1]

(c) Find the first three terms of the sequence with nth term $n^2 + 5n$.

..... , ... , ... [2]

BLANK PAGE