Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

7303093533

MATHEMATICS **0580/31**

Paper 3 (Core) **May/June 2019**

2 hours

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Tracing paper (optional)
Geometrical instruments

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.
If working is needed for any question it must be shown below that question.
Electronic calculators should be used.
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 104.

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

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[Turn over

1 Here is part of the menu for Jamie's café.

Menu	
	Price ($)
Tea	2.35
Coffee	3.40
Lemonade	1.80
Cake	4.45
Biscuit	0.85

(a) Sue has one tea and one cake.

Calculate how much she pays.

$ ..... [1]

(b) Derrick has one coffee and two biscuits.

How much change does he receive from a $10 note?

$ ..... [2]

(c) Harriet works at the café for 34 hours each week.
She is paid $8.25 for each hour.

(i) Work out the amount she is paid each week.

$ ..... [1]

(ii) One week she works 8 hours extra.
The extra hours are paid at 1.5 times her usual rate of $8.25 for each hour.

Work out the total amount she is paid for that week.

$ ..... [2]

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(d) Peter works these hours each week at the café.

Day	Time
Monday	08 30 to 16 00
Tuesday	10 00 to 17 00
Thursday	08 30 to 16 30
Saturday	08 00 to 18 30

Work out the number of hours he works in one week.

..... hours [2]

(e) Jamie buys a clock for the café from Japan for 9395 yen.
The exchange rate is \$1 = 110.27 yen.

Work out the cost of the clock in dollars, correct to the nearest cent.

\$ ..... [3]

(f) Jamie invests \$12 000 at a rate of 5% per year compound interest.

Calculate the value of his investment at the end of 3 years.

\$ ..... [3]

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[Turn over

2 **(a)** Work out $48 \div 3 - 5 \times 2$.

..... [1]

(b) Insert one pair of brackets to make this statement correct.

$$3 + 2 \times 12 - 4 = 19$$ [1]

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

$\frac{3}{4}$ 0.749 76% $\frac{11}{15}$

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

(d) Find the value of

(i) $\sqrt{265.69}$,

..... [1]

(ii) 8^3.

..... [1]

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(e) Write down the smallest prime number.

..... [1]

(f) Write down all the factors of 18.

..... [2]

(g) Write down a common factor of 16 and 72 that is greater than 2.

..... [1]

(h) Write $\frac{28}{140}$ as a fraction in its simplest form.

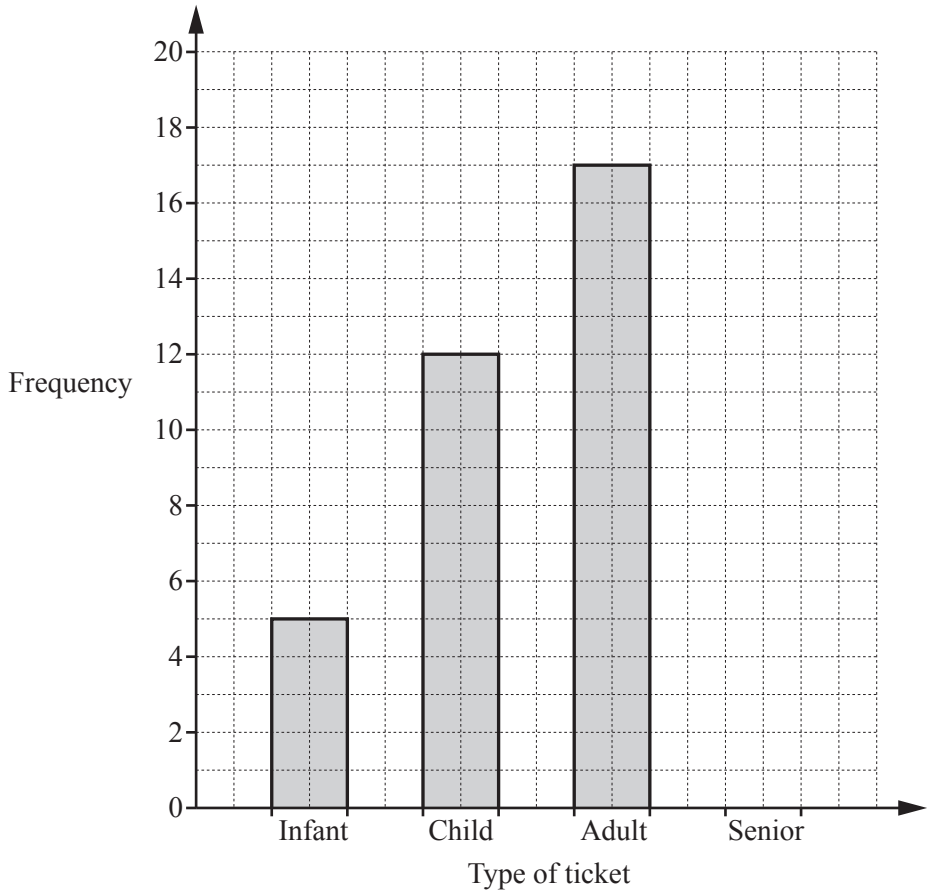
..... [1]

(i) Jeff and his friends win a prize.
Jeff's share is \$160 which is $\frac{5}{11}$ of the prize.

Work out the value of the prize.

\$ ..... [2]

3 **(a)** On Monday, Main Street station sells 40 tickets.
There are four types of ticket; infant, child, adult and senior.
The bar chart shows the number of infant, child and adult tickets sold.



(i) Complete the bar chart. [3]

(ii) Find how many more adult tickets were sold than child tickets.

..... [1]

(iii) Write down the modal type of ticket.

..... [1]

(iv) One of these 40 people is chosen at random.

Find the probability that this person is a child.

..... [1]

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(b) At Donville station the number of tickets sold each day is recorded for seven days.

104 18 72 31 27 45 60

Find

(i) the range,

..... [1]

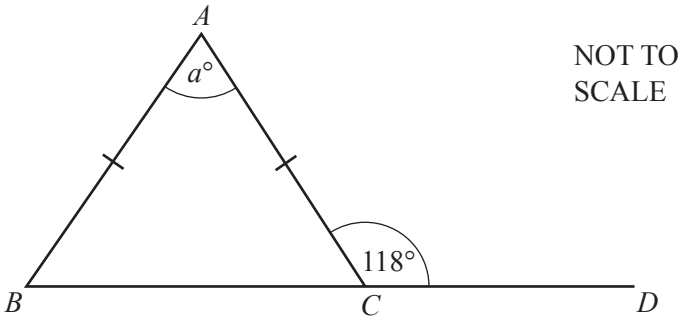
(ii) the median,

..... [2]

(iii) the mean.

..... [2]

4 **(a)**



NOT TO SCALE

ABC is an isosceles triangle.
BCD is a straight line.

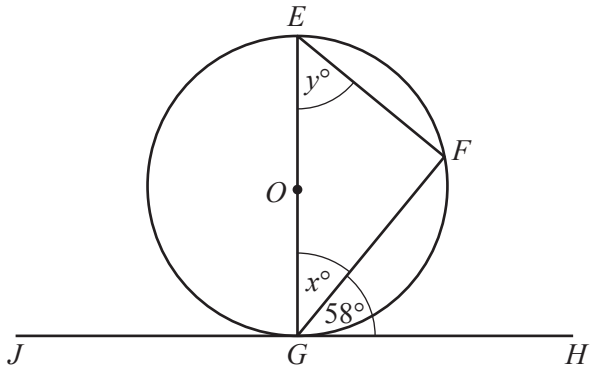
Find the value of *a*.

a = ... [2]

(b) Find the size of one interior angle of a regular 10-sided polygon.

..... [3]

(c)



NOT TO SCALE

The points *E*, *F* and *G* lie on the circumference of a circle, centre *O*.
JGH is a tangent to the circle.

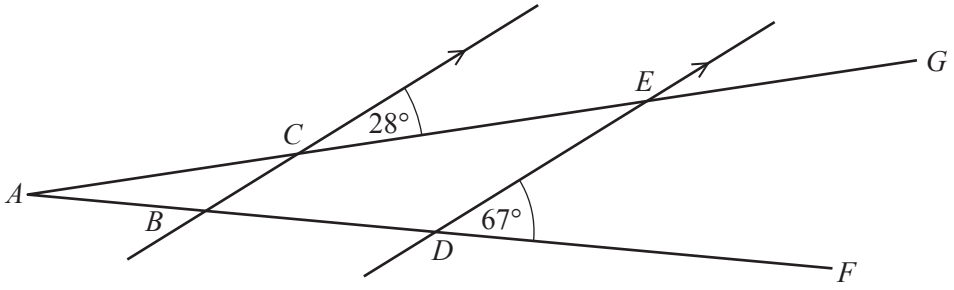
Find the value of *x* and the value of *y*.

x = ...

y = ... [2]

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(d)



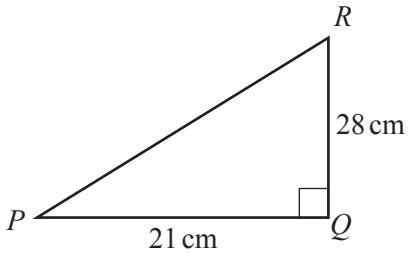
NOT TO SCALE

In the diagram AG and AF are straight lines.
Lines BC and DE are parallel.

Find angle CED and give a reason for your answer.

Angle CED = ... because ..... [2]

(e)

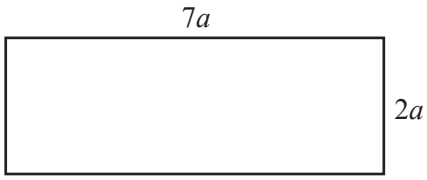


NOT TO SCALE

Calculate PR.

PR = ... cm [2]

5 **(a)** The diagram shows a rectangle with length $7a$ and width $2a$.



NOT TO SCALE

Write an expression, in its simplest form, for

(i) the perimeter,

..... [2]

(ii) the area.

..... [2]

(b) The nth term of a sequence is $n^2 + 5$.

Find the first three terms of this sequence.

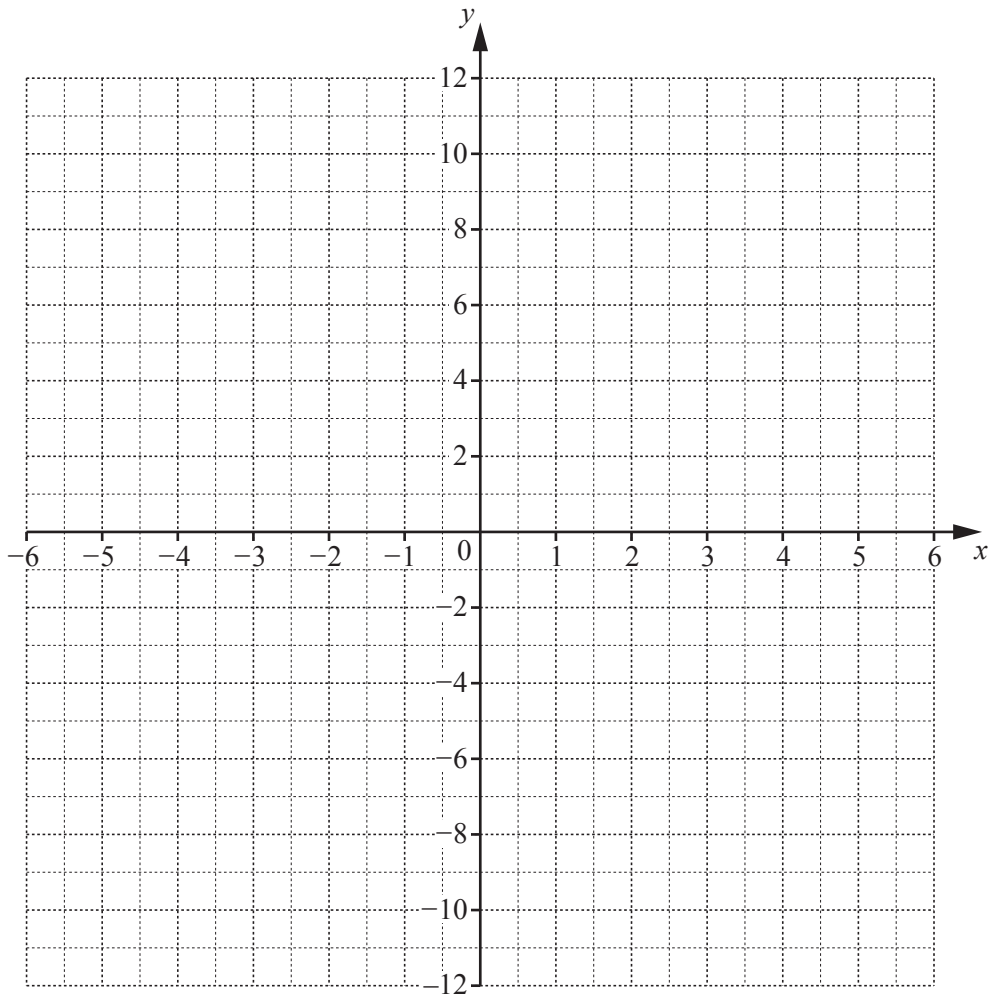
..... , ... , ... [2]

(c) (i) Complete the table of values for $y = \frac{12}{x}$, $x \neq 0$.

x	−6	−4	−3	−2	−1		1	2	3	4	6
y	−2	−3					12				2

[3]

(ii) On the grid, draw the graph of $y = \frac{12}{x}$ for $-6 \leqslant x \leqslant -1$ and $1 \leqslant x \leqslant 6$.



[4]

(iii) On the grid, draw the line $y = 8$. [1]

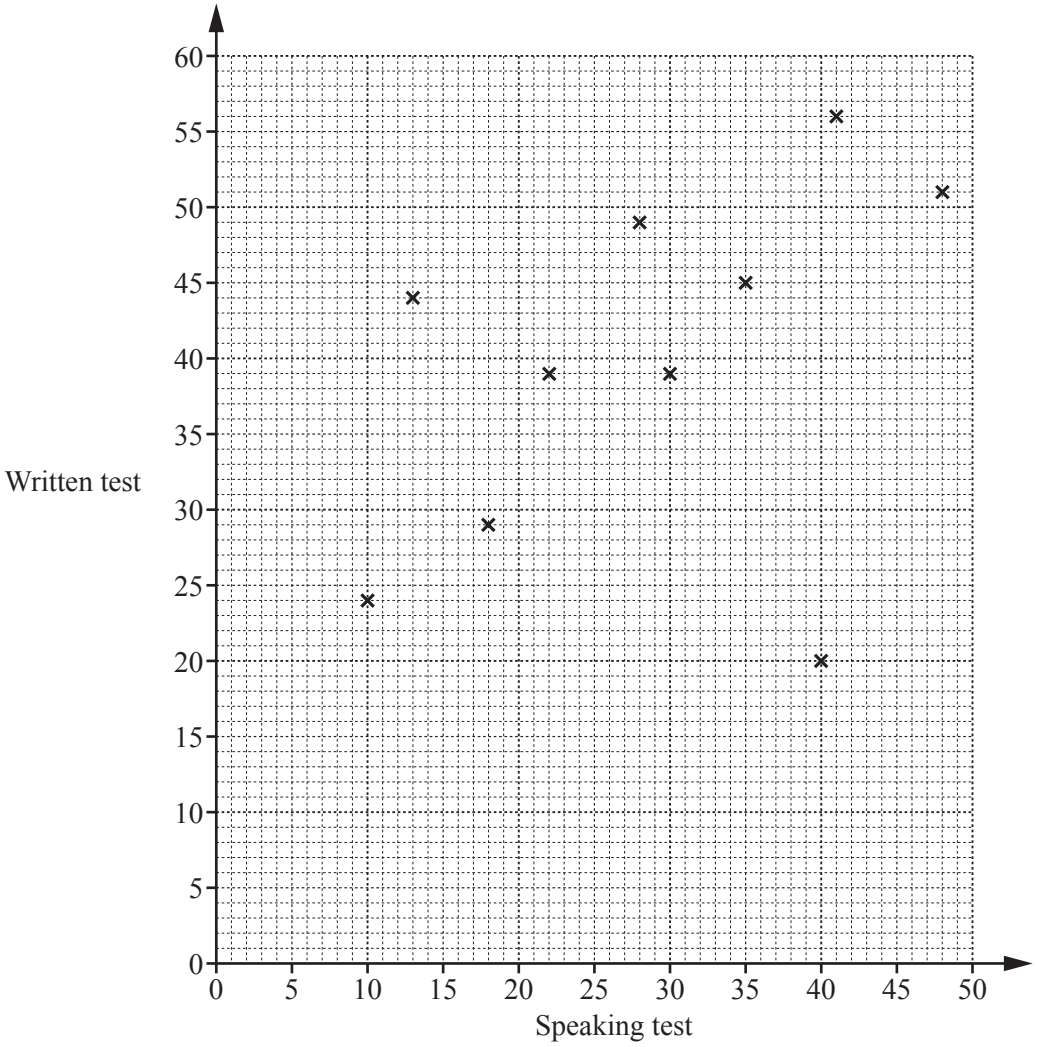
(iv) Use your graph to solve $\frac{12}{x} = 8$.

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

6 Fourteen students each take two tests in French, a speaking test and a written test.
The table shows the scores.

Speaking test	10	13	48	30	35	18	41	40	22	28	20	44	37	46
Written test	24	44	51	39	45	29	56	20	39	49	33	52	44	52

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



[2]

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

..... [1]

(c) One student has a high score in the speaking test and a low score in the written test.

On the scatter diagram, put a ring around this point. [1]

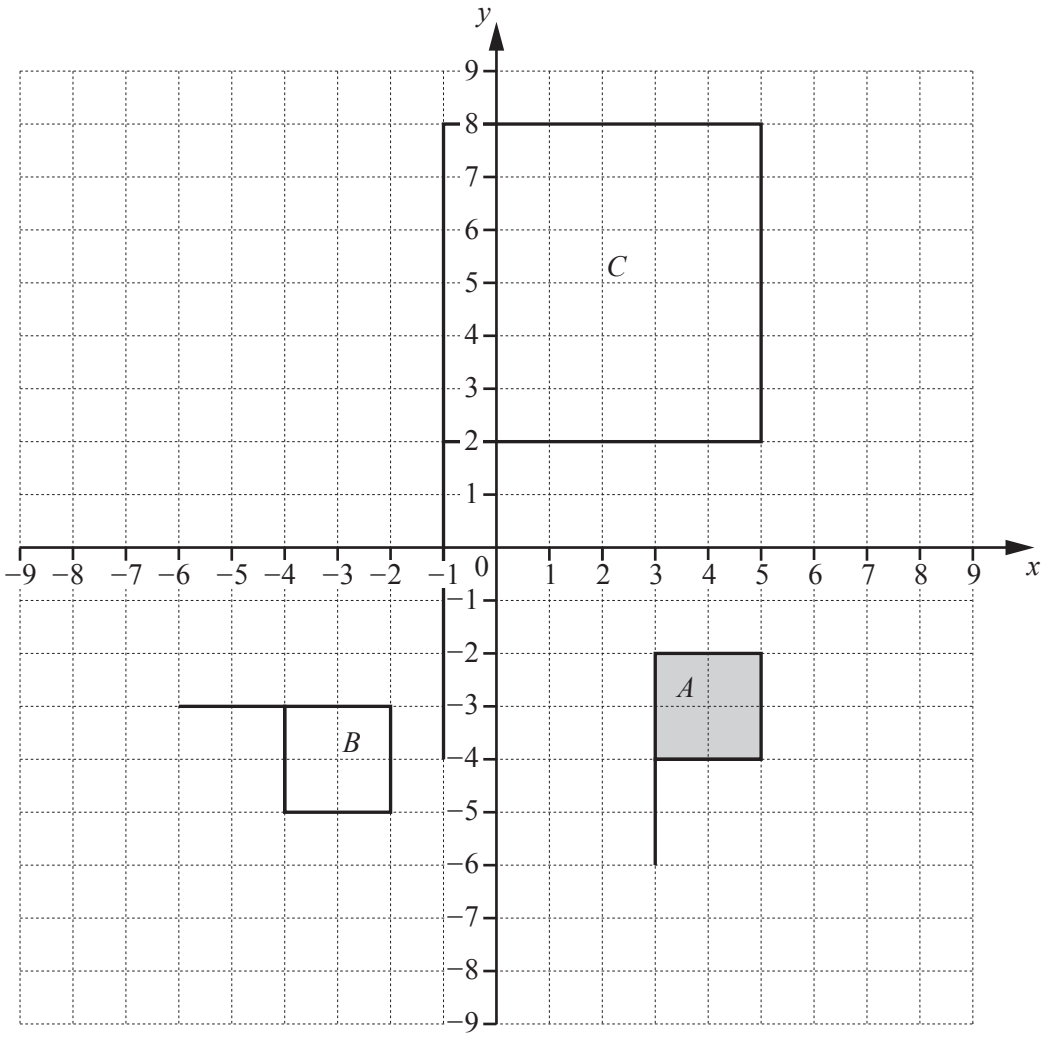
(d) On the scatter diagram, draw a line of best fit. [1]

(e) Use your line of best fit to estimate a score in the written test for a student who scored 25 in the speaking test.

..... [1]

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7



(a) Describe fully the **single** transformation that maps shape *A* onto shape *B*.

.....

..... [3]

(b) Describe fully the **single** transformation that maps shape *A* onto shape *C*.

.....

..... [3]

(c) On the grid, draw the image of shape *A* after a translation by the vector $\begin{pmatrix} 3 \\ 1 \end{pmatrix}$. [2]

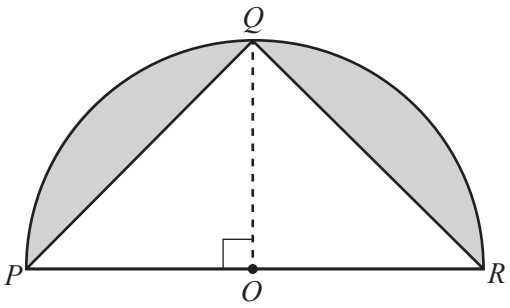
(d) On the grid, draw the image of **shape *B*** after a reflection in the line $y = 1$. [2]

8 **(a)** A cylinder has a radius of 6 cm and a height of 17 cm.

Show that the volume of this cylinder is 1923 cm^3, correct to 4 significant figures.

[2]

(b)



NOT TO SCALE

Points P, Q and R are on the circumference of a semicircle, centre O and radius 8 cm.
Angle $POQ = 90°$.

Calculate the shaded area.

..... cm^2 [5]

9 **(a)** Simplify $8a + 3b - 2a + b$.

..... [2]

(b) Calculate the value of $4x^2 + xy$ when $x = 3$ and $y = -2$.

..... [2]

(c) Solve these equations.

(i) $\frac{x}{4} = 20$

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

(ii) $3x - 5 = 16$

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

(iii) $5(2x + 1) = 27$

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

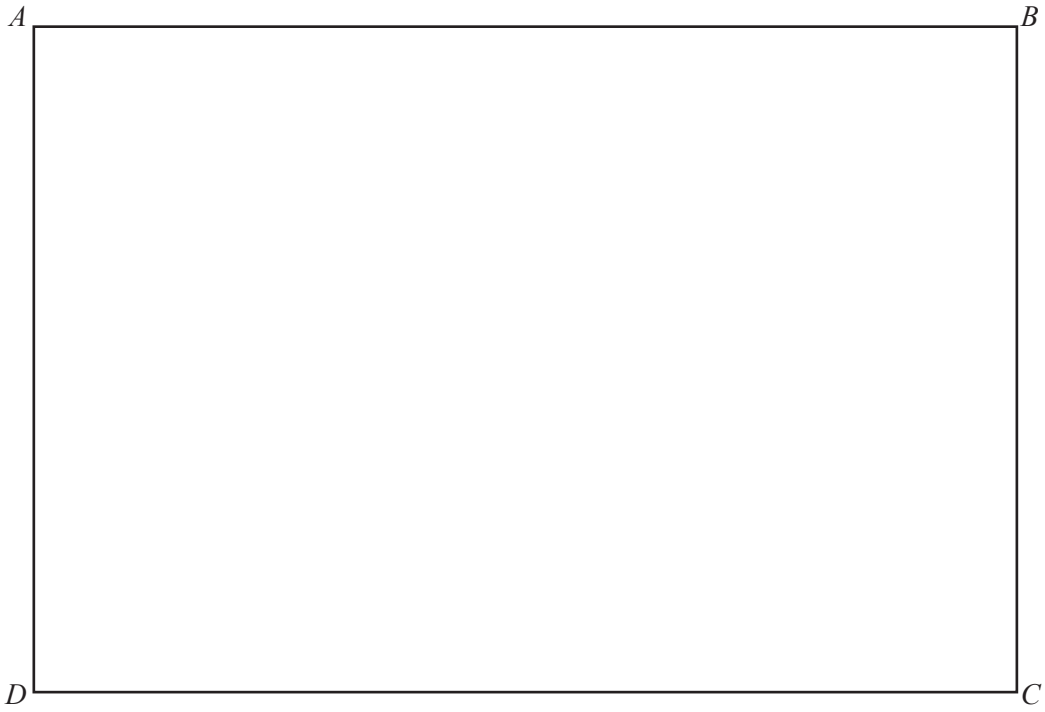
(d) Make r the subject of this formula.

$$p = 3r - 5$$

$r =$ ..... [2]

Question 10 is printed on the next page.

10 The scale drawing shows a rectangle $ABCD$.
The scale is 1 centimetre represents 20 metres.



Scale: 1 cm to 20 m

(a) **Using a straight edge and compasses only**, construct the bisector of angle ADC.
Show all your construction arcs. [2]

(b) Shade the region inside the rectangle that is

- nearer to DA than to DC

and

- less than 210 m from C.

[3]

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