Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

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2869692078

MATHEMATICS **0580/23**

Paper 2 (Extended) **May/June 2019**

1 hour 30 minutes

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 70.

This document consists of **15** printed pages and **1** blank page.

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[Turn over

1 Write 1.8972 correct to 2 decimal places.

..... [1]

2 Factorise $2x^2 - x$.

..... [1]

3 Giulio's reaction times are measured in two games.
In the first game his reaction time is $\frac{1}{3}$ of a second.
In the second game his reaction time is $\frac{1}{8}$ of a second.

Find the difference between the two reaction times.

..... s [1]

4 The table shows the different methods of travel for 20 people going to work.

Method of travel	Frequency
Car	10
Walk	5
Bike	3
Bus	2

Which type of average, mean, median or mode, can be used for this information?

..... [1]

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5 **(a)** Find the co-ordinates of the point where the line $y = 3x - 8$ crosses the y-axis.

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

(b) Write down the gradient of the line $y = 3x - 8$.

..... [1]

6 Calculate.

(a) $-12 \div -2$

..... [1]

(b) $\sqrt[3]{2^3 + 2}$

..... [1]

7 Here is a list of numbers.

21 $\quad \frac{2}{3} \quad$ $\sqrt{13}$ $\quad$ 31 $\quad$ $\sqrt{121}$ $\quad$ 51 $\quad$ 0.7

From this list, write down

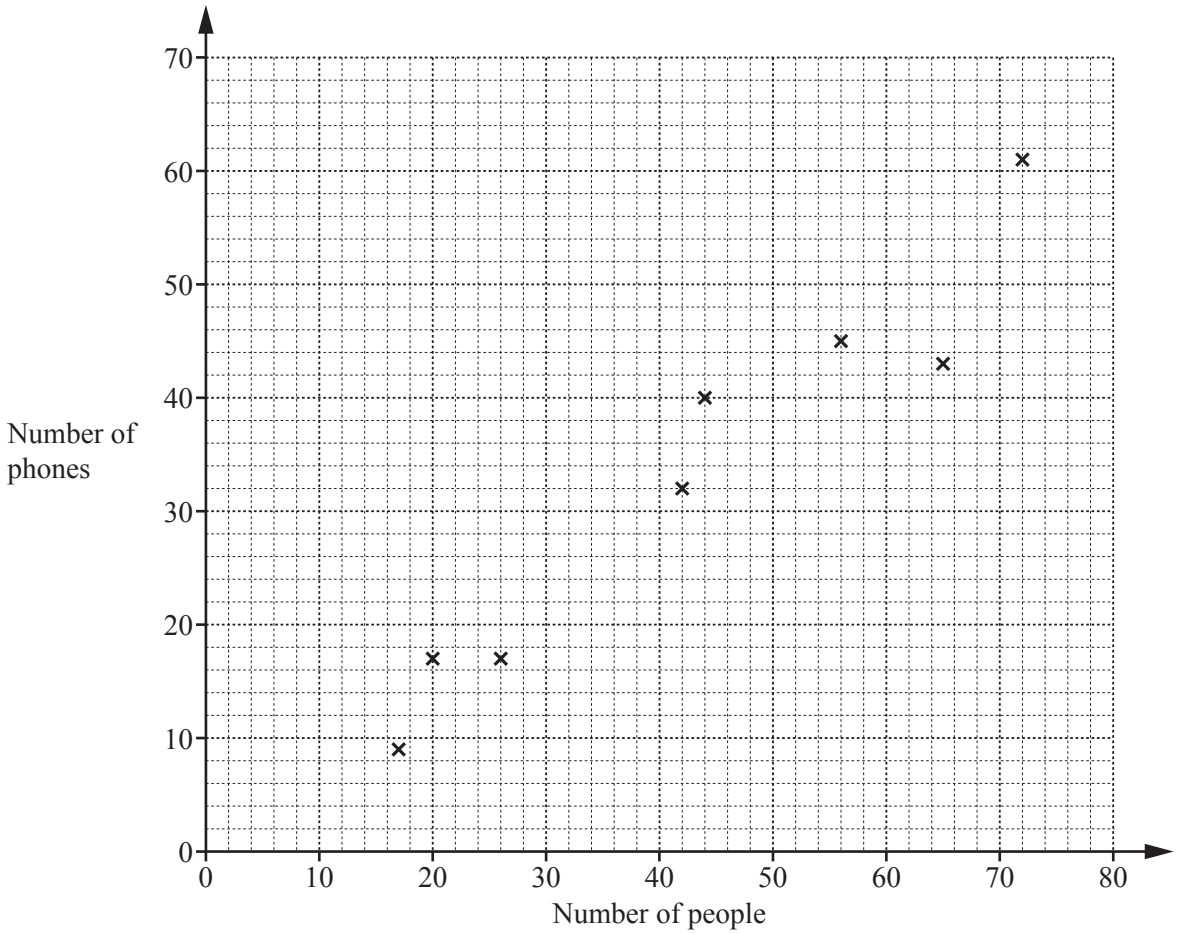
(a) a prime number,

..... [1]

(b) an irrational number.

..... [1]

8 The scatter diagram shows the number of people and the number of phones in each of 8 buildings.



(a) One of the buildings contains 42 people.

Write down the number of phones in this building.

..... [1]

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

..... [1]

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9 **Without using a calculator**, work out $\frac{12}{35} \times \frac{7}{9}$.
You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

10 Rearrange $2(w+h) = P$ to make w the subject.

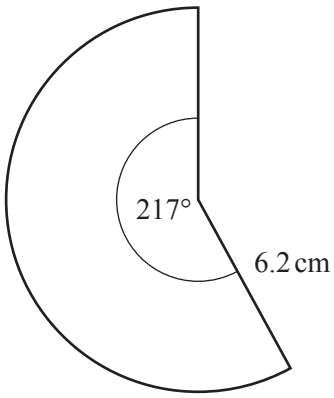
$w =$ ..... [2]

11 Complete this statement with an expression in terms of m.

$$18m^3 + 9m^2 + 14m + 7 = (9m^2 + 7)(.....)$$

[2]

12



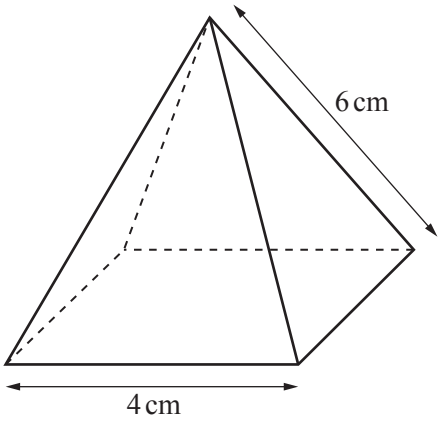
NOT TO SCALE

The diagram shows a sector of a circle with radius 6.2 cm and sector angle 217°.

Calculate the area of this sector.

..... cm^2 [2]

13



NOT TO SCALE

The diagram shows a pyramid with a square base.
The triangular faces are congruent isosceles triangles.

(a) Write down the number of planes of symmetry of this pyramid.

..... [1]

(b) **Using a ruler and compasses only**, construct an accurate drawing of one of the triangular faces of the pyramid.

[2]

14 One solution of the equation $ax^2 + a = 150$ is $x = 7$.

(a) Find the value of a.

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

(b) Find the other solution.

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

15 A is the point $(7, 12)$ and B is the point $(2, -1)$.

Find the length of AB.

..... [3]

16 $A = \dfrac{b \times h}{2}$

$A = 10$, correct to the nearest whole number.
$h = 4$, correct to the nearest whole number.

Work out the upper bound for the value of b.

..... [3]

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17 Simplify $\dfrac{x^3+5x^2}{x^2-25}$, giving your answer as a single fraction.

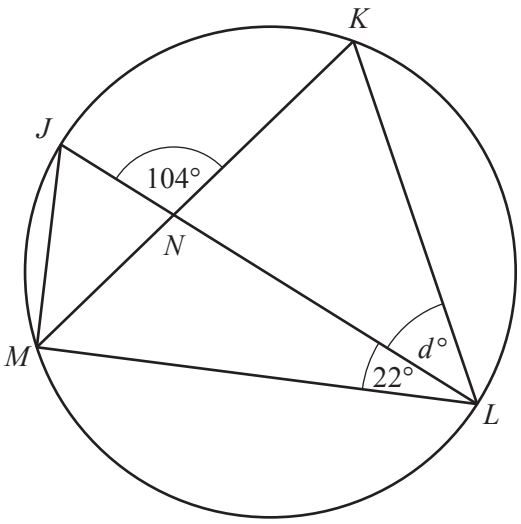
..... [3]

18 y is inversely proportional to the square of $(x+1)$.
$y = 0.875$ when $x = 1$.

Find y when $x = 4$.

$y =$ ..... [3]

19



NOT TO SCALE

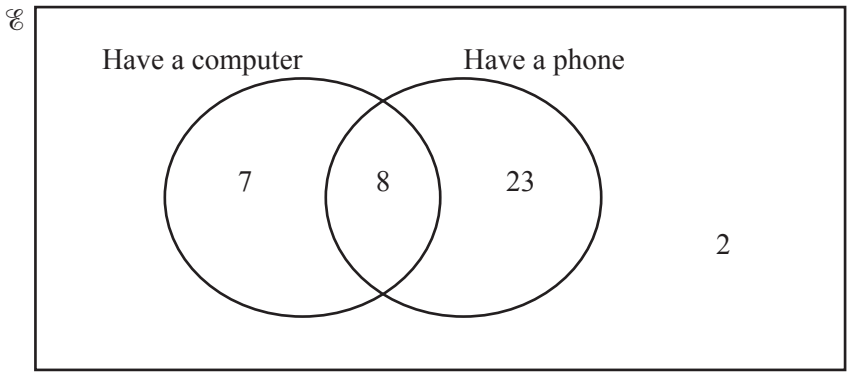
J, K, L and M are points on the circumference of a circle with diameter JL.
JL and KM intersect at N.
Angle $JNK = 104°$ and angle $MLJ = 22°$.

Work out the value of d.

$d =$ ..... [4]

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20 **(a)** 40 children were asked if they have a computer or a phone or both.
The Venn diagram shows the results.

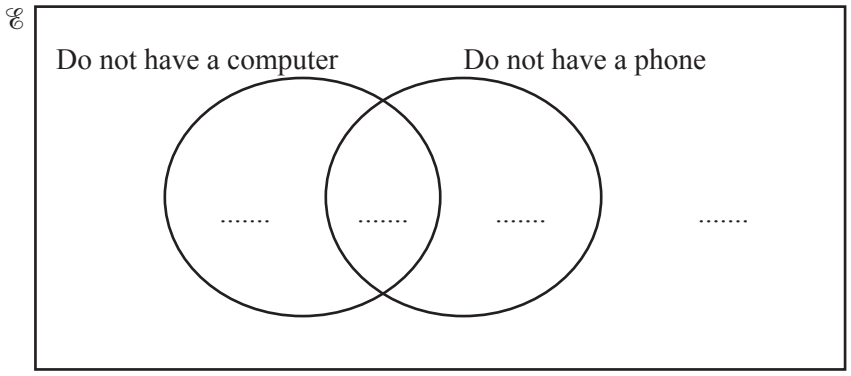


(i) A child is chosen at random from the children who have a computer.

Write down the probability that this child also has a phone.

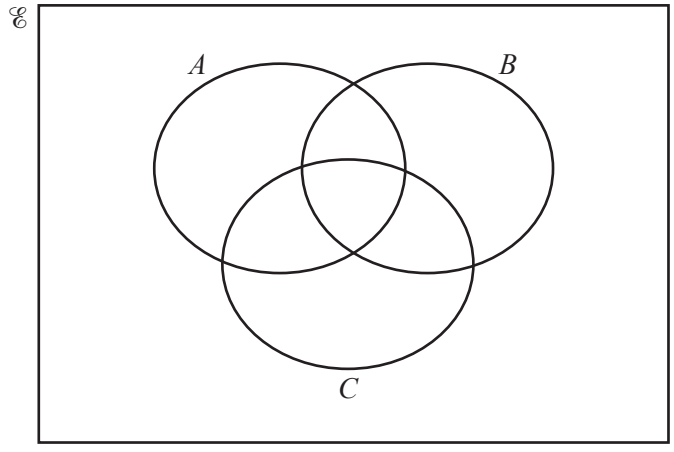
..... [1]

(ii) Complete the Venn diagram.



[2]

(b) In this Venn diagram, shade the region $(A \cup B') \cap C$.



[1]

21 $\mathbf{A} = \begin{pmatrix} 3 & 4 \\ 5 & 0 \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} 1 & 4 \\ -3 & 2 \end{pmatrix}$

Find

(a) $5\mathbf{A}$,

$\begin{pmatrix} & \\ & \end{pmatrix}$ [1]

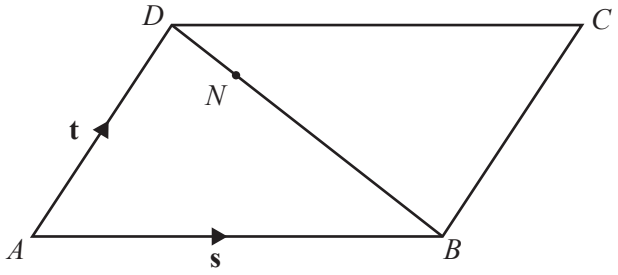
(b) $\mathbf{A} + \mathbf{B}$,

$\begin{pmatrix} & \\ & \end{pmatrix}$ [1]

(c) $\mathbf{AB}$.

$\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

22



NOT TO SCALE

$ABCD$ is a parallelogram.
N is the point on BD such that $BN : ND = 4 : 1$.
$\overrightarrow{AB} = \mathbf{s}$ and $\overrightarrow{AD} = \mathbf{t}$.

Find, in terms of $\mathbf{s}$ and $\mathbf{t}$, an expression in its simplest form for

(a) $\overrightarrow{BD}$,

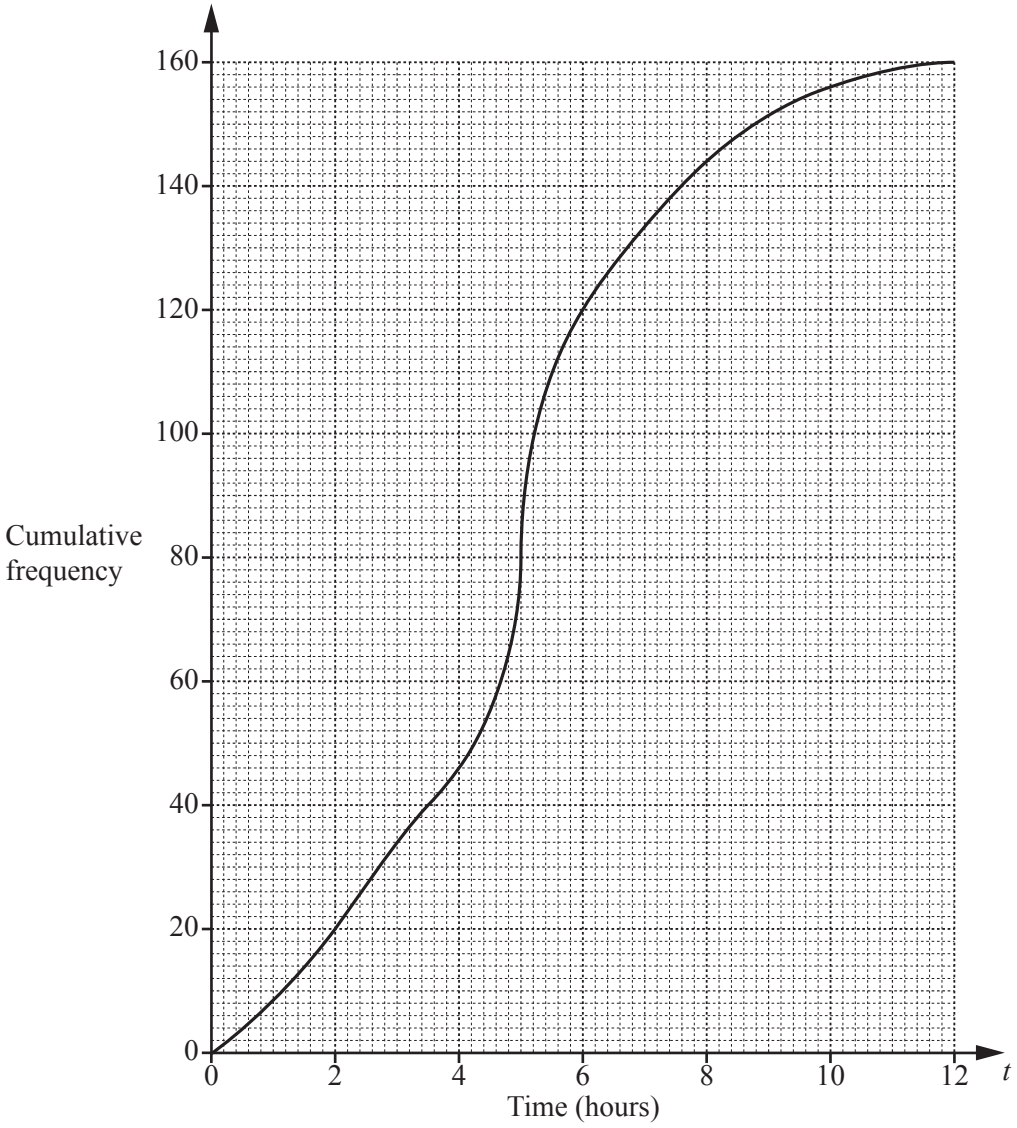
$\overrightarrow{BD} =$ ..... [1]

(b) $\overrightarrow{CN}$.

$\overrightarrow{CN} =$ ..... [3]

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23 160 students record the amount of time, t hours, they each spend playing computer games in a week. This information is shown in the cumulative frequency diagram.



(a) Use the diagram to find an estimate of

(i) the median,

..... hours [1]

(ii) the interquartile range.

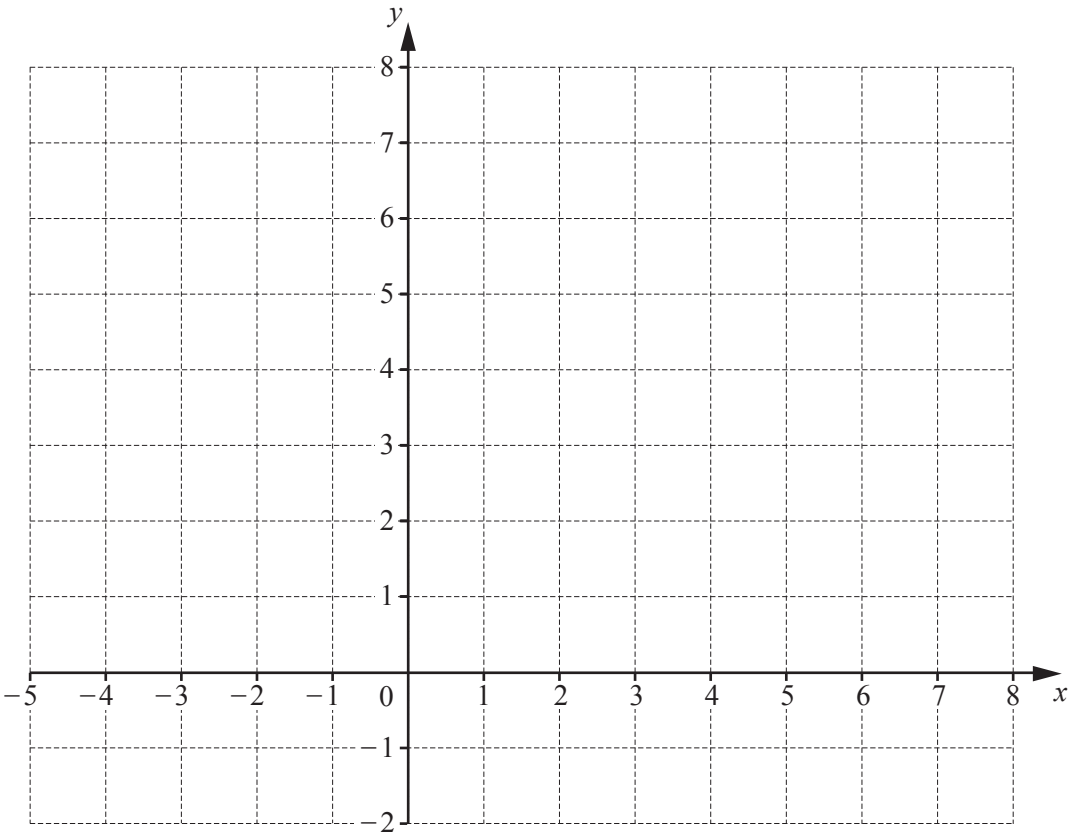
..... hours [2]

(b) Use the diagram to complete this frequency table.

Time (t hours)	$0 < t \leqslant 2$	$2 < t \leqslant 4$	$4 < t \leqslant 6$	$6 < t \leqslant 8$	$8 < t \leqslant 10$	$10 < t \leqslant 12$
Frequency	20			24	12	4

[2]

24



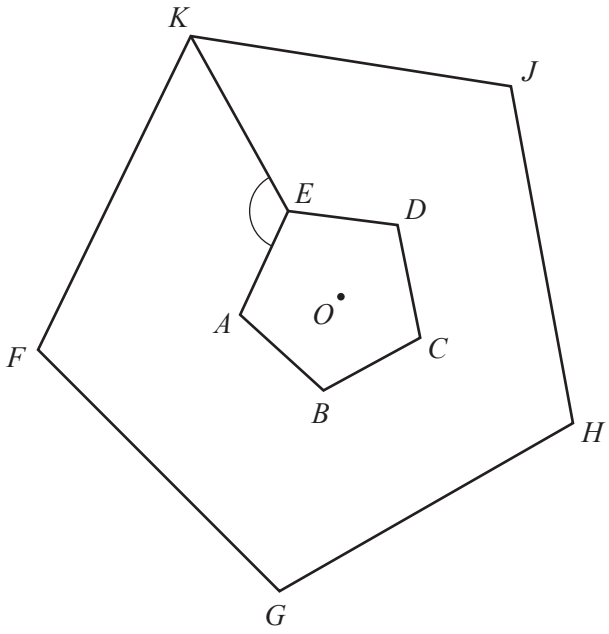
By shading the **unwanted** regions of the grid, draw and label the region R which satisfies the following three inequalities.

$y \leqslant 2$ $\quad$ $x < 3$ $\quad$ $y \leqslant x + 4$

[5]

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25



NOT TO SCALE

The diagram shows two regular pentagons.
Pentagon *FGHJK* is an enlargement of pentagon *ABCDE*, centre *O*.

(a) Find angle *AEK*.

Angle *AEK* = ... [4]

(b) The area of pentagon *FGHJK* is 73.5 cm^2.
The area of pentagon *ABCDE* is 6 cm^2.

Find the ratio perimeter of pentagon *FGHJK* : perimeter of pentagon *ABCDE* in its simplest form.

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

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