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MATHEMATICS **0580/43**

Paper 4 Calculator (Extended) **October/November 2025**

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 scientific 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 100.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

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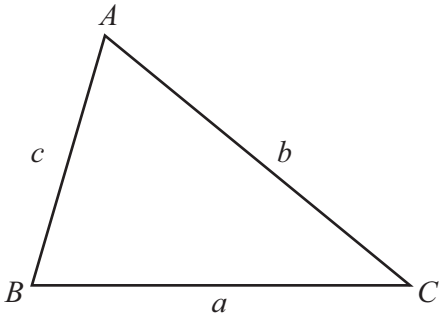
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List of formulas

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle of radius r.	$A = \pi r^2$
Circumference, C, of circle of 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.	$A = \pi rl$
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.	$V = \frac{4}{3}\pi r^3$
For the equation $ax^2 + bx + c = 0$, where $a \neq 0$,	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

For the triangle shown,



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$\text{Area} = \frac{1}{2}ab\sin C$$

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1 The nth term of a sequence is $5 - 2n$.

(a) Find the 6th term of this sequence.

..... [1]

(b) Find the greatest number in this sequence.

..... [1]

2 The stem-and-leaf diagram shows the age of each of 16 adults.

3	2	3	3	5	6	7	
4	0	1	5	5	6	8	9
5	1	1	1				

Key: 3 | 2 represents age 32 years

(a) Find the mode.

..... years [1]

(b) Find the median.

..... years [1]

(c) Find the percentage of the 16 adults with an age of less than 38 years.

.....% [2]

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3 $G = \frac{4}{5}m^2n$

Find the value of G when $m = 6$ and $n = 15$.

$G =$ ..... [1]

4 **(a)** The scale diagram shows the position of town A on a map.
Town B is 12 km from town A on a bearing of 080°.

Using a scale of 1 cm represents 2 km, mark the position of town B on the diagram.



Scale: 1 cm to 2 km

[2]

(b) The bearing of C from D is 130°.

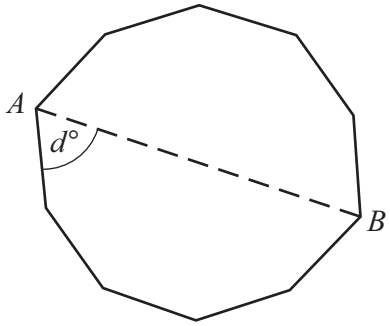
Work out the bearing of D from C.

..... [2]

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5 **(a)** The diagram shows a regular decagon.
AB is a line of symmetry of the decagon.



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Work out the value of *d*.

d = ... [3]

(b) The exterior angle of a regular polygon with *n* sides is 45°.

Work out the value of *n*.

n = ... [1]

6 Simplify.

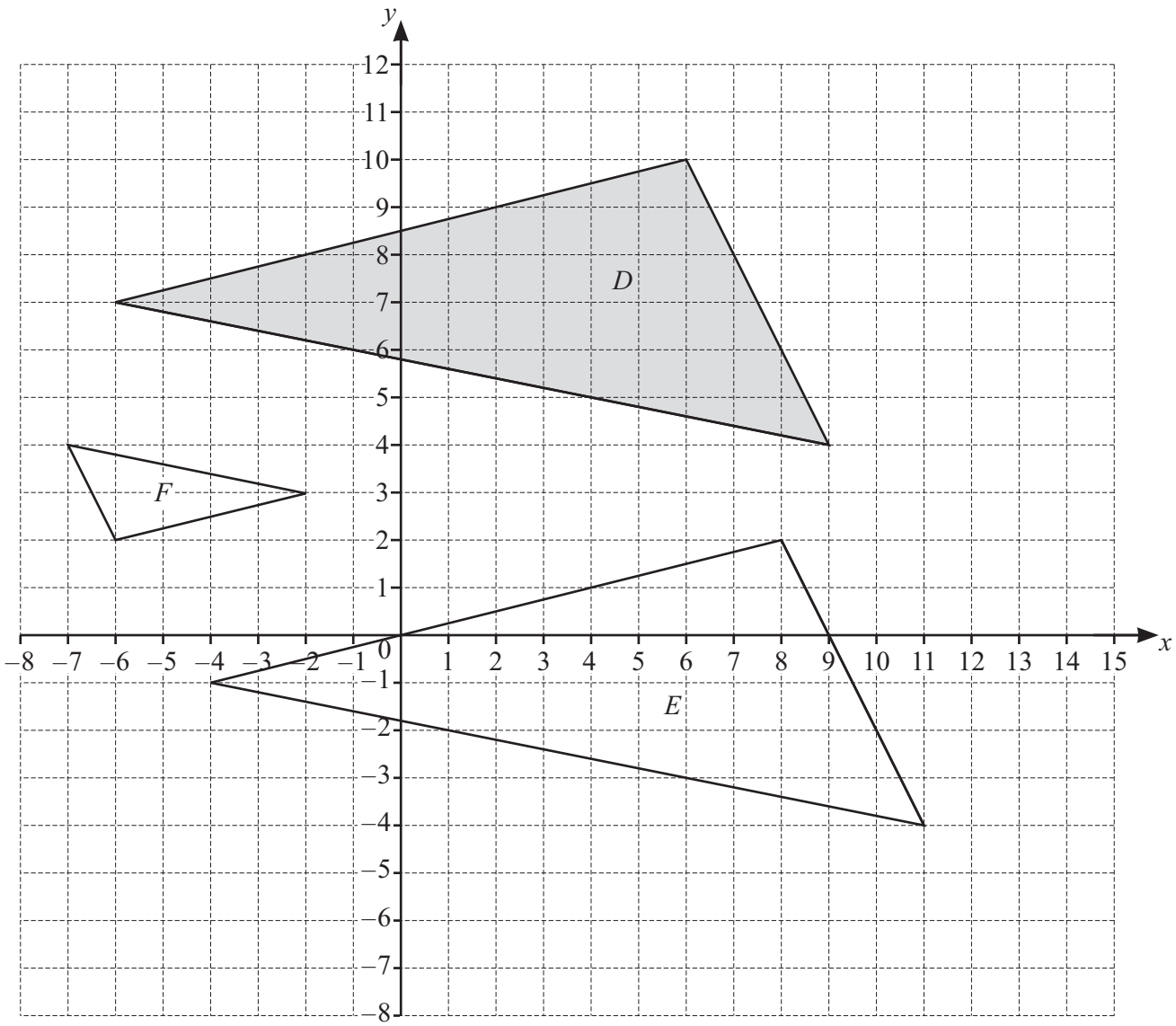
(a) $\frac{y^5}{y^2}$

..... [1]

(b) $3x^3 \times 5x^5$

..... [2]

7



(a) Describe fully the **single** transformation that maps triangle *D* onto triangle *E*.

.....

..... [2]

(b) Describe fully the **single** transformation that maps triangle *D* onto triangle *F*.

.....

..... [3]

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8 m is a positive integer.

Write these values in order of size, starting with the smallest.

m 33% of m $\frac{1}{3}$ of m 320% of $\frac{m}{10}$

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

smallest

9 Draw a ring around the calculation that is equivalent to $n \div 2\frac{3}{5}$.

$n \times 2\frac{5}{3}$ $n \times \frac{5}{13}$ $n \times \frac{13}{5}$ $\frac{1}{n} \times \frac{13}{5}$ $\frac{1}{n} \times \frac{5}{13}$

[1]

10 Solve the simultaneous equations.

You must show all your working.

$3x + 5y = 5$
$2x - 5y = 45$

$x =$ .....

$y =$ .....

[2]

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2.89×10^{-1}	1.3×10^{12}	8.3×10^{1}	9×10^{11}	2.03×10^{-5}	0.3×10^{-2}

Use a number from the box to complete each statement.

The number that is not written in standard form is ..... .

The largest number is ..... .

The smallest number is ..... .

[2]

12 A vase contains flowers that are red or pink or white.
Ruth picks a flower at random from the vase.
The probability that the flower is **not** red is 0.9 .
The probability that the flower is **not** pink is 0.65 .

Find the probability that the flower is white.

..... [2]

13 The point (5, 1024) lies on the curve $y = c^x$, where c is a whole number.

Find the y-coordinate of the point on the curve with x-coordinate -2.

..... [3]

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14 These expressions are all equal in value.

$$\frac{5x-2}{3} \qquad 10-x \qquad y+11$$

Find the value of y.

$y =$ ..... [5]

15 The population of a town is 54 000.
The population is **decreasing** exponentially at a rate of 2% per year.

(a) Calculate the decrease in the population at the end of 4 years.

..... [3]

(b) Find the number of complete years it takes for the population of 54 000 to first fall below 44 000.

..... years [2]

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16 Expand and simplify.

(a) $7(x+2)+4(3x-5)$

..... [2]

(b) $(3x-y)(5x+2y)$

..... [2]

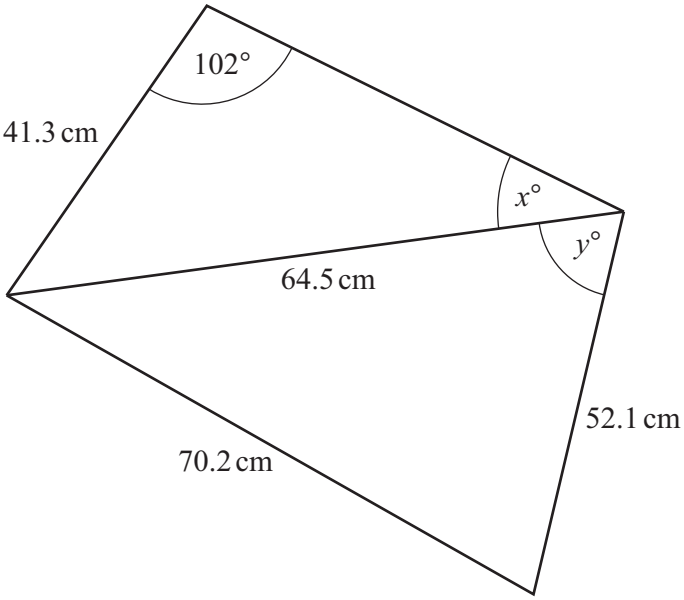
17 Make t the subject of the formula.

$$x = \frac{7t}{5-t}$$

$t =$ ..... [3]

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NOT TO SCALE

(a) Calculate the value of x.

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

(b) Calculate the value of y.

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

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19 $f(x) = 5^x$ $g(x) = 3x - 2$ $h(x) = x^2 + 1$

(a) Find $f(5)$.

..... [1]

(b) Find $g(8x)$.

..... [1]

(c) Find $g^{-1}(x)$.

$g^{-1}(x) =$ ..... [2]

(d) Find the positive solution of $gh(x) = 364$.

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

(e) Find $ff^{-1}(12)$.

..... [1]

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20 $y = x^3 + 3x^2 - 13x$

(a) Find $\frac{dy}{dx}$.

..... [2]

(b) Find the gradient of the curve $y = x^3 + 3x^2 - 13x$ at the point where $x = 3$.

..... [2]

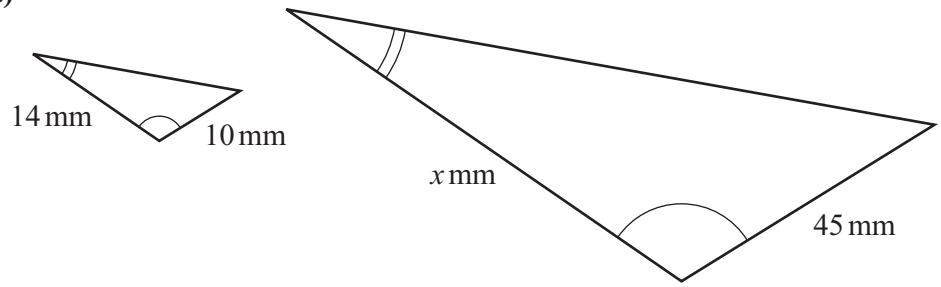
21 A dressmaker takes 75 hours to make 31 dresses.
In week 1, she takes a total of 12 hours 30 minutes to make the first 4 dresses.
In week 2, she makes the remaining 27 dresses at a constant hourly rate.

Work out the percentage increase in her hourly rate of making dresses from week 1 to week 2.

..... % [4]

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22 (a)



NOT TO SCALE

The diagram shows two mathematically similar triangles.

Find the value of x.

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

(b) The surface areas of two mathematically similar containers are 124 cm^2 and 279 cm^2.
The capacity of the smaller container is 56 ml.

Find the capacity of the larger container.

..... ml [3]

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23 The table shows some information about the mass of each of 200 oranges.

Mass (m grams)	$180 < m \leqslant 200$	$200 < m \leqslant 210$	$210 < m \leqslant 215$	$215 < m \leqslant 230$
Frequency	32	64	74	30

(a) Calculate an estimate of the mean mass of an orange.

..... g [4]

(b) Sarah draws a histogram to show this information.
The table shows the height of one of the bars for this histogram.

Complete the table.

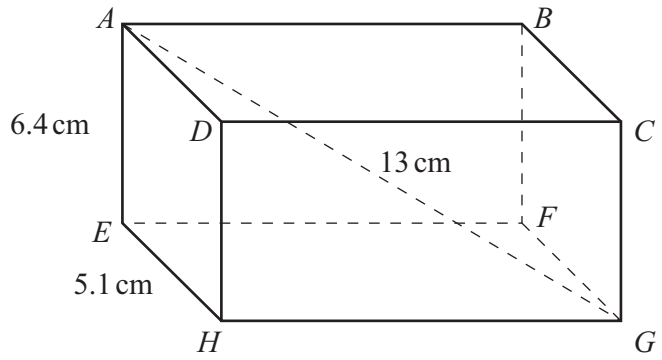
Mass (m grams)	$180 < m \leqslant 200$	$200 < m \leqslant 210$	$210 < m \leqslant 215$	$215 < m \leqslant 230$
Height of bar (cm)			7.4	

[3]

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NOT TO SCALE

The diagram shows a cuboid *ABCDEFGH*.
$AE = 6.4$ cm, $EH = 5.1$ cm and $AG = 13$ cm.

(a) Calculate *EF*.

EF = ... cm [3]

(b) Calculate the angle between the line *AG* and the base *EFGH* of the cuboid.

..... [3]

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25 Jenna has a length of wire measuring 68 cm, correct to the nearest cm.

From this wire she cuts off two smaller pieces

- a piece of length 4.7 cm, correct to the nearest mm
- a piece of length 10.0 cm, correct to the nearest mm.

Work out the lower bound and the upper bound for the length of the wire remaining.

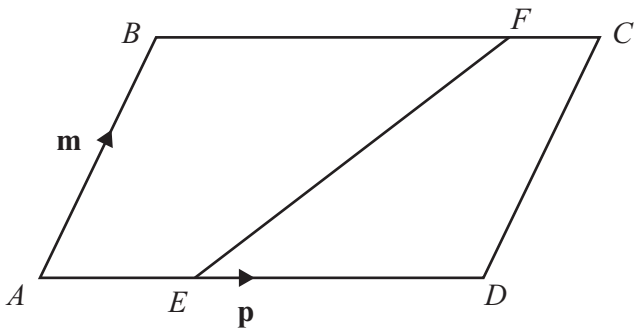
Lower bound = ... cm

Upper bound = ... cm

[3]

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NOT TO SCALE

ABCD is a parallelogram.
$\overrightarrow{AB} = \mathbf{m}$ and $\overrightarrow{AD} = \mathbf{p}$.
F is a point on *BC* and $BF = 4FC$.
E is a point on *AD* and $AE : ED = 1 : 2$.

(a) Find $\overrightarrow{EF}$, in terms of **m** and **p**, in its simplest form.

..... [3]

(b) *EF* and *DC* are extended to meet at the point *G*.

Find $\overrightarrow{CG}$, in terms of **m** and/or **p**, in its simplest form.

..... [2]

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