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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.

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 .

$$V = \frac{1}{3}\pi r^2 h$$

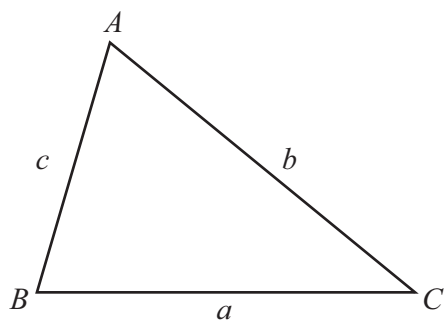
Volume, V , of sphere of radius r .

$$V = \frac{4}{3}\pi r^3$$

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,



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

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

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



1 The n th 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]





3

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

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

$$G = \dots\dots\dots [1]$$

- 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]

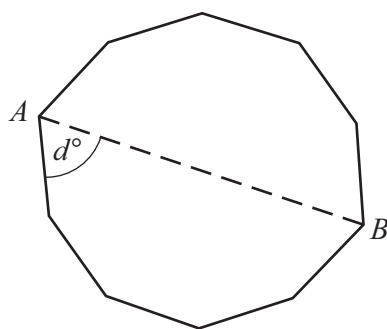
- (b) The bearing of C from D is 130° .

Work out the bearing of D from C .

..... [2]



- 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 .

$$d = \dots\dots\dots [3]$$

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

Work out the value of n .

$$n = \dots\dots\dots [1]$$

- 6 Simplify.

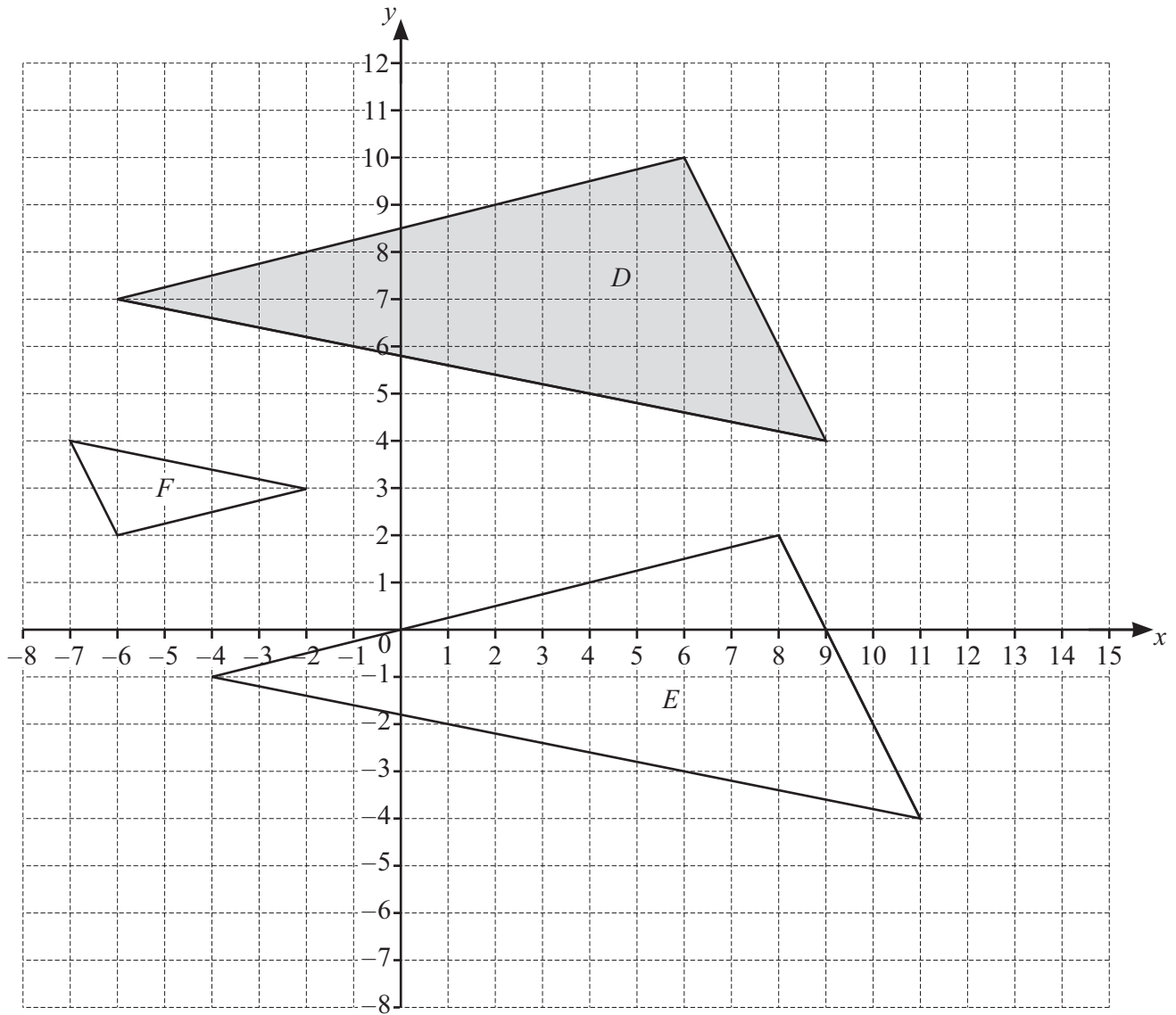
(a) $\frac{y^5}{y^2}$

$$\dots\dots\dots [1]$$

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

$$\dots\dots\dots [2]$$





(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]



8 m is a positive integer.

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

m

$33\% \text{ of } m$

$\frac{1}{3} \text{ of } m$

$320\% \text{ of } \frac{m}{10}$

.....,, [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]





11

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]



- 14 These expressions are all equal in value.

$$\frac{5x-2}{3}$$

$$10-x$$

$$y+11$$

Find the value of y .

$$y = \dots\dots\dots [5]$$

- 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.

$$\dots\dots\dots [3]$$

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

$$\dots\dots\dots \text{ years } [2]$$





16 Expand and simplify.

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

..... [2]

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

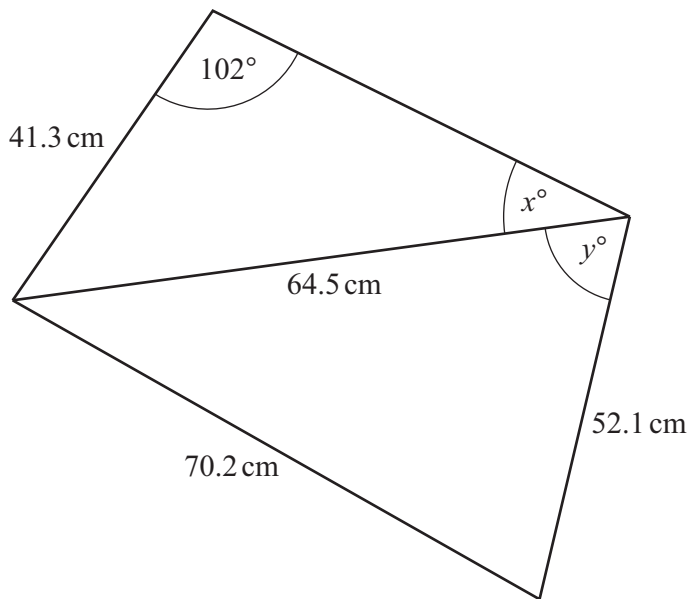
..... [2]

17 Make t the subject of the formula.

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

$t =$ [3]





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(a) Calculate the value of x .

$x = \dots\dots\dots$ [3]

(b) Calculate the value of y .

$y = \dots\dots\dots$ [3]



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

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

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

$$x = \dots\dots\dots [3]$$

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

..... [1]



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.

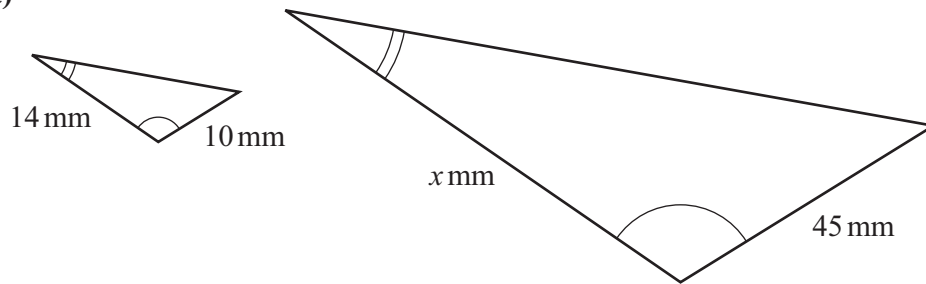
In week 2, she makes the remaining 27 dresses at a constant hourly rate.

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

..... % [4]



22 (a)

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The diagram shows two mathematically similar triangles.

Find the value of x .

$$x = \dots\dots\dots [2]$$

- (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.

$$\dots\dots\dots \text{ ml } [3]$$



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

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

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

..... g [4]

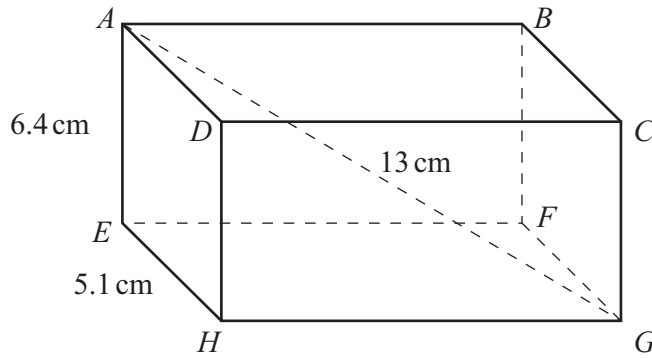
- (b) Sarah draws a histogram to show this information.
The table shows the height of one of the bars for this histogram.

Complete the table.

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

[3]





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

(a) Calculate EF .

$EF = \dots\dots\dots$ cm [3]

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

$\dots\dots\dots$ [3]



- 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.

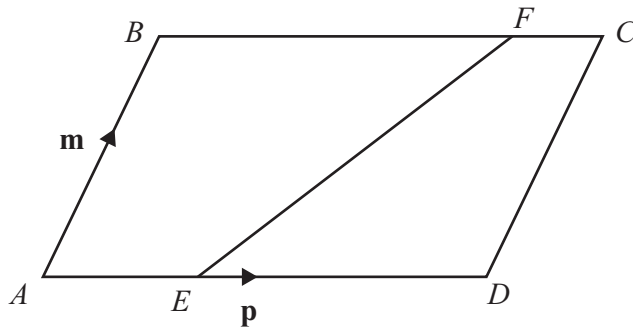
Work out the lower bound and the upper bound for the length of the wire remaining.

Lower bound = cm

Upper bound = cm

[3]





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$ABCD$ is a parallelogram.

$\vec{AB} = \mathbf{m}$ and $\vec{AD} = \mathbf{p}$.

F is a point on BC and $BF = 4FC$.

E is a point on AD and $AE : ED = 1 : 2$.

(a) Find \vec{EF} , in terms of \mathbf{m} and \mathbf{p} , in its simplest form.

..... [3]

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

Find \vec{CG} , in terms of \mathbf{m} and/or \mathbf{p} , in its simplest form.

..... [2]







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