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MATHEMATICS**0580/21**

Paper 2 Non-calculator (Extended)

May/June 2026**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. Do **not** use correction fluid or tape.
- Do **not** write on any bar codes.
- Calculators must **not** be used in this paper.
- You may use tracing paper.
- You must show all necessary working clearly.

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.

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 .

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

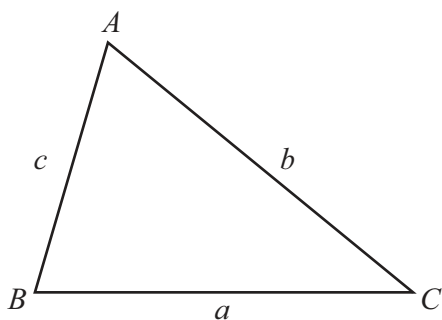
Volume, V , of sphere of radius r .

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

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,



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

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

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



Calculators must **not** be used in this paper.

- 1 Write down the value of 143^0 .

..... [1]

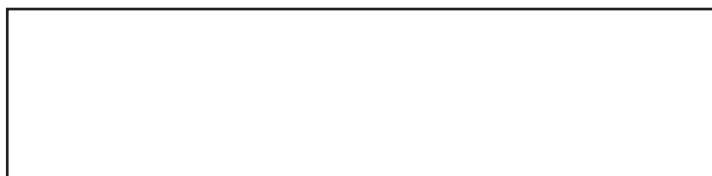
- 2 Solve $7x + 4 = 25$.

$x =$ [2]

- 3 Find the value of $4x^2 + 3y$ when $x = 5$ and $y = 10$.

..... [2]





6 cm

NOT TO SCALE

The diagram shows a rectangle with width 6 cm.

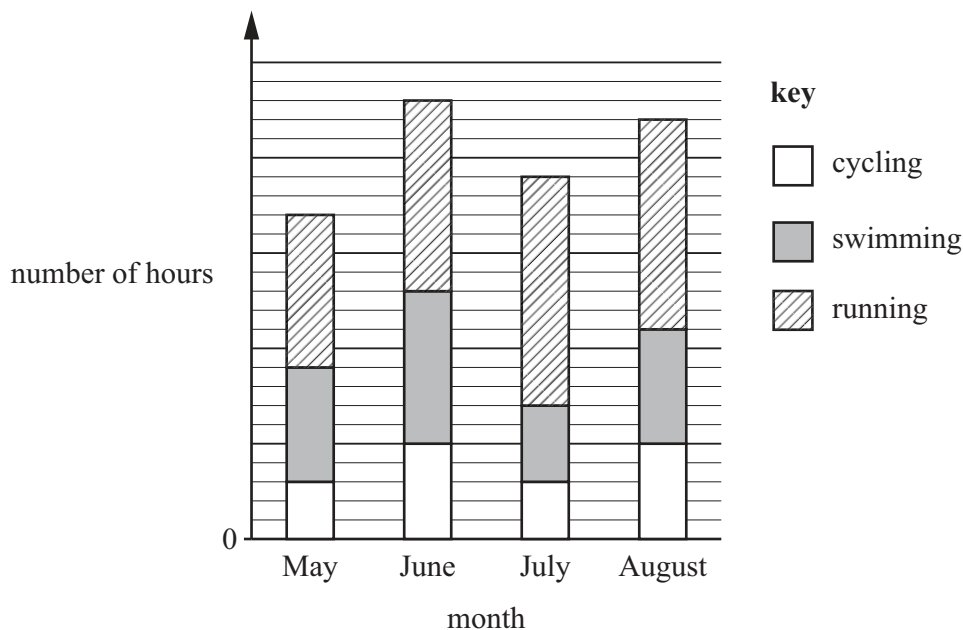
The width of the rectangle is $\frac{1}{12}$ of the perimeter of the rectangle.

Work out the length of the rectangle.

..... cm [2]



- 5 For four months, Hannah records the amount of time that she spends swimming, running and cycling. The composite bar chart shows this information.



- (a) Complete the statement with the correct month.

Hannah spends more time running in than in any of the other months. [1]

- (b) In May, Hannah spends 9 more hours swimming than she spends cycling.

Find the number of hours Hannah spends swimming in July.

..... hours [2]



6 Solve the simultaneous equations.

$$2x - y = 3$$

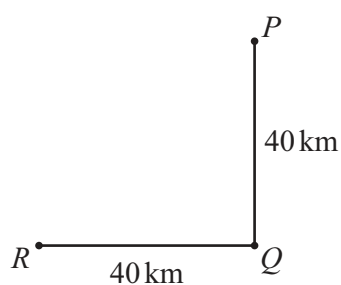
$$x + y = 12$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

[2]

7



NOT TO SCALE

The diagram shows the positions of three ships P , Q and R .

Ship Q is 40 km due east of ship R .

Ship P is 40 km due north of ship Q .

Work out the bearing of ship R from ship P .

..... [2]



8 P is the point $(0, 4)$ and Q is the point $(1, 8)$.

(a) Find the coordinates of the midpoint of PQ .

(....., ...) [2]

(b) Find the vector $\overrightarrow{QP}$.

$\overrightarrow{QP} = \begin{pmatrix} \\ \end{pmatrix}$ [2]

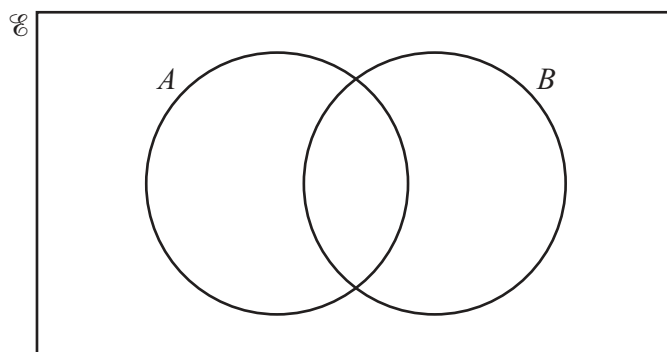
(c) The graph of $y = x^2 + ax + b$ passes through the points P and Q .
This graph also passes through the point $(-2, c)$.

Find the value of c .

$c = \dots\dots\dots$ [4]



- 9 In this Venn diagram, shade the region $A' \cup B$.



[1]

10 (a) $24\,192 = 2^7 \times 3^3 \times 7$

$$245\,000 = 2^3 \times 5^4 \times 7^2$$

Find the highest common factor (HCF) of 24 192 and 245 000.

..... [1]

- (b) A number, k , is written as a product of its prime factors.

$$k = 2^3 \times 3^4 \times 5 \times c^2$$

where c is a prime number greater than 5.

Write the number $20k^2$ as a product of its prime factors.
Give your answer in terms of c in its simplest form.

..... [2]



- 11 (a) A , B and C are linear sequences.

The table gives some information about these sequences.

sequence	1st term	2nd term	3rd term	4th term	n th term
A	3				
B	-4				$B_n = n - 5$
C	-1	2	5	8	

For these sequences, $C_n = A_n + B_n$.

Work out A_n , the n th term of sequence A .

$$A_n = \dots\dots\dots [3]$$

- (b) These are the first five terms of another sequence.

$$\frac{1}{2} \quad 1 \quad 2 \quad 4 \quad 8$$

- (i) Find the next term in this sequence.

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

- (ii) Find the n th term of this sequence.

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



- 12 The coordinates of A are $(3, 20)$.
The coordinates of B are $(5, 10)$.

Work out the gradient of AB .

..... [2]

- 13 (a) Work out.

$$0.9\dot{2}\dot{4} - 0.213$$

Give your answer as a decimal correct to 5 decimal places.

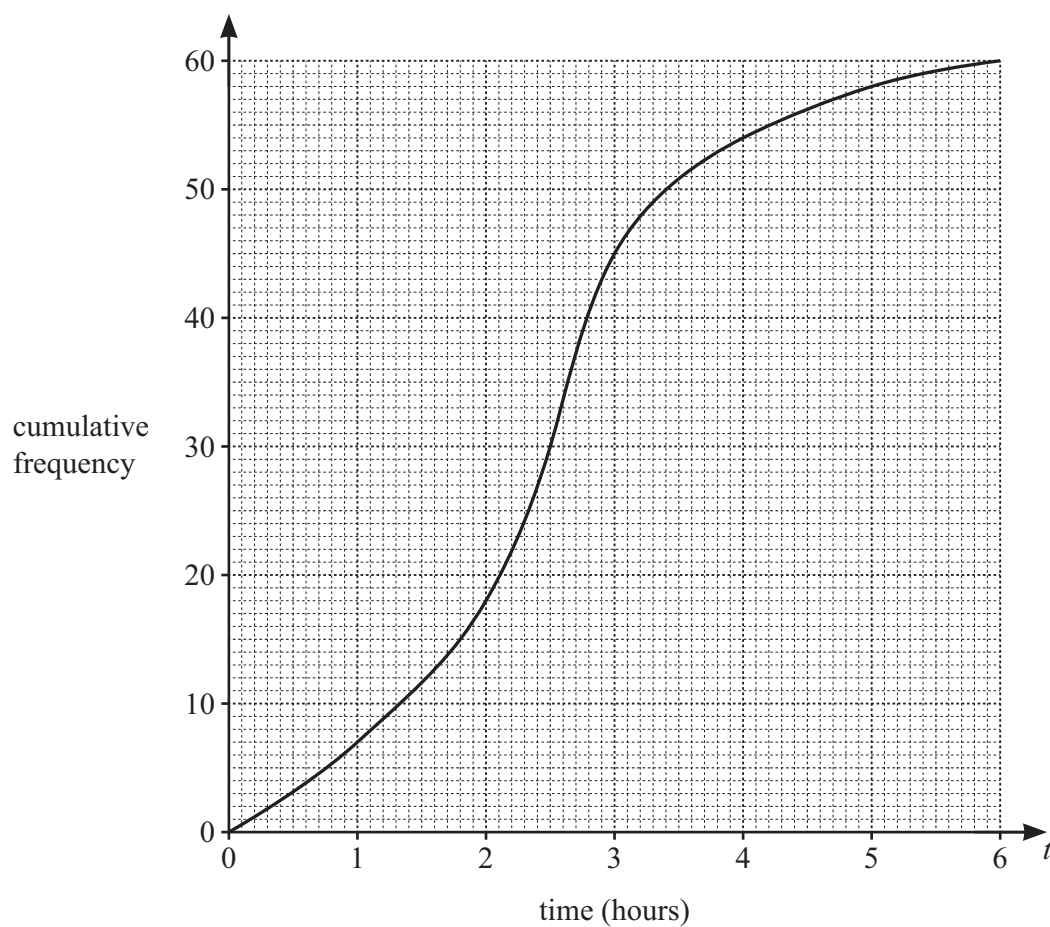
..... [2]

- (b) Write $0.6\dot{7}$ as a fraction.

..... [2]



- 14 The cumulative frequency diagram shows information about the amount of time 60 students spend watching television on one day.



- (a) Find an estimate for

(i) the median

..... hours [1]

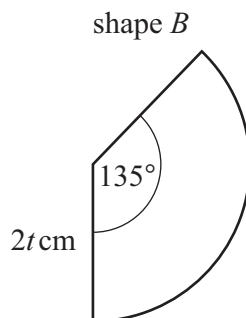
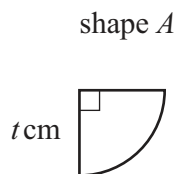
(ii) the interquartile range.

..... hours [2]

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

time spent watching television (t hours)	$0 < t \leq 1$	$1 < t \leq 2$	$2 < t \leq 3$	$3 < t \leq 4$	$4 < t \leq 5$	$5 < t \leq 6$
frequency	7			9	4	2

[2]



NOT TO SCALE

Shape A is one quarter of a circle with radius t cm.
 Shape B is a sector of a circle with radius $2t$ cm and sector angle 135° .
 The area of shape B is k times the area of shape A .

Work out the value of k .

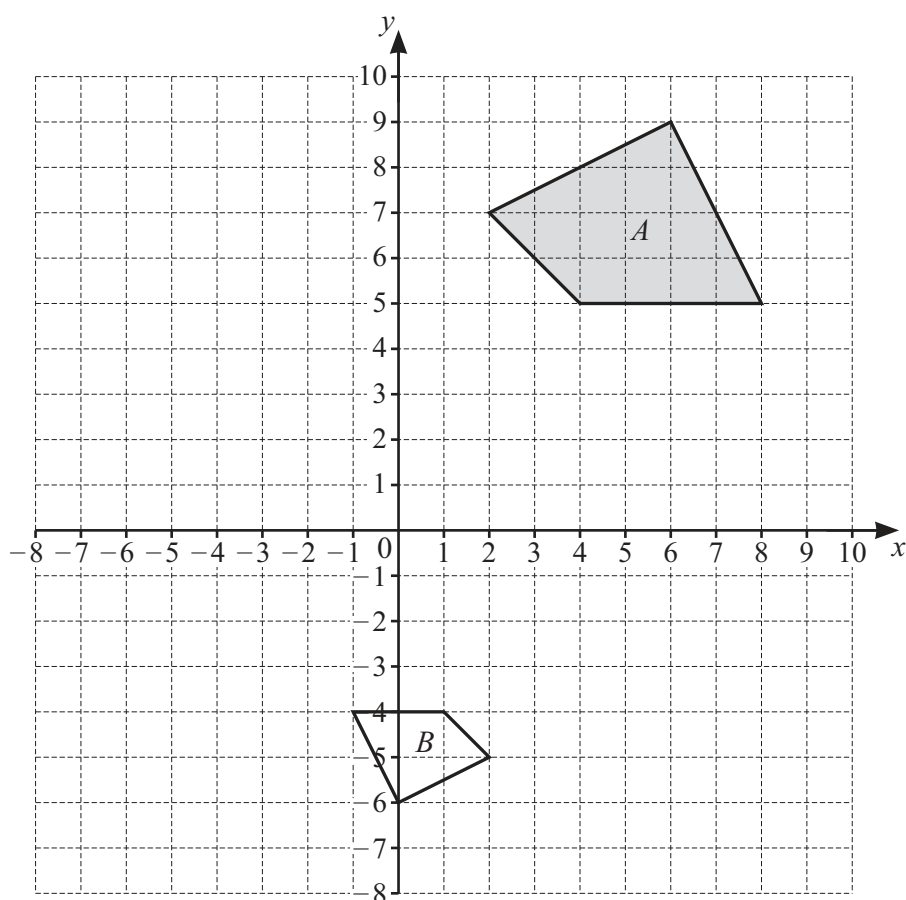
$k = \dots\dots\dots$ [4]

16 Expand and simplify $(3x + a)(x + 4a)$.

$\dots\dots\dots$ [2]



17 The diagram shows shape A and shape B drawn on a grid.



(a) On the grid, draw the image of shape A after a reflection in the line $x = 1$.

[2]

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

.....

..... [3]



18 $y = \sin 60^\circ \times \tan 30^\circ.$

Find the value of y .

$y = \dots\dots\dots$ [2]

19 $710\,000.03 = (7.1 \times 10^a) + (3 \times 10^b)$

Find the value of a and the value of b .

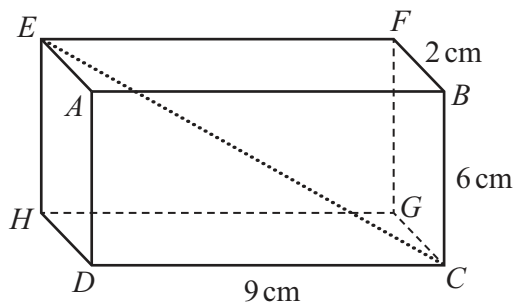
$a = \dots\dots\dots$

$b = \dots\dots\dots$ [2]

20 Find the value of $27^{-\frac{2}{3}} \times (6^4)^{0.5}.$

$\dots\dots\dots$ [4]





NOT TO SCALE

The diagram shows a solid cuboid $ABCDEFGH$.
 $BF = 2$ cm, $BC = 6$ cm and $CD = 9$ cm.

(a) Calculate the volume of the cuboid.

..... cm^3 [1]

(b) Calculate the surface area of the cuboid.

..... cm^2 [3]

(c) Calculate CE .

$CE =$ cm [3]

(d) The angle between CE and the base $CDHG$ is x° .

Find the value of $\sin x^\circ$.

..... [2]



- 22 The table shows some information about the lengths of 145 pieces of wire.

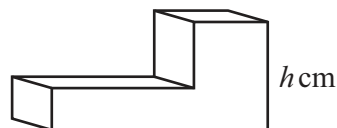
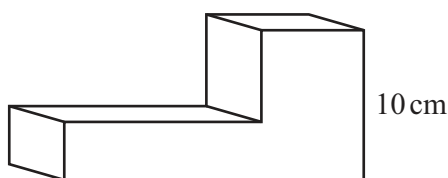
length (L cm)	$70 < L \leq 90$	$90 < L \leq 100$	$100 < L \leq 115$	$115 < L \leq 120$
frequency	40	35	45	25
height of bar in histogram (cm)	4			

Stanley wants to draw a histogram to represent the information.

Complete the table.

[3]

- 23



NOT TO SCALE

The two solids are mathematically similar.

The volume of the larger solid is 64 cm^3 and the volume of the smaller solid is 27 cm^3 .

The height of the larger solid is 10 cm and the height of the smaller solid is h cm.

Find the value of h .

$h = \dots\dots\dots$ [3]



24 (a) Find the coordinates of the turning points of the graph of $y = x^3 - 6x^2 + 7$.

(..... , ...)

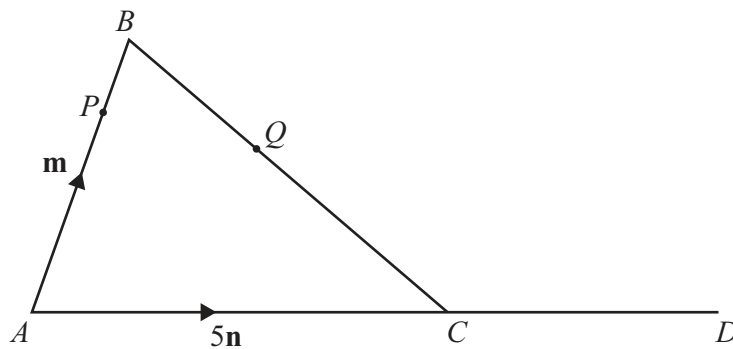
(..... , ...)

[6]

(b) By drawing a suitable sketch, determine whether each turning point is a maximum or a minimum.

[3]





NOT TO SCALE

The diagram shows triangle ABC and straight line ACD .

P lies on AB and $AP : PB = 4 : 1$.

Q lies on BC and $BQ = \frac{2}{5}BC$.

$\vec{AB} = \mathbf{m}$ and $\vec{AC} = 5\mathbf{n}$.

(a) In each part, give your answer in terms of $\mathbf{m}$ and $\mathbf{n}$ in its simplest form.

(i) Find $\vec{BC}$.

$\vec{BC} = \dots\dots\dots [1]$

(ii) Find $\vec{PQ}$.

$\vec{PQ} = \dots\dots\dots [3]$



(b) $\overrightarrow{CD} = 3\mathbf{n}$

Show that P , Q and D lie on a straight line.

[3]

Question 26 is on the back page.

26 (a) Expand and simplify.

$$(5 + \sqrt{2})(3 - \sqrt{8})$$

..... [3]

(b) $\sqrt{2\frac{9}{20}} + \frac{6}{\sqrt{5}} = k\sqrt{5}$

Find the value of k .

$k =$ [4]

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