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Cambridge IGCSE™(9–1)

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

MATHEMATICS **0980/21**

Paper 2 (Extended) **October/November 2024**

1 hour 30 minutes

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 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 70.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **12** pages.

[Turn over

1 A concert starts at 19 50 and finishes 2 hours 42 minutes later.

Work out the time the concert finishes.

.... [1]

2 Find the reciprocal of $1\frac{1}{4}$.

.... [1]

3 Use one of the symbols $<$, $>$ or $=$ to make each statement true.

$\frac{2}{7}$ 0.2861

$\frac{99}{900}$ 11%

1^3 .... 4^0

[2]

4 Safia has a piece of fabric of length 5.6 m.
She cuts the fabric into two parts, with lengths in the ratio 3 : 4.
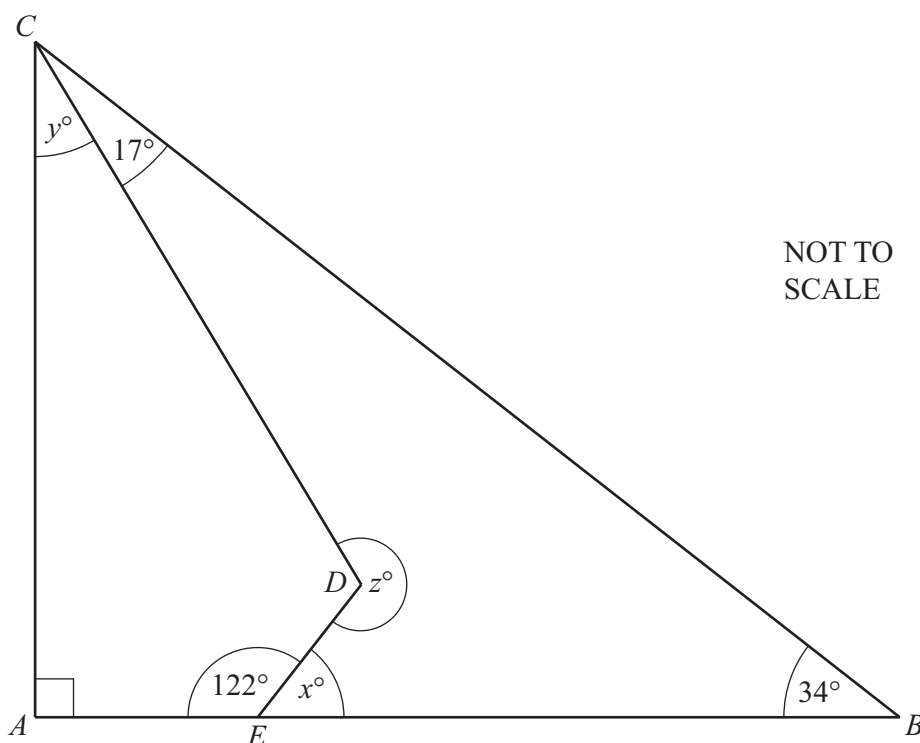
Calculate the length of the longer part.

.... m [2]

5 Work out.

(a) $3\begin{pmatrix} 6 \\ -4 \end{pmatrix}$

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

(b) $\begin{pmatrix} 4 \\ -1 \end{pmatrix} + \begin{pmatrix} -7 \\ 5 \end{pmatrix}$

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

6 The diagram shows a right-angled triangle ABC and a quadrilateral $AEDC$.

NOT TO
SCALE

Find the value of

(a) x

$x =$ .... [1]

(b) y

$y =$ .... [1]

(c) z.

$z =$ .... [1]

7 Factorise.

$$28x - 35$$

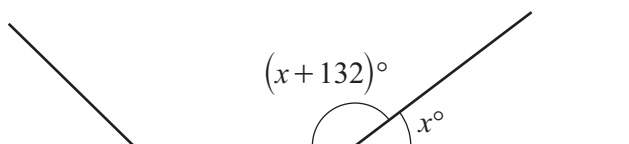... [1]

8 Edith invests $3000 in a savings account.
The account pays simple interest at a rate of 2.6% per year.

Calculate the total interest earned at the end of 3 years.

$ .... [2]

9

$(x + 132)°$

$x°$

NOT TO
SCALE

The diagram shows part of a regular polygon.
The interior angle of the polygon is 132° larger than the exterior angle.

Calculate the number of sides of this polygon.

.... [3]

10 Jacinda plays a game with her friend.
She can win, lose or draw the game.
The probability that she wins the game is 0.28 .

(a) Jacinda is twice as likely to draw the game as to lose the game.

Work out the probability that she loses the game.

.... [2]

(b) Jacinda plays the game 150 times.

Find the expected number of times that **she wins**.

.... [1]

11 **Without using a calculator**, work out $5\frac{1}{3} - 3\frac{4}{7}$.

You must show all your working and give your answer as a mixed number in its simplest form.

.... [3]

0980/21/O/N/24   **[Turn over**

12 Solve the simultaneous equations.
You must show all your working.

$$5x + 6y = 9$$
$$3x - 2y = -17$$

$x =$ ....

$y =$ ....
[3]

13 (a) A sequence has nth term $3n^2 - 1$.

Find the second term in this sequence.

.... [1]

(b) The table shows the first five terms of sequences A and B.

	1st term	2nd term	3rd term	4th term	5th term	nth term
Sequence A	–6	–2	2	6	10	
Sequence B	3	17	55	129	251	

Complete the table to show the nth term of each sequence.

[4]

14 Two solid steel statues are mathematically similar.
The smaller statue has height 12 cm and the larger statue has height 15 cm.
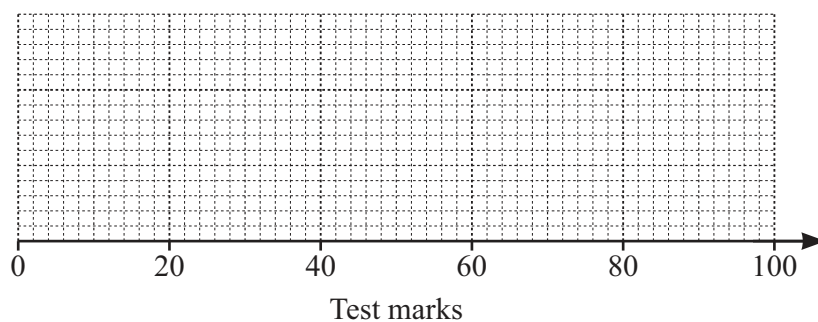The larger statue has a mass 2.5 kg.
The density of steel is 8 g/cm^3.

Calculate the volume of the smaller statue.
[Density = mass ÷ volume.]

.... cm^3 [4]

15 Students in class P take a test.
These statistics show information about their marks.

- lower quartile = 38
- median = 53
- interquartile range = 28
- range = 81
- highest mark = 96

(a) Draw a box-and-whisker plot to represent this information.

Test marks

[3]

(b) Students in class Q take the same test.
For class Q, the median is 49 and the interquartile range is 35.

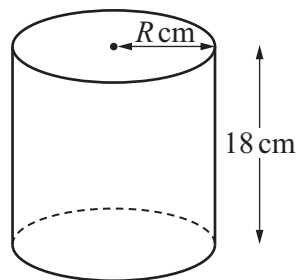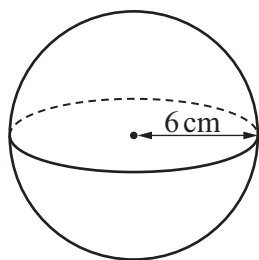Make two comments comparing the distribution of marks for class P with that of class Q.

1. ....

....

2. ....

....

[2]

16

The diagram shows a sphere of radius 6 cm and a cylinder of height 18 cm and radius R cm.
The volume of the sphere is equal to the volume of the cylinder.

Calculate the curved surface area of the cylinder.
Give your answer in terms of π.
[The volume, V, of a sphere with radius r is $V = \dfrac{4}{3}\pi r^3$]

.... cm^2 [4]

17 Solve.
$$3x^2 - 7x - 16 = 0$$

You must show all your working and give your answers correct to 2 decimal places.

$x = $ .... or $x = $ .... [4]

18 $\text{g}(x) = 4^{x+3}$

(a) Find x when $\text{g}(x) = 1$.

.... [1]

(b) Find $\text{g}^{-1}\left(\dfrac{1}{16}\right)$.

.... [2]

19 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
$P = \{\text{odd numbers}\}$
$Q = \{\text{multiples of 3}\}$
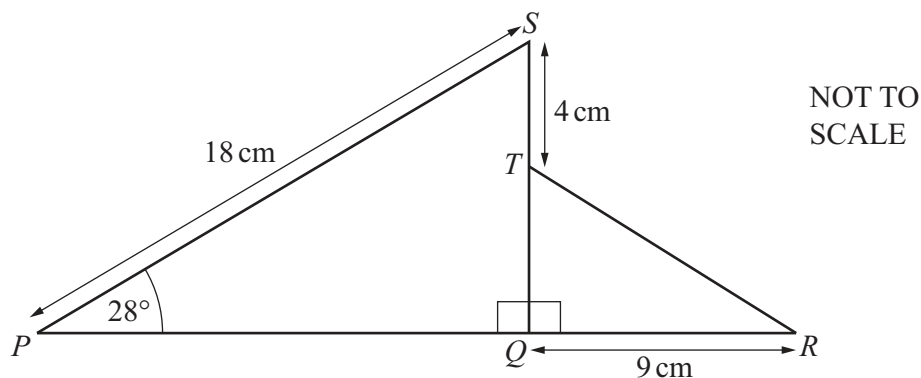$R = \{\text{square numbers}\}$

(a) Find $P \cap Q \cap R$.

{ .... } [1]

(b) (i) Find $Q \cup R$.

{ .... } [1]

(ii) Find $\text{n}\big(P \cap (Q \cup R)'\big)$.

.... [1]

0980/21/O/N/24   **[Turn over**

20

The diagram shows two right-angled triangles *PQS* and *RQT*.
PQR and *QTS* are straight lines.

Calculate angle *QTR*.

Angle *QTR* = ... [5]

21 Solve the equation $3\tan x + 5 = 1$ for $0° \leqslant x \leqslant 360°$.

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

22 The graph of $y = (x+2)(x-1)^2$ is shown on the grid.
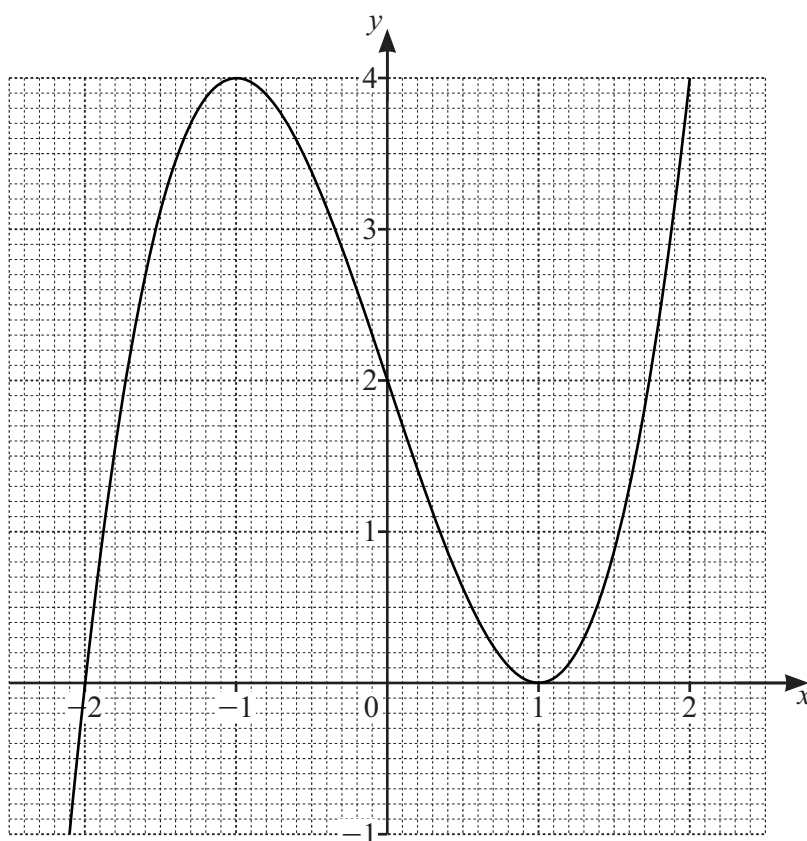
(a) Show that $y = (x+2)(x-1)^2$ can be written as $y = x^3 - 3x + 2$.

[2]

(b) By drawing a suitable straight line, solve the equation $2x^3 - 5x = 0$.

$x =$ .... or $x =$ .... or $x =$ .... [4]

Question 23 is printed on the next page.

23 $(x-5)^2 + k = x^2 - px - 21$

Find the value of p and the value of k.

$p =$ ....

$k =$ ....

[2]