



CANDIDATE
NAME

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CENTRE
NUMBER

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CANDIDATE
NUMBER

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4024/12

May/June 2022

2 hours

You must answer on the question paper.

You will need: Geometrical instruments

- 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.
- Calculators must **not** be used in this paper.
- You may use tracing paper.
- You must show all necessary working clearly.

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [].

This document has **16** pages.

ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER

1 Work out.

(a) $\frac{2}{3} + \frac{1}{6}$

..... [1]

(b) 0.4×0.2

..... [1]

2 Asha asks a group of students about their favourite fruit.
The table and pictogram show some of the results.

Fruit	Apple	Banana	Orange	Melon
Frequency	8		5	

Apple	
Banana	○○○
Orange	
Melon	○ 

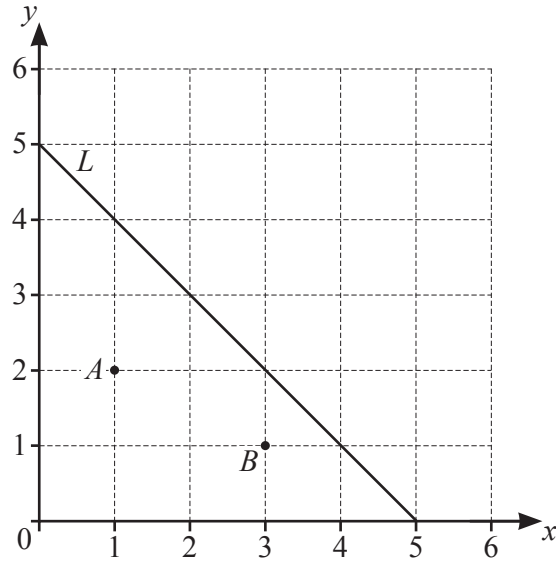
Key: ○ represents 4 people

(a) Complete the table and pictogram. [3]

(b) Write down the mode.

..... [1]

3



A and B are vertices of a quadrilateral.
Line L is the line of symmetry of the quadrilateral.

Find the coordinates of the other two vertices of the quadrilateral.

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

- 4 (a) The temperature inside Luke's house is 18°C .
The temperature outside his house is -3°C .

Find the difference between these temperatures.

..... $^{\circ}\text{C}$ [1]

- (b) Luke's thermometer measures the temperature correct to the nearest degree.
At midnight, the thermometer measures the temperature outside as -6°C .

Find the upper bound of the temperature outside at midnight.

..... $^{\circ}\text{C}$ [1]

- 5 The scale drawing shows the positions of two villages, A and B .
The scale is 1 cm to 2 km.



Scale: 1 cm to 2 km

- (a) Find the actual distance between village A and village B .

..... km [2]

- (b) Measure the bearing of B from A .

..... [1]

- 6 Kabir invests \$250 in a savings account.
The account pays simple interest at a rate of 1.5% per year.

Calculate the total amount of interest he will receive at the end of 4 years.

\$ [2]

7



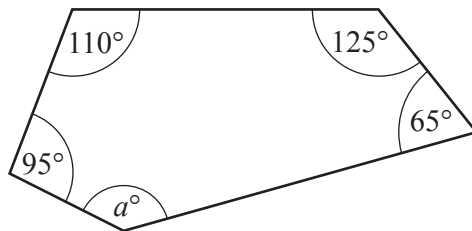
NOT TO
SCALE

The area of the rectangle is 9 cm^2 .
The area of the triangle is 85 mm^2 .

Calculate the shaded area.
Give your answer in cm^2 .

..... cm^2 [2]

8



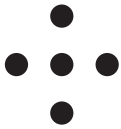
NOT TO
SCALE

The diagram shows a pentagon.

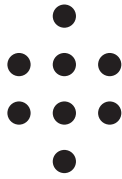
Find the value of a .

$a =$ [3]

- 9 Shani makes a sequence of patterns using counters.



Pattern 1



Pattern 2



Pattern 3

- (a) Complete the table.

Pattern number	1	2	3	4	5
Number of counters	5	8	11		

[1]

- (b) Find an expression, in terms of n , for the number of counters in Pattern n .

..... [2]

- (c) Shani has 100 counters.
She uses some of the counters to make Pattern 20.
She uses all the remaining counters to make Pattern k .

Find the value of k .

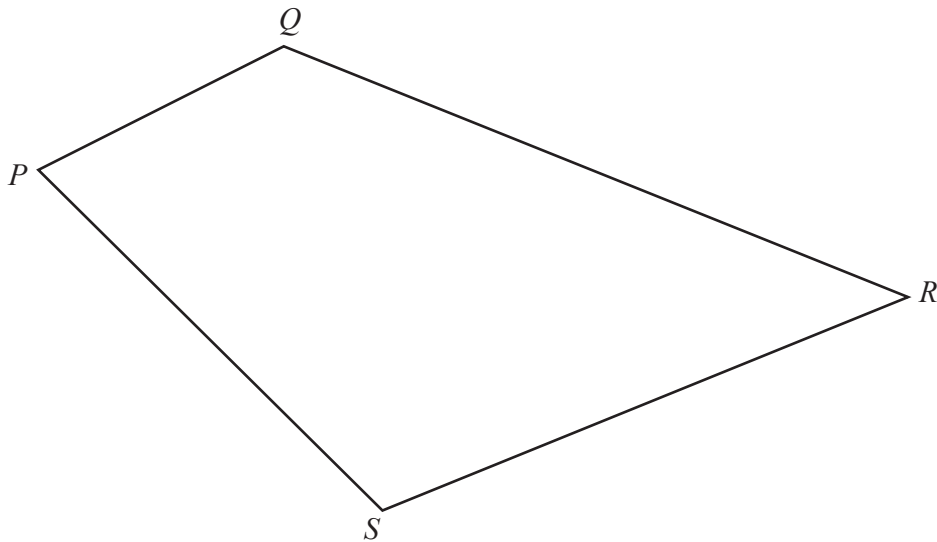
$k =$ [3]

- 10** A bag contains red balls, blue balls and green balls.
 The ratio red : blue = 3 : 8 .
 The ratio green : blue = 2 : 5 .

Work out the fraction of the balls that are blue.

..... [3]

11



- (a)** Use a **straight edge and compasses only** to construct the bisector of angle PSR . [2]
- (b)** Point X lies inside quadrilateral $PQRS$ and is closer to PS than to RS .
 Shade the region in which X must lie. [1]

- 12 (a) Write 0.002 035 61 correct to 3 significant figures.

..... [1]

- (b) By writing each number correct to 1 significant figure, estimate the value of

$$\frac{\sqrt{3.93} \times 63.7}{0.425}.$$

..... [2]

- 13 (a) Evaluate $(\sqrt{9} \times \sqrt[3]{64})^2$.

..... [2]

- (b) Write down an irrational value of n that satisfies this inequality.

$$4.5 \leq n \leq 5.5$$

..... [1]

- 14 (a) Write these numbers in order of size, starting with the smallest.

2000 0.002 2×10^{-4} 2×10^{-2}

.....,,, [1]
smallest

- (b) This is a calculation using numbers in standard form.

$$a \times 10^{-7} \div 5 \times 10^b = 4 \times 10^{-16}$$

Find the value of a and the value of b .

$a =$

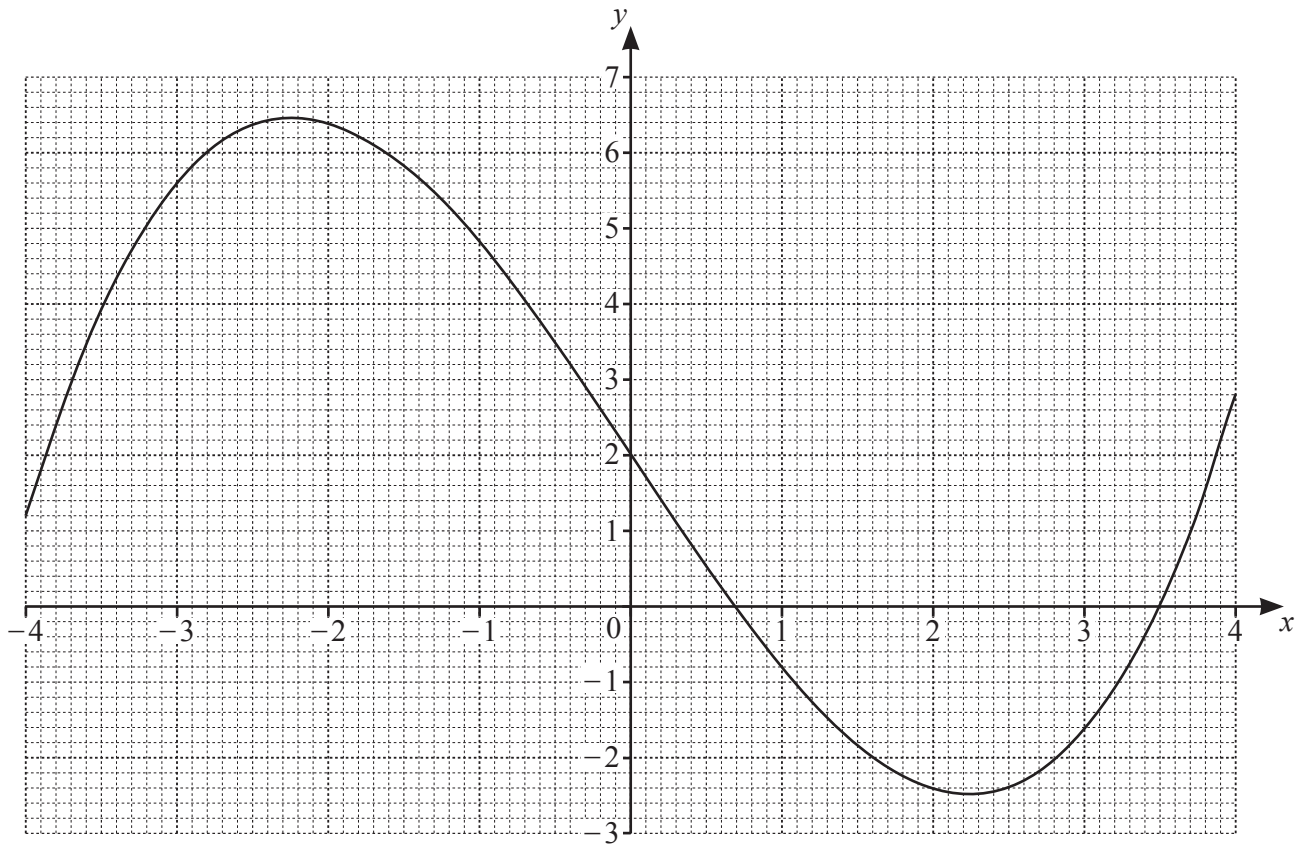
$b =$ [2]

- 15 y is directly proportional to $(x-1)^2$.
 When $x = 5$, $y = 32$.

Find the value of y when $x = -2$.

$y =$ [2]

- 16 The graph of $y = \frac{x^3}{5} - 3x + 2$ is drawn on the grid.



- (a) By drawing a tangent, estimate the gradient of the curve at $x = -1$.

..... [2]

- (b) By drawing a suitable straight line on the graph, find the solutions of the equation $\frac{x^3}{5} - 3x = 0$.

..... [3]

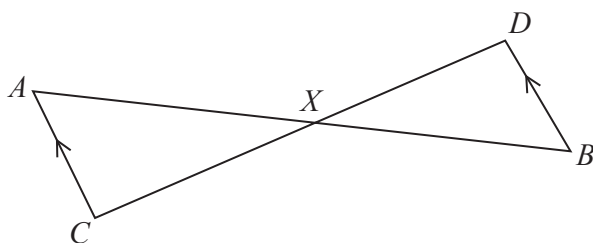
17 (a) Ryan says:

Each diagonal of quadrilateral Q divides it into two congruent isosceles triangles.

Draw a ring around each of the quadrilaterals in the list for which Ryan's statement is always true.

Square Rectangle Rhombus Parallelogram Trapezium Kite [1]

(b)



NOT TO
SCALE

AXB and CXD are straight lines.

X is the midpoint of AB .

AC is parallel to DB .

Show that triangle AXC is congruent to triangle BXD .

Give a reason for each statement you make.

.....

.....

.....

.....

[3]

18 $f(x) = 3x - 7$

Find $f^{-1}(x)$.

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

19 (a) $\mathcal{C} = \{a, b, c, d, e, f, g, h, i, j\}$
 $P = \{a, e, i\}$
 $Q = \{f, g, h, i, j\}$
 $R = \{c, d, e, f, g\}$

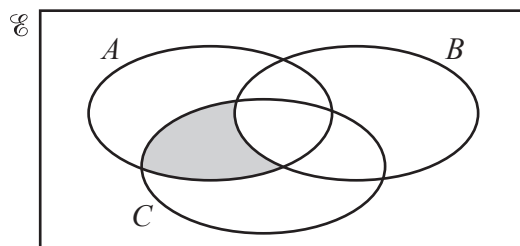
(i) Find $P \cup Q$.

$\dots\dots\dots$ [1]

(ii) Find $n(P' \cap (Q \cup R))$.

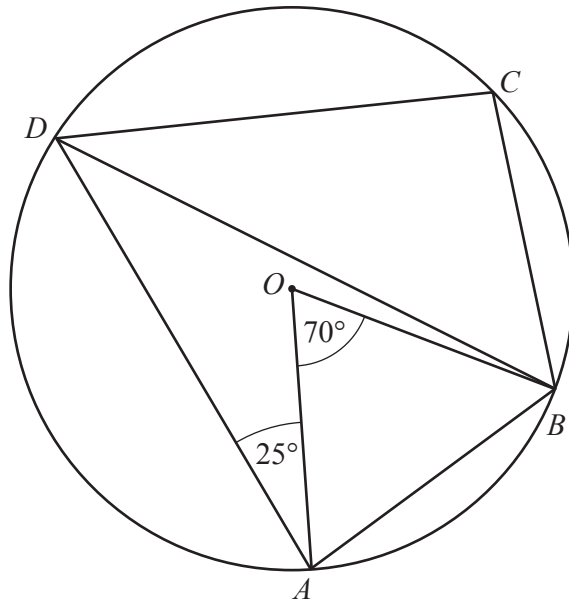
$\dots\dots\dots$ [1]

(b)



Use set notation to describe the shaded subset in the Venn diagram.

$\dots\dots\dots$ [1]



NOT TO
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A , B , C and D are points on the circle, centre O .

(a) Find $\hat{ADB}$.

$\hat{ADB} = \dots\dots\dots$ [1]

(b) Find $\hat{BCD}$.

$\hat{BCD} = \dots\dots\dots$ [2]

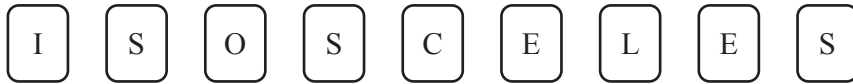
- 21 (a) Factorise $4x^2 + 5x - 6$.

..... [2]

- (b) Simplify $\left(\frac{16}{x^6}\right)^{-\frac{1}{2}}$.

..... [2]

- 22 A bag contains these 9 letter tiles.



- (a) Nur takes one tile from the bag at random.
She notes the letter and then puts the tile back in the bag.

Find the probability that she does **not** take a letter E.

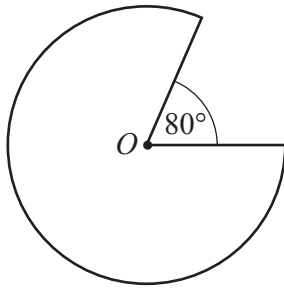
..... [1]

- (b) Nur now takes two of the 9 letter tiles at random without replacement.

Find the probability that both tiles show the same letter.

..... [3]

23

NOT TO
SCALE

The diagram shows the major sector of a circle with centre O and radius 3 cm.

Calculate the area of this sector.

Give your answer in the form $k\pi$, where k is an integer.

..... cm^2 [2]

24 (a) Solve $\frac{2-5x}{3x+10} = 3$.

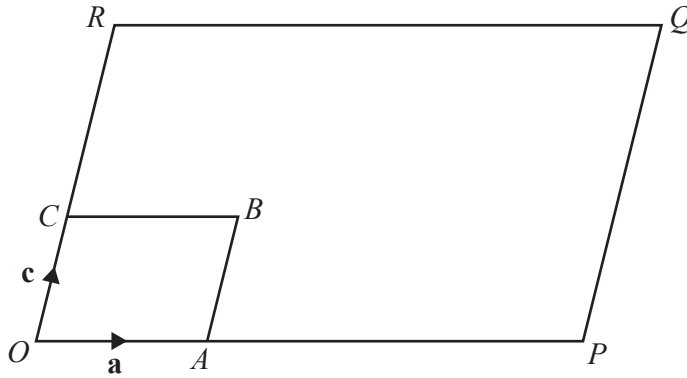
$x =$ [3]

(b) Express as a single fraction in its simplest form $\frac{3}{x-2} - \frac{5}{2x+1}$.

..... [3]

Question 25 is printed on the next page.

25



NOT TO
SCALE

$OABC$ and $OPQR$ are parallelograms.
 A is a point on OP and C is a point on OR .
 $\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OC} = \mathbf{c}$.
 $OA : OP = 1 : 4$ and $OC : CR = 2 : 3$.

(a) Find $\overrightarrow{OR}$ in terms of $\mathbf{c}$.

$$\overrightarrow{OR} = \dots\dots\dots [1]$$

(b) Find $\overrightarrow{CQ}$, as simply as possible, in terms of $\mathbf{a}$ and $\mathbf{c}$.

$$\overrightarrow{CQ} = \dots\dots\dots [2]$$

(c) Find the ratio area $OABC$: area $OPQR$.

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

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