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MATHEMATICS

0580/22

Paper 2 (Extended)

February/March 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.

- 1 A night bus runs from 21 50 to 05 18 the next day.

Work out the number of hours and minutes that the night bus runs.

..... h min [1]

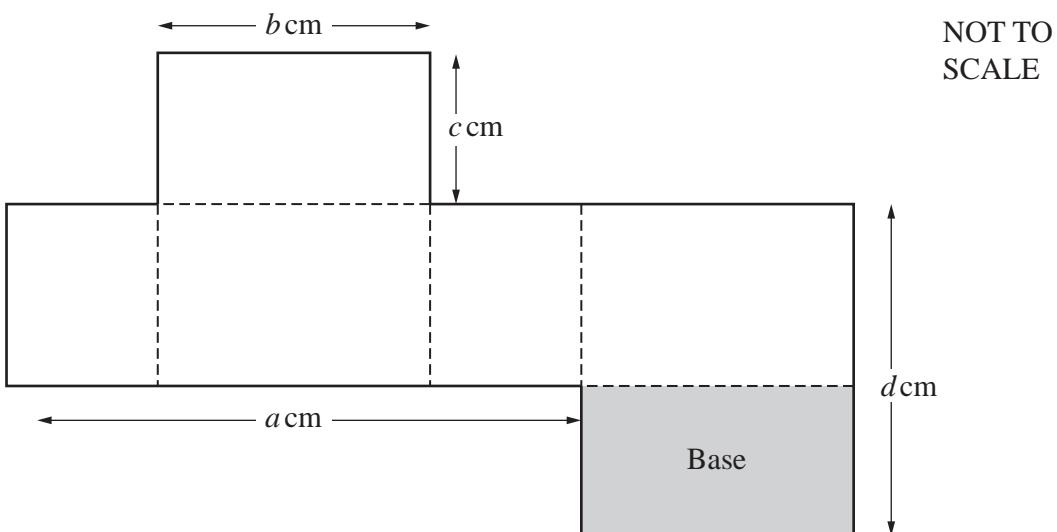
- 2 Calculate $\sqrt{5.76} + 2.8^3$.

..... [1]

- 3 Simplify $4m + 7k - m + 3k$.

..... [2]

4



The diagram shows the net of a cuboid with its base shaded.

The length of the cuboid is 10 cm, its width is 4 cm and its height is 5 cm.

Write down the values of each of a , b , c and d .

$a = \dots$, $b = \dots$, $c = \dots$, $d = \dots$ [4]

- 5 There are 20 cars in a car park and 3 of the cars are blue.

(a) James wants to draw a pie chart to show this information.

Find the angle of the sector for the blue cars in this pie chart.

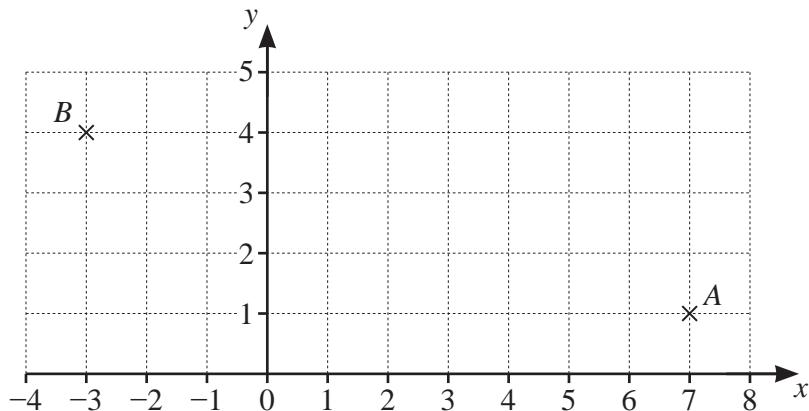
..... [2]

- (b) One of the 20 cars is picked at random.

Find the probability that this car is **not** blue.

..... [1]

6



Write \overrightarrow{AB} as a column vector.

$$\overrightarrow{AB} = \begin{pmatrix} \quad \\ \quad \end{pmatrix} [1]$$

- 7 As the temperature increases, the number of people who go swimming increases.

Write down the type of correlation that this statement describes.

..... [1]

- 8 (a) The n th term of a sequence is $n^2 - 3$.

Find the first three terms of this sequence.

.....,, [2]

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

1 3 9 27 81

Find the n th term of this sequence.

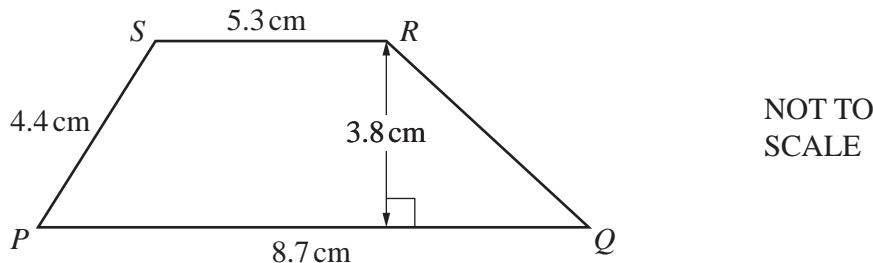
..... [2]

- 9 The line $y = 2x - 5$ intersects the line $y = 3$ at the point P .

Find the coordinates of the point P .

(.....,) [2]

10



The diagram shows a trapezium $PQRS$.

Calculate the area of the trapezium.

..... cm^2 [2]

11 Without using a calculator, work out $1\frac{1}{4} - \frac{5}{6}$.

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

..... [3]

- 12 Farid spins a three-sided spinner with sides labelled A , B and C .
The probability that the spinner lands on C is 0.35.
Farid spins the spinner 40 times.

Calculate the number of times he expects the spinner to land on C .

..... [1]

- 13 The bearing of B from A is 107° .

Calculate the bearing of A from B .

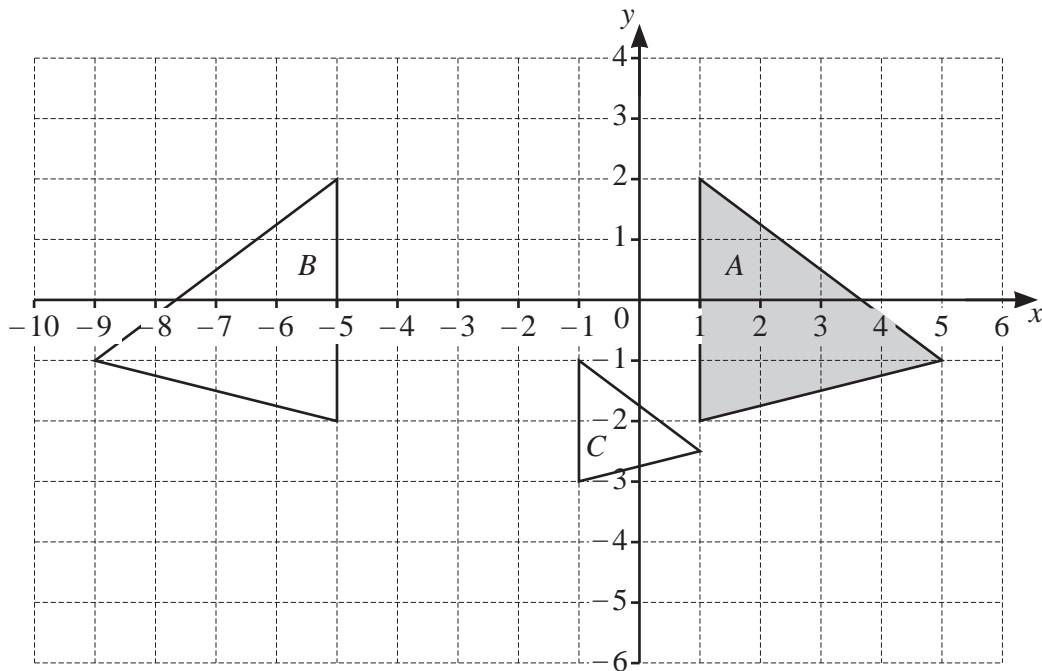
..... [2]

- 14 A train, 1750 metres long, is travelling at 55 km/h.

Calculate how long it will take for the whole train to completely cross a bridge that is 480 metres long.
Give your answer in seconds, correct to the nearest second.

..... s [3]

15



(a) Describe fully the **single** transformation that maps

(i) triangle A onto triangle B

.....

[2]

(ii) triangle A onto triangle C.

.....

[3]

(b) Draw the image of triangle A after a rotation, 90° clockwise, about $(1, 3)$.

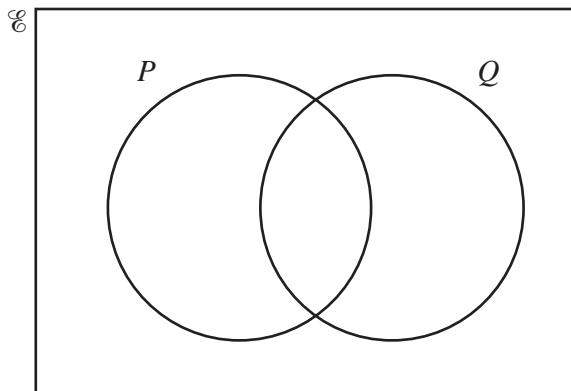
[2]

- 16** x is an integer.

$$\mathcal{E} = \{x : 1 \leq x \leq 10\}$$

$$P = \{x : x \text{ is an even number}\}$$

$$Q = \{x : x \text{ is a multiple of 5}\}$$



Complete the Venn diagram.

[2]

- 17** The height of each of 200 people is measured.
 The table shows the results.

Height (h cm)	$100 < h \leq 120$	$120 < h \leq 130$	$130 < h \leq 150$	$150 < h \leq 190$
Frequency	32	55	64	49

Calculate an estimate of the mean height.

..... cm [4]

- 18** Find the highest common factor (HCF) of $28x^5$ and $98x^3$.

..... [2]

19

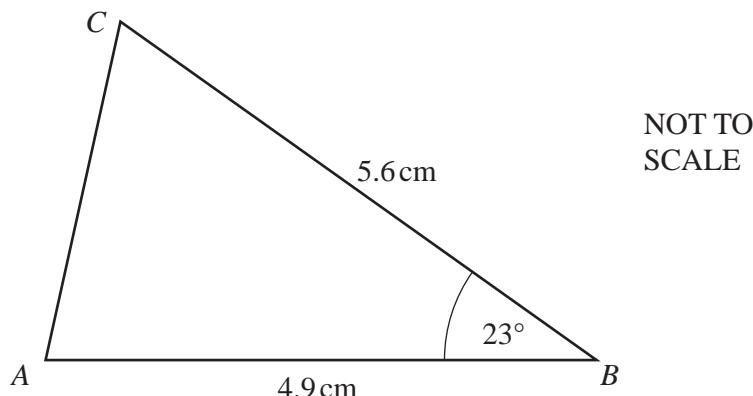


The speed–time graph shows information about a bus journey.

Calculate the total distance travelled by the bus.

..... m [3]

20



Calculate the area of triangle ABC .

..... cm^2 [2]

- $$21 \quad (a) \quad \sqrt[5]{3} = 3^h$$

Write down the value of h .

$$h = \dots [1]$$

- (b) Simplify $(4x^3)^3$.

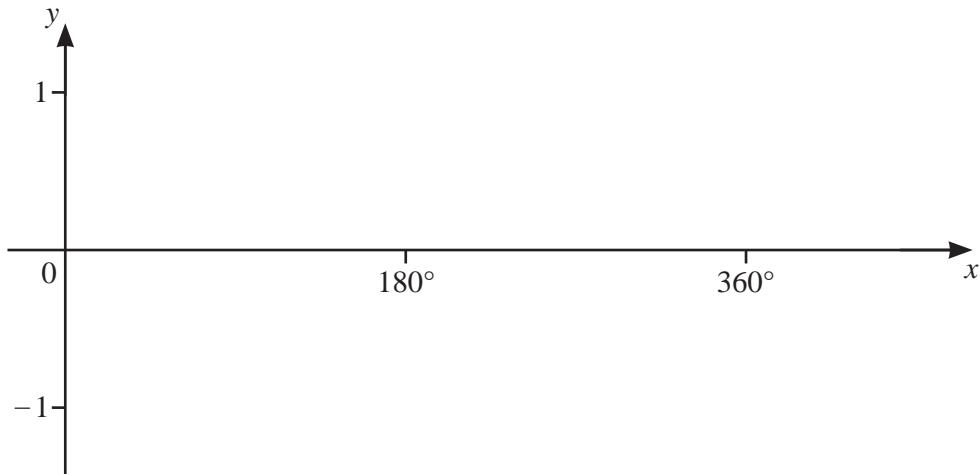
[2]

- 22 y is inversely proportional to the square of $(x + 3)$.
When $x = 5$, $y = 0.375$.

Find y in terms of x .

$$y = \dots [2]$$

- 23 (a)** On the axes, sketch the graph of $y = \cos x$, for $0^\circ \leq x \leq 360^\circ$.



[2]

- (b)** Solve the equation $\cos x = 0.294$ for $0^\circ \leq x \leq 360^\circ$.

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

- 24** $x^2 - 16x + a$ can be written in the form $(x+b)^2$.

Find the value of a and the value of b .

$a = \dots$

$b = \dots$ [2]

Questions 25 and 26 are printed on the next page.

- 25 A bag contains 2 green buttons, 5 red buttons and 6 blue buttons. Two buttons are taken at random from the bag without replacement.

Calculate the probability that the two buttons are different colours.

..... [4]

- 26 A is the point $(6, 1)$ and B is the point $(2, 7)$.

Find the equation of the perpendicular bisector of AB .
Give your answer in the form $y = mx + c$.

$y =$ [5]

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