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2765303769

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.

DC (PQ/CGW) 327786/3

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]

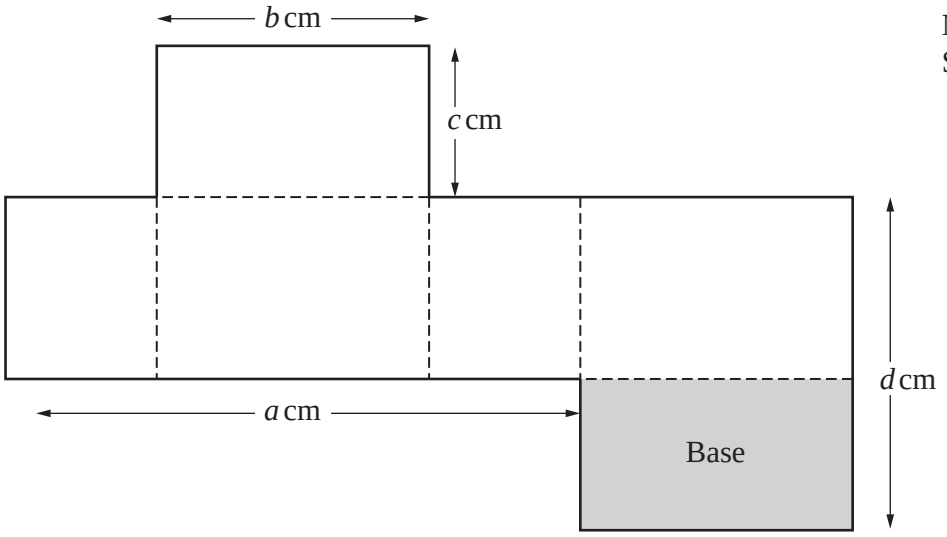
2 Calculate $\sqrt{5.76}+2.8^3$.

..... [1]

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

..... [2]

4



NOT TO SCALE

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.

$a =$ ....., $b =$ ....., $c =$ ....., $d =$ ..... [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.

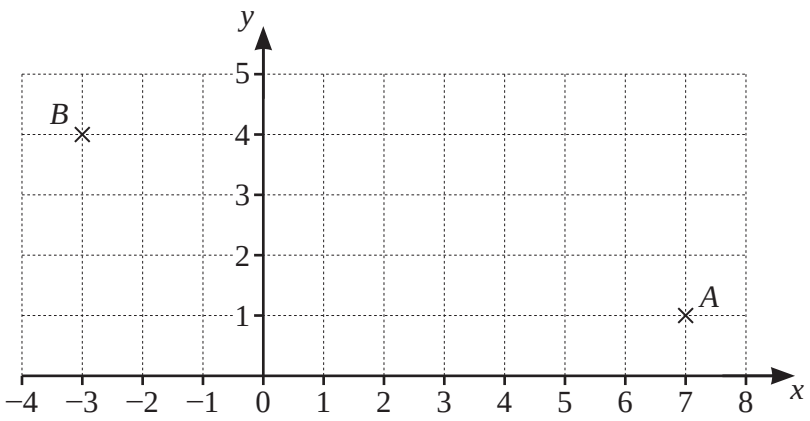
..... [2]

(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 nth 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 nth term of this sequence.

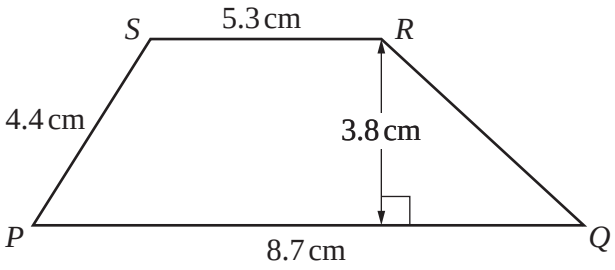
..... [2]

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

Find the coordinates of the point P.

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

10



NOT TO SCALE

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*.

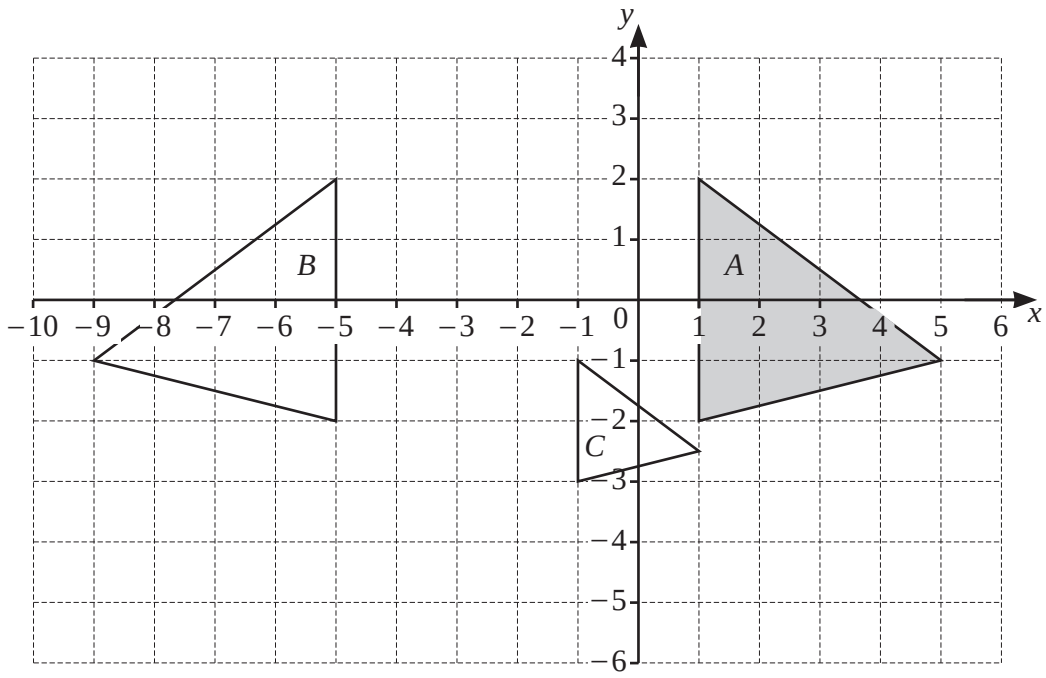
..... [2]

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*.

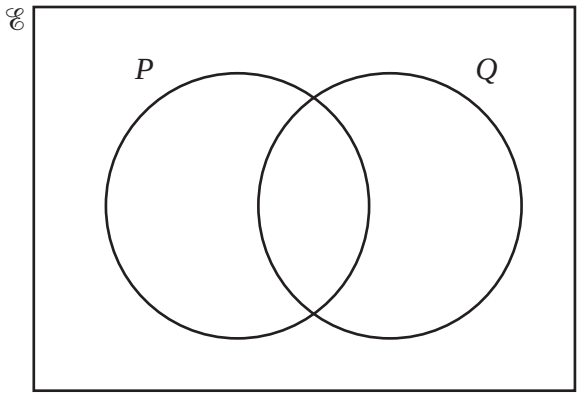
.....

..... [3]

(b) Draw the image of triangle *A* after a rotation, 90° clockwise, about (1, 3). [2]

16 x is an integer.

$\mathscr{E} = \{x : 1 \leqslant x \leqslant 10\}$
$P = \{x : x \text{ is an even number}\}$
$Q = \{x : x \text{ is a multiple of } 5\}$



Complete the Venn diagram. [2]

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

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

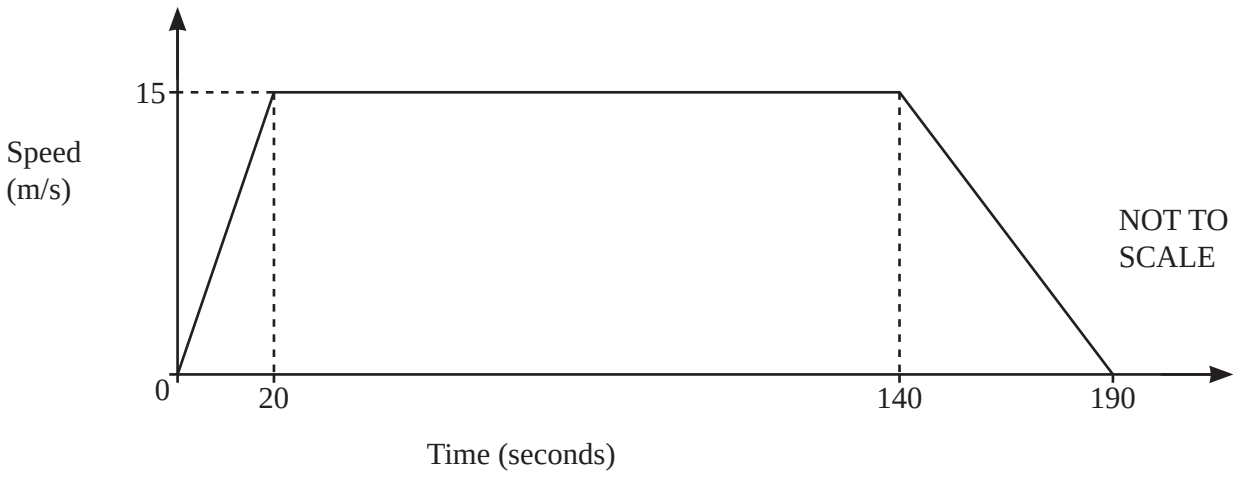
Calculate an estimate of the mean height.

..... cm [4]

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

..... [2]

19

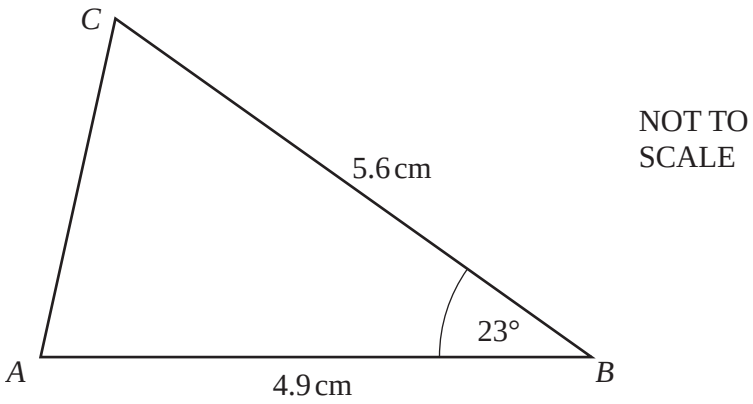


The speed–time graph shows information about a bus journey.

Calculate the total distance travelled by the bus.

..... m [3]

20



Calculate the area of triangle *ABC*.

..... cm^2 [2]

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

Write down the value of h.

$h =$ ..... [1]

(b) Simplify $\left(4x^3\right)^3$.

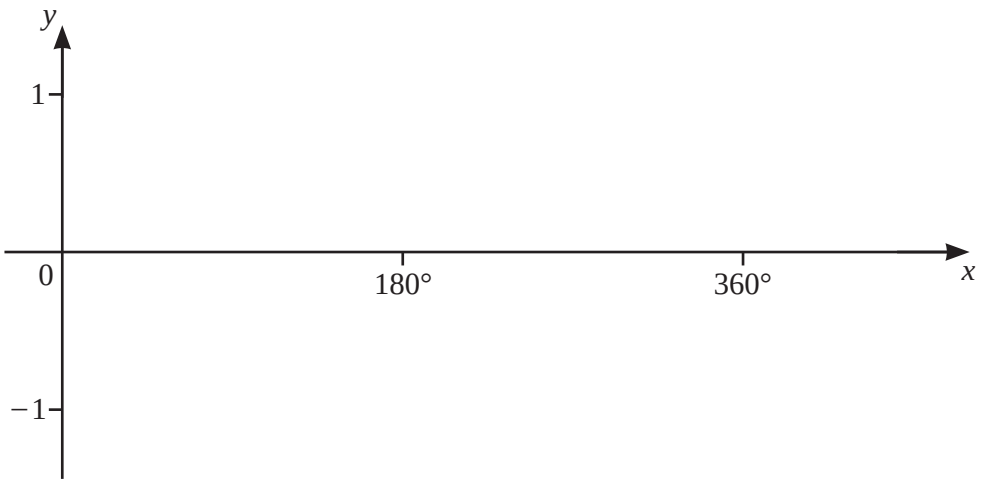
..... [2]

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

Find y in terms of x.

$y =$ ..... [2]

23 **(a)** On the axes, sketch the graph of $y = \cos x$, for $0° \leqslant x \leqslant 360°$.



[2]

(b) Solve the equation $\cos x = 0.294$ for $0° \leqslant x \leqslant 360°$.

$x =$ ..... or $x =$ ..... [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.

$a =$ .....

$b =$ ..... [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]