Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

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MATHEMATICS **0580/23**

Paper 2 (Extended) **May/June 2020**

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. Blank pages are indicated.

1   32   33   34   35   36   37   38   39
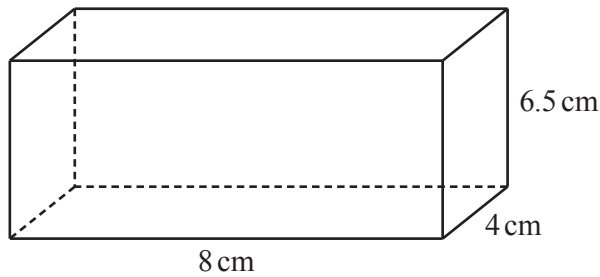
From this list of numbers, write down

(a) a multiple of 8,

.... [1]

(b) a square number,

.... [1]

(c) a prime number.

.... [1]

2

6.5 cm   NOT TO
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4 cm

8 cm

The diagram shows a cuboid.

Calculate the volume of the cuboid.

.... cm^3 [1]

3
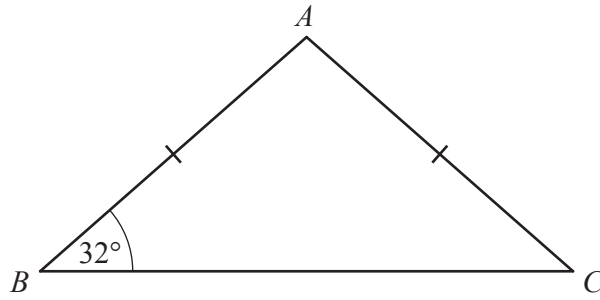
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Triangle *ABC* is isosceles.
Angle *ABC* = 32° and *AB* = *AC*.

Find angle *BAC*.

Angle *BAC* = ... [2]

4 A train journey takes 5 hours 54 minutes.

(a) The journey starts at 09 15.

Find the time that the journey ends.

.... [1]

(b) The average speed of the train for this journey is 80 km/h.

Calculate the distance travelled.

.... km [2]

5 Sofia has a bag containing 8 blue beads and 7 red beads only.
She takes one bead out of the bag at random and replaces it.
She does this 90 times.

Find the number of times she expects to take a red bead.

.... [2]

6 Simplify.

(a) $p^2 \times p^4$

.... [1]

(b) $m^{15} \div m^5$

.... [1]

(c) $(k^3)^5$

.... [1]

7 **Without using a calculator**, work out $3\frac{1}{4} - 2\frac{2}{3}$.
You must show all your working and give your answer as a fraction in its simplest form.

.... [3]

8 The bearing of X from Y is 274°.

Calculate the bearing of Y from X.

.... [2]

9 Calculate the area of the sector of a circle with radius 65 mm and sector angle 42°.
Give your answer in square centimetres.

.... cm² [3]

10 A solid cylinder has radius 3 cm and height 4.5 cm.

Calculate the **total** surface area of the cylinder.

.... cm² [4]

11 y is directly proportional to the cube root of $(x+3)$.
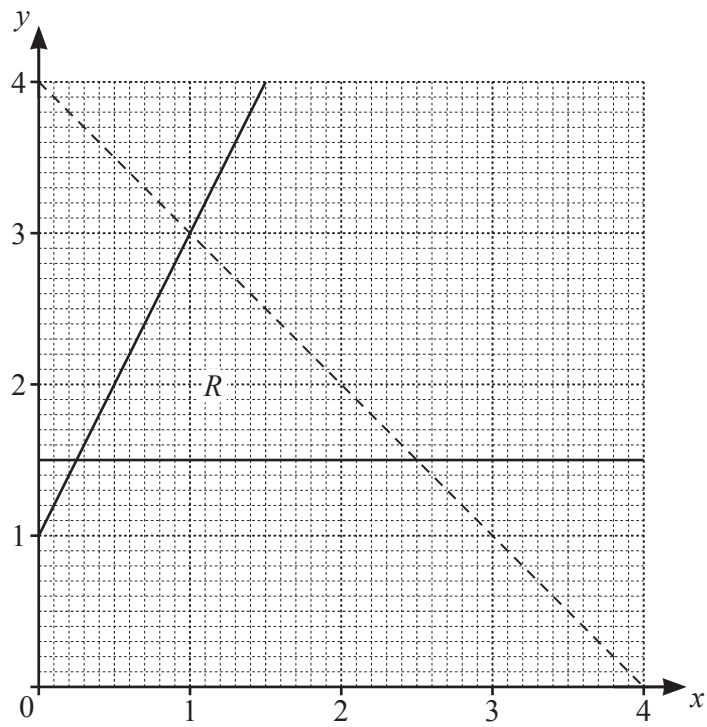When $x = 5$, $y = \frac{2}{3}$.

Find y when $x = 24$.

$y = $ .... [3]

12 The total perimeter of a semicircle is 19.02 cm.

Calculate the radius of the semicircle.

.... cm [3]

13

Write down the three inequalities that define the region *R*.

....

....

.... [4]

14 The diagram shows the speed–time graph of a train journey between two stations.
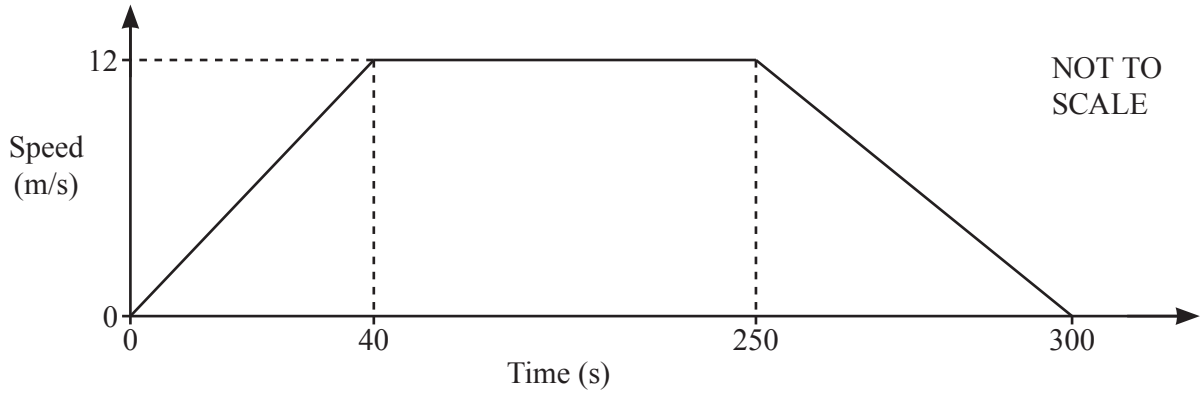
(a) Find the acceleration of the train during the first 40 seconds.

.... m/s^2 [1]

(b) Calculate the distance between the two stations.

.... m [3]

15 The table shows the amount of money, $x, given to a charity by each of 60 people.

Amount ($x)	$0 < x \leqslant 20$	$20 < x \leqslant 25$	$25 < x \leqslant 35$	$35 < x \leqslant 50$	$50 < x \leqslant 100$
Frequency	21	16	6	10	7

Calculate an estimate of the mean.

$ .... [4]

16 Paddy and Anna each invest $2000 for 5 years.
Paddy earns simple interest at a rate of 1.25% per year.
Anna earns compound interest at a rate of r% per year.
At the end of 5 years, Paddy's investment is worth the same as Anna's investment.

Calculate the value of r.

$r = $ .... [5]

17

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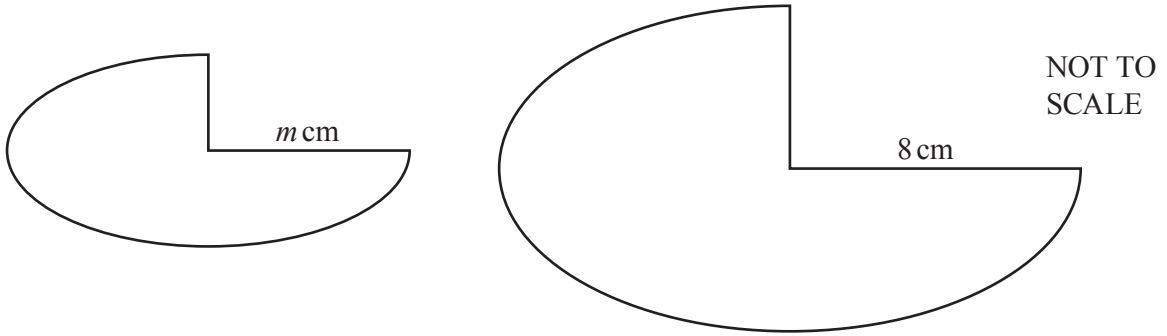
The diagram shows two shapes that are mathematically similar.
The smaller shape has area $52.5\,\text{cm}^2$ and the larger shape has area $134.4\,\text{cm}^2$.

Calculate the value of m.

$m =$ .... [3]

18 (a) Write $x^2 - 18x - 27$ in the form $(x+k)^2 + h$.

.... [2]

(b) Use your answer to **part (a)** to solve the equation $x^2 - 18x - 27 = 0$.

$x =$ .... or $x =$ .... [2]

19 (a) In a class of 40 students:

- 28 wear glasses (*G*)
- 13 have driving lessons (*D*)
- 4 do not wear glasses and do not have driving lessons.
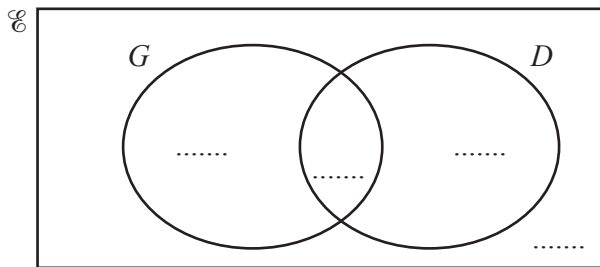
(i) Complete the Venn diagram. [2]

(ii) Use set notation to describe the region that contains a total of 32 students.

.... [1]

(b) This Venn diagram shows information about the number of students who play basketball (*B*), football (*F*) and hockey (*H*).
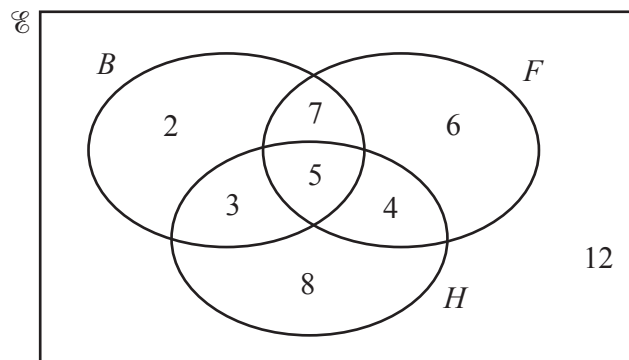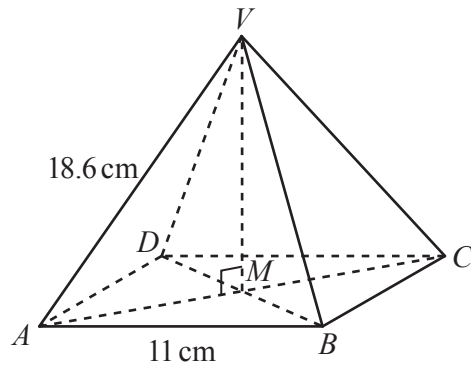

Find n$((B \cup F) \cap H')$.

.... [1]

(c)
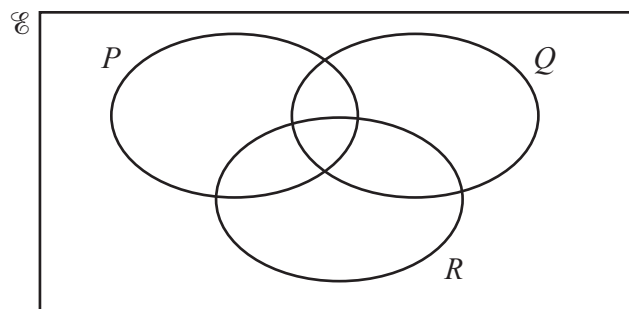
Shade the region $P \cup (Q \cap R)'$. [1]

20

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The diagram shows a pyramid with a square base *ABCD*.
The diagonals *AC* and *BD* intersect at *M*.
The vertex *V* is vertically above *M*.
AB = 11 cm and *AV* = 18.6 cm.

Calculate the angle that *AV* makes with the base.

.... [4]

Question 21 is printed on the next page.

21

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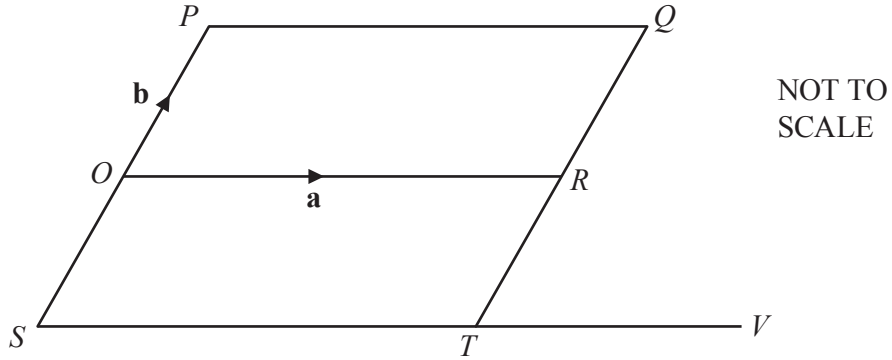
O is the origin and *OPQR* is a parallelogram.
SOP is a straight line with *SO = OP*.
TRQ is a straight line with *TR = RQ*.
STV is a straight line and *ST : TV* = 2 : 1.
$\overrightarrow{OR}$ = **a** and $\overrightarrow{OP}$ = **b**.

(a) Find, in terms of **a** and **b**, in its simplest form,

(i) the position vector of *T*,

.... [2]

(ii) $\overrightarrow{RV}$.

$\overrightarrow{RV}$ = ... [1]

(b) Show that *PT* is parallel to *RV*.

[2]