Cambridge Assessment International Education

Cambridge IGCSE™

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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.

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1 32 33 34 35 36 37 38 39

From this list of numbers, write down

(a) a multiple of 8,

..... [1]

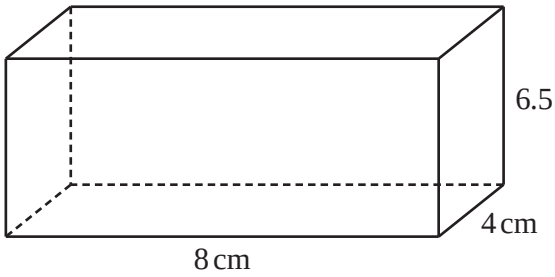
(b) a square number,

..... [1]

(c) a prime number.

..... [1]

2



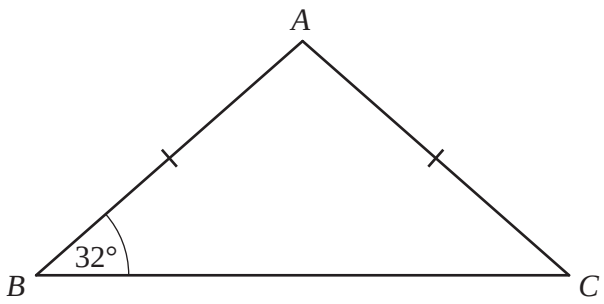
NOT TO SCALE

The diagram shows a cuboid.

Calculate the volume of the cuboid.

..... cm^3 [1]

3



NOT TO SCALE

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.

..... cm^2 [3]

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

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

..... cm^2 [4]

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

Find y when $x = 24$.

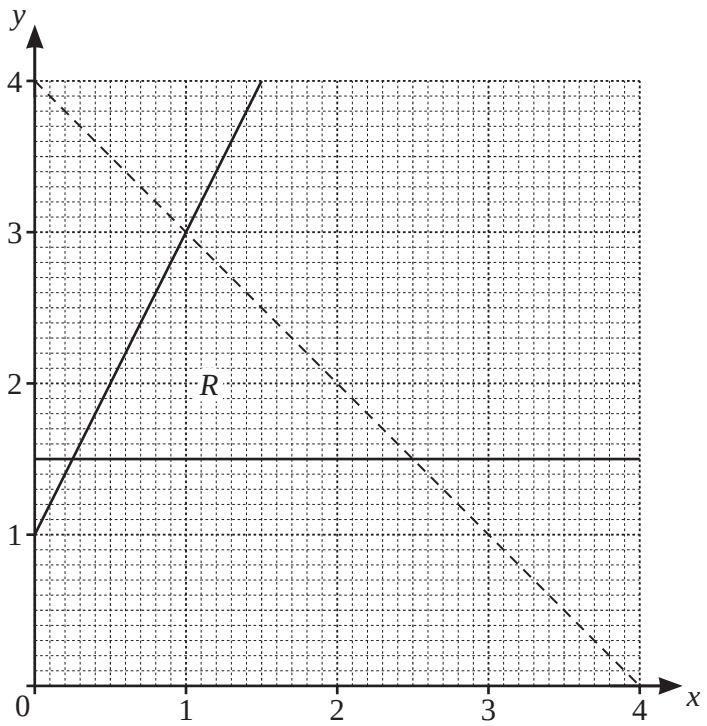
$y =$ ..... [3]

12 The total perimeter of a semicircle is 19.02 cm.

Calculate the radius of the semicircle.

..... cm [3]

13



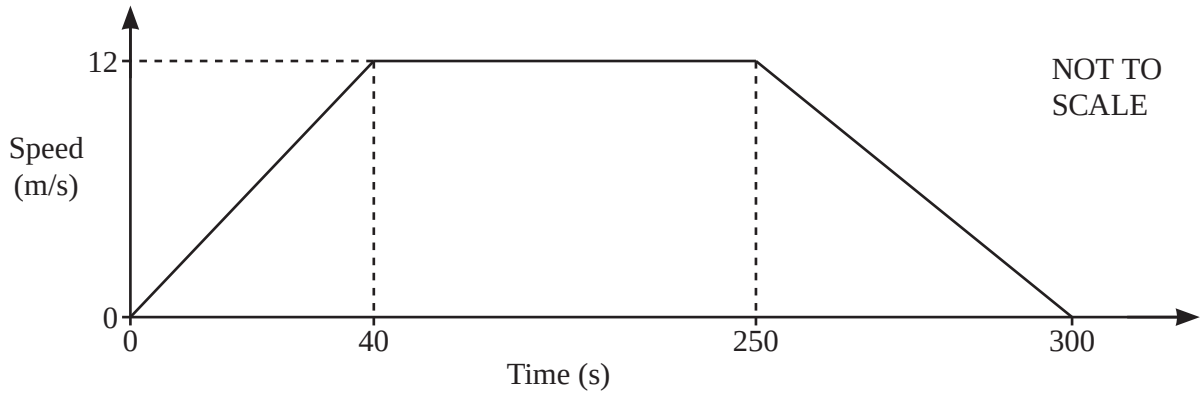
Write down the three inequalities that define the region *R*.

.....

.....

..... [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.

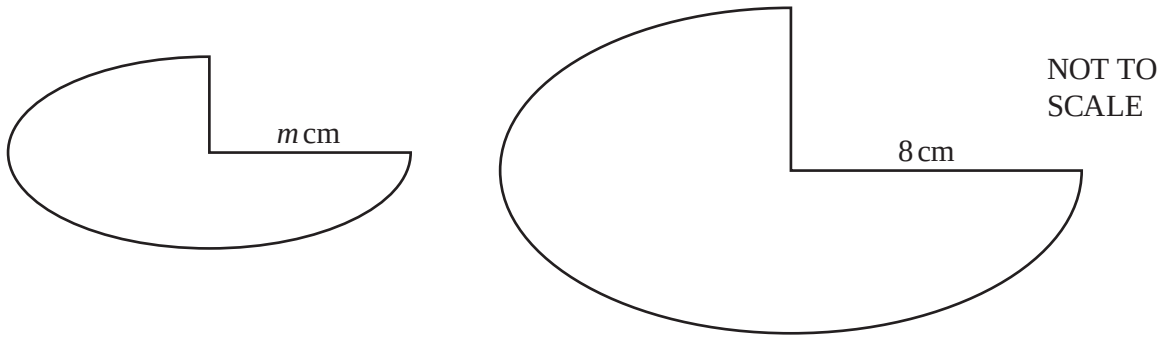
$ ..... [4]

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



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 $(x+k)^2 + h$.

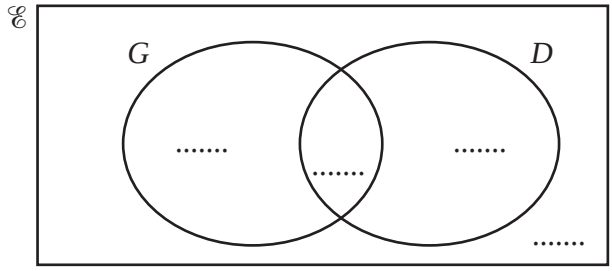
..... [2]

(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.

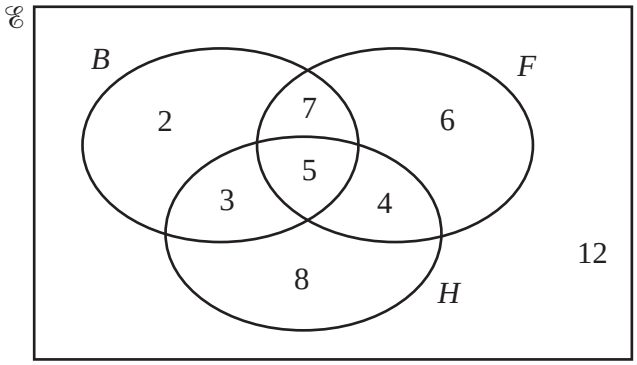


(i) Complete the Venn diagram. [2]

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

..... [1]

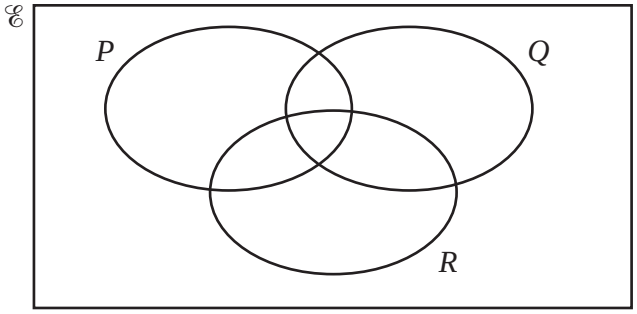
(b) This Venn diagram shows information about the number of students who play basketball (B), football (F) and hockey (H).



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

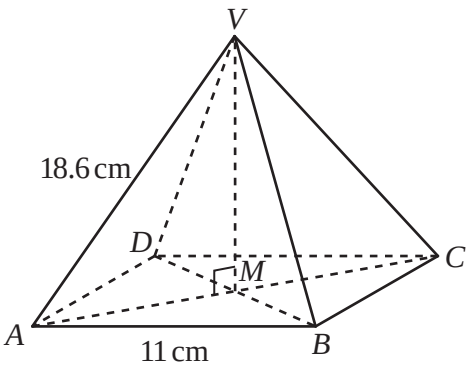
..... [1]

(c)



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

20



NOT TO SCALE

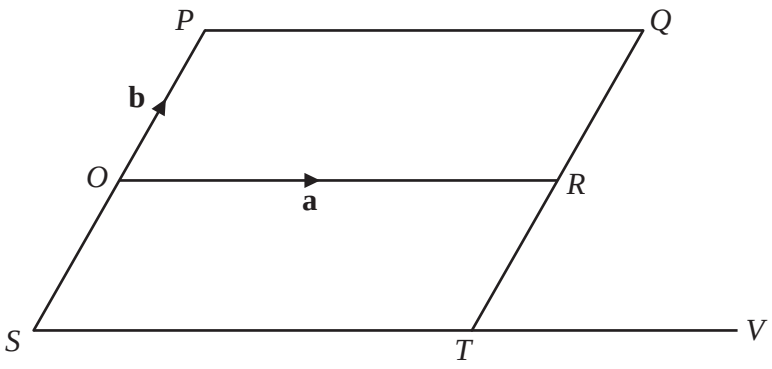
The diagram shows a pyramid with a square base $ABCD$.
The diagonals AC and BD intersect at M.
The vertex V is vertically above M.
$AB = 11$ cm and $AV = 18.6$ cm.

Calculate the angle that AV makes with the base.

..... [4]

Question 21 is printed on the next page.

21



NOT TO SCALE

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 $ST : TV = 2 : 1$.
$\overrightarrow{OR} = \mathbf{a}$ and $\overrightarrow{OP} = \mathbf{b}$.

(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]