



# Cambridge IGCSE™

CANDIDATE  
NAME

--

CENTRE  
NUMBER

--	--	--	--	--

CANDIDATE  
NUMBER

--	--	--	--



**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  $\pi$ , 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]

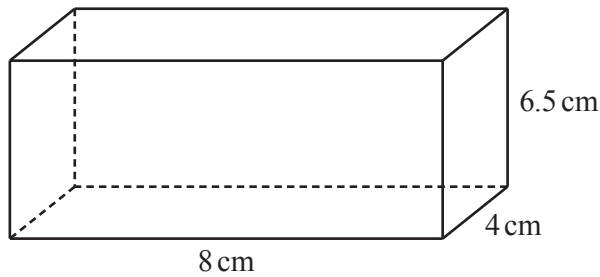
(b) a square number,

..... [1]

(c) a prime number.

..... [1]

2



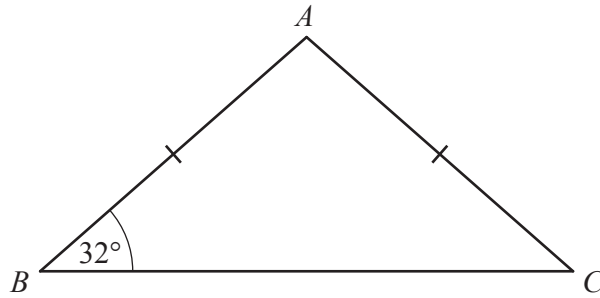
NOT TO  
SCALE

The diagram shows a cuboid.

Calculate the volume of the cuboid.

..... cm<sup>3</sup> [1]

3



NOT TO SCALE

Triangle  $ABC$  is isosceles.  
 Angle  $ABC = 32^\circ$  and  $AB = AC$ .

Find angle  $BAC$ .

Angle  $BAC = \dots\dots\dots$  [2]

4 A train journey takes 5 hours 54 minutes.

(a) The journey starts at 09 15.

Find the time that the journey ends.

$\dots\dots\dots$  [1]

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

Calculate the distance travelled.

$\dots\dots\dots$  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.

$\dots\dots\dots$  [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  $274^\circ$ .

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  $42^\circ$ .  
Give your answer in square centimetres.

.....  $\text{cm}^2$  [3]

- 10 A solid cylinder has radius 3 cm and height 4.5 cm.  
Calculate the **total** surface area of the cylinder.

.....  $\text{cm}^2$  [4]

- 11  $y$  is directly proportional to the cube root of  $(x+3)$ .  
When  $x = 5$ ,  $y = \frac{2}{3}$ .  
Find  $y$  when  $x = 24$ .

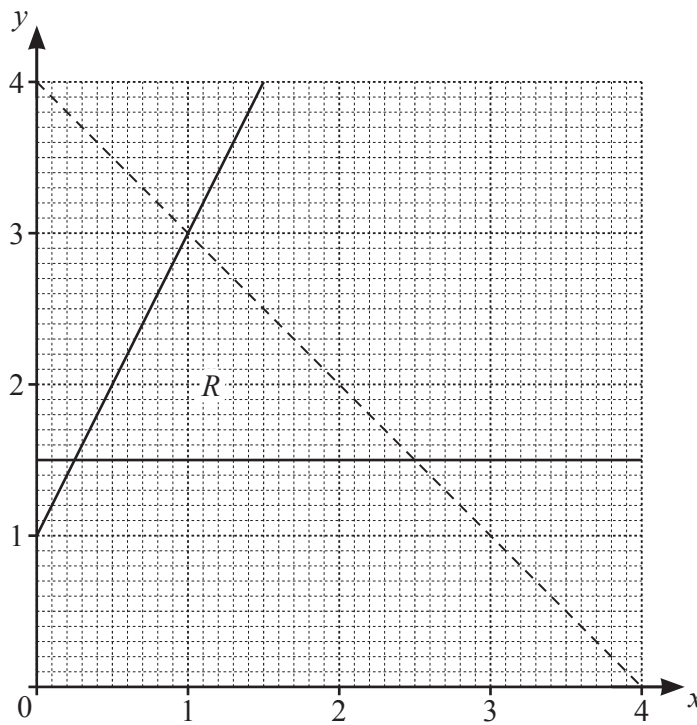
$y =$  ..... [3]

12 The total perimeter of a semicircle is 19.02 cm.

Calculate the radius of the semicircle.

..... cm [3]

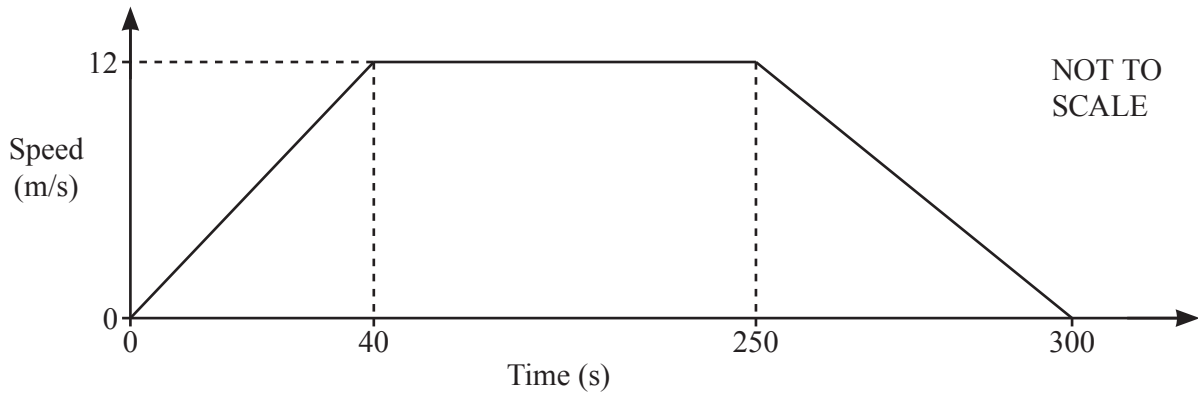
13



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.

.....  $\text{m/s}^2$  [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 (\$ $x$ )	$0 < x \leq 20$	$20 < x \leq 25$	$25 < x \leq 35$	$35 < x \leq 50$	$50 < x \leq 100$
Frequency	21	16	6	10	7

Calculate an estimate of the mean.

\$ ..... [4]

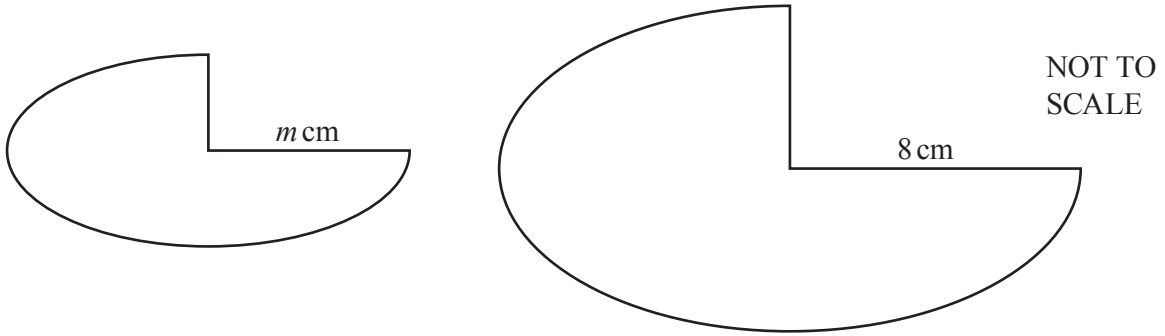
- 16 Paddy and Anna each invest \$2000 for 5 years.  
Paddy earns simple interest at a rate of 1.25% per year.  
Anna earns compound interest at a rate of  $r\%$  per year.  
At the end of 5 years, Paddy's investment is worth the same as Anna's investment.

Calculate the value of  $r$ .

$$r = \dots\dots\dots [5]$$



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  $m$ .

$m = \dots\dots\dots$  [3]

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

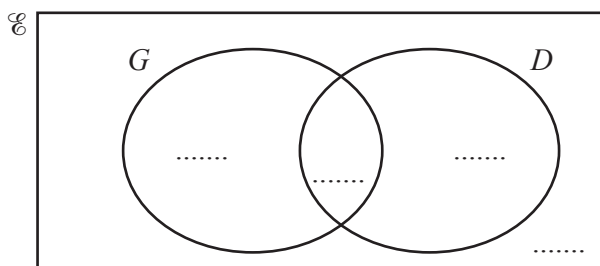
$\dots\dots\dots$  [2]

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

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

19 (a) In a class of 40 students:

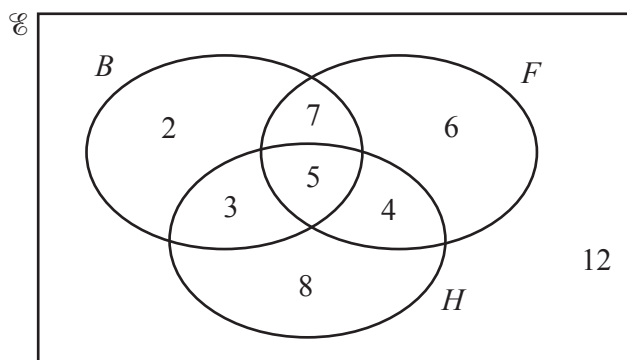
- 28 wear glasses ( $G$ )
- 13 have driving lessons ( $D$ )
- 4 do not wear glasses and do not have driving lessons.



(i) Complete the Venn diagram. [2]

(ii) Use set notation to describe the region that contains a total of 32 students.  
 ..... [1]

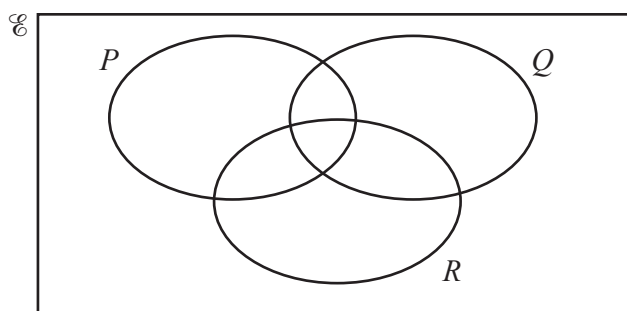
(b) This Venn diagram shows information about the number of students who play basketball ( $B$ ), football ( $F$ ) and hockey ( $H$ ).



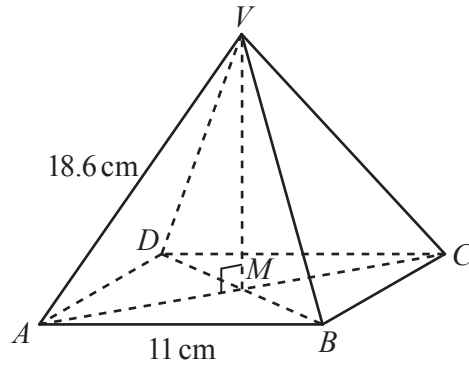
Find  $n((B \cup F) \cap H')$ .

..... [1]

(c)



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



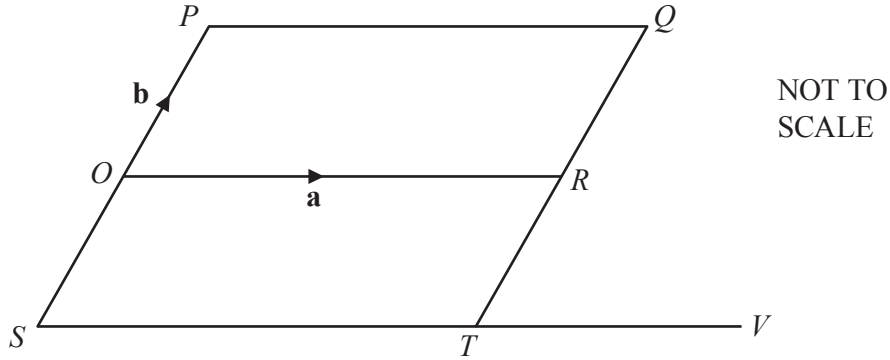
NOT TO  
SCALE

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.**



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

(a) Find, in terms of  $\mathbf{a}$  and  $\mathbf{b}$ , in its simplest form,

(i) the position vector of  $T$ ,

..... [2]

(ii)  $\vec{RV}$ .

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

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

[2]

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at [www.cambridgeinternational.org](http://www.cambridgeinternational.org) after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.