Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

2566649839

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/41**

Paper 4 (Extended) **May/June 2020**

2 hours 15 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 graphic display calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
- 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 your calculator value.

INFORMATION

- The total mark for this paper is 120.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Blank pages are indicated.

Formula List

For the equation $ax^2 + bx + c = 0$ $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Curved surface area, A, of cylinder of radius r, height h. $A = 2\pi rh$

Curved surface area, A, of cone of radius r, sloping edge l. $A = \pi rl$

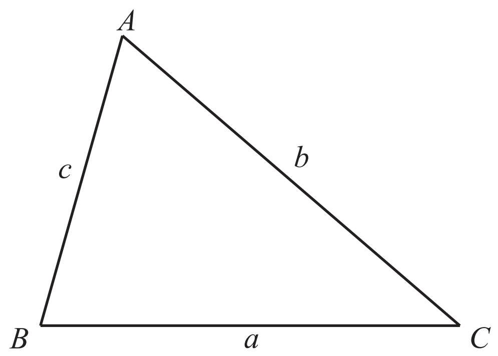
Curved surface area, A, of sphere of radius r. $A = 4\pi r^2$

Volume, V, of pyramid, base area A, height h. $V = \dfrac{1}{3}Ah$

Volume, V, of cylinder of radius r, height h. $V = \pi r^2 h$

Volume, V, of cone of radius r, height h. $V = \dfrac{1}{3}\pi r^2 h$

Volume, V, of sphere of radius r. $V = \dfrac{4}{3}\pi r^3$



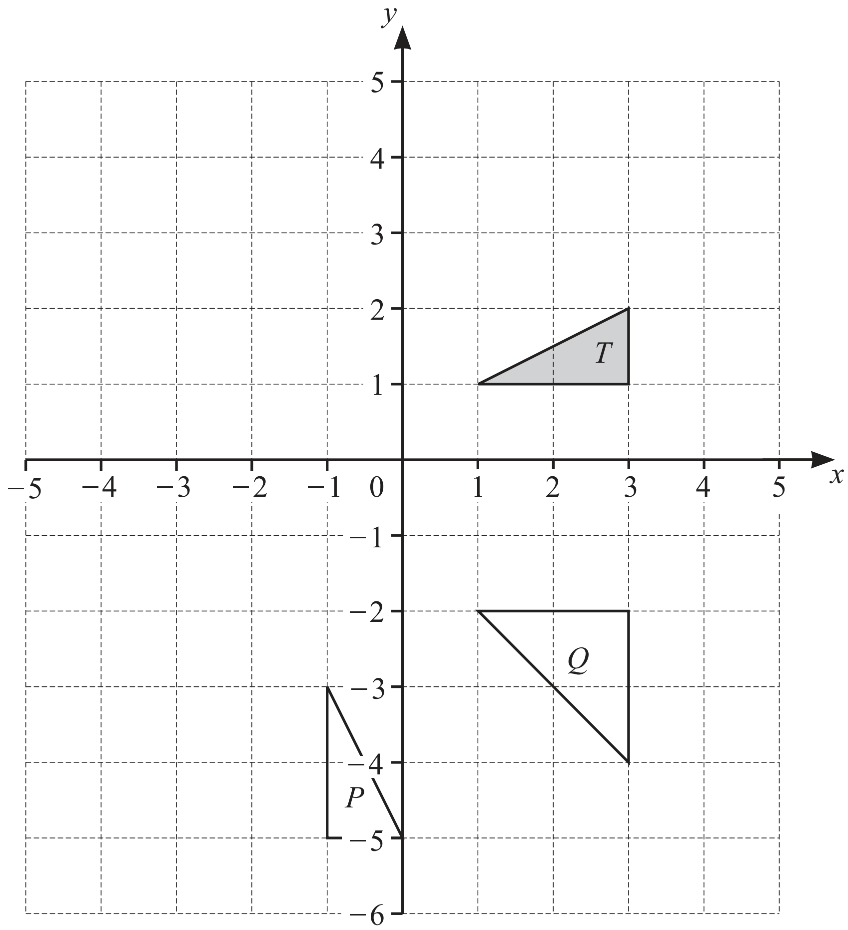
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$\text{Area} = \frac{1}{2}bc\sin A$$

Answer **all** the questions.

1



(a) **(i)** Reflect shape T in the y-axis. [1]

(ii) Translate shape T by the vector $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$. [2]

(iii) Enlarge shape T by scale factor 2, centre (2, 0). [2]

(b) Describe fully the **single** transformation that maps shape T onto

(i) shape P,

....

.... [3]

(ii) shape Q.

....

.... [3]

2 **(a)** These are Tom's ten homework marks.

8	7	10	8	9	5	8	10	6	8

Find

(i) the range,

.... [1]

(ii) the mean,

.... [1]

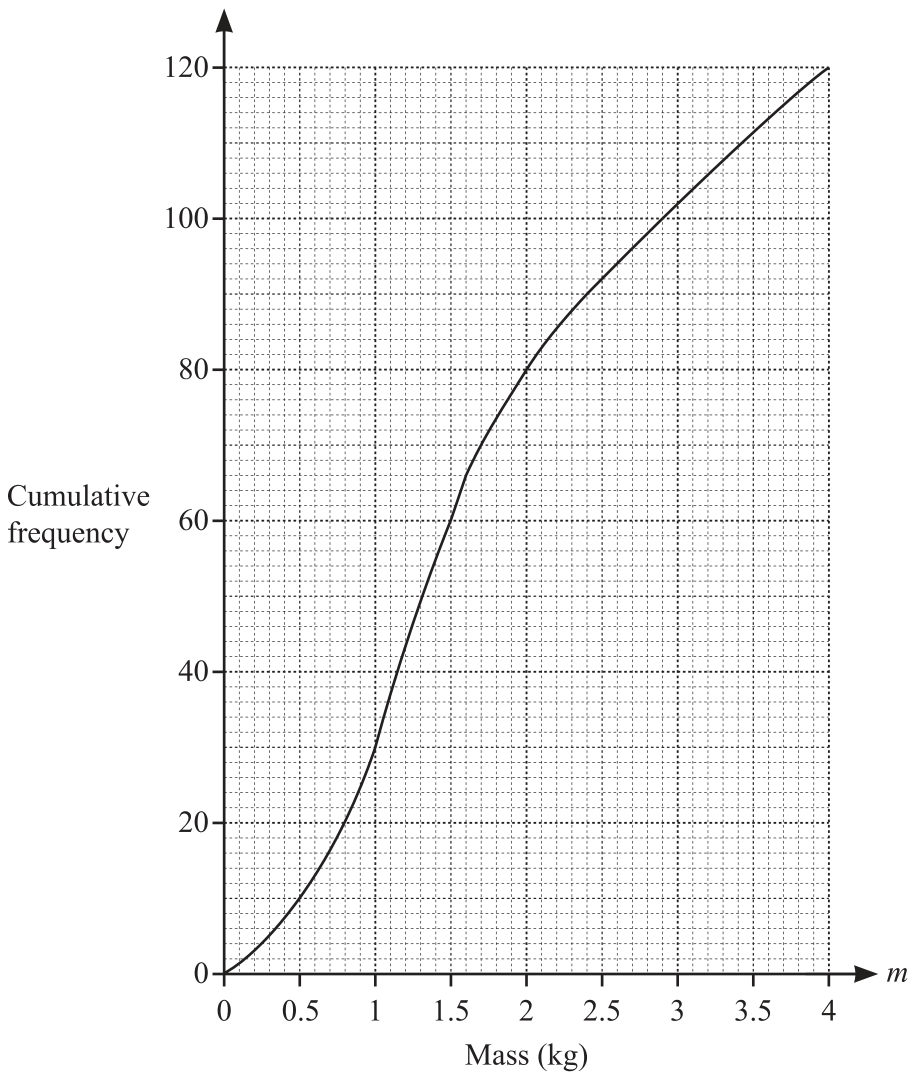
(iii) the median,

.... [1]

(iv) the upper quartile.

.... [1]

(b) The mass, m kg, of each of 120 parcels is recorded.
The cumulative frequency curve shows the results.



(i) Find the median.

.... kg [1]

(ii) Find the lower quartile.

.... kg [1]

(iii) Find the interquartile range.

.... kg [1]

(iv) Find the number of parcels with a mass of more than 3 kg.

.... [2]

(v) **(a)** Use the cumulative frequency curve to complete the frequency table.

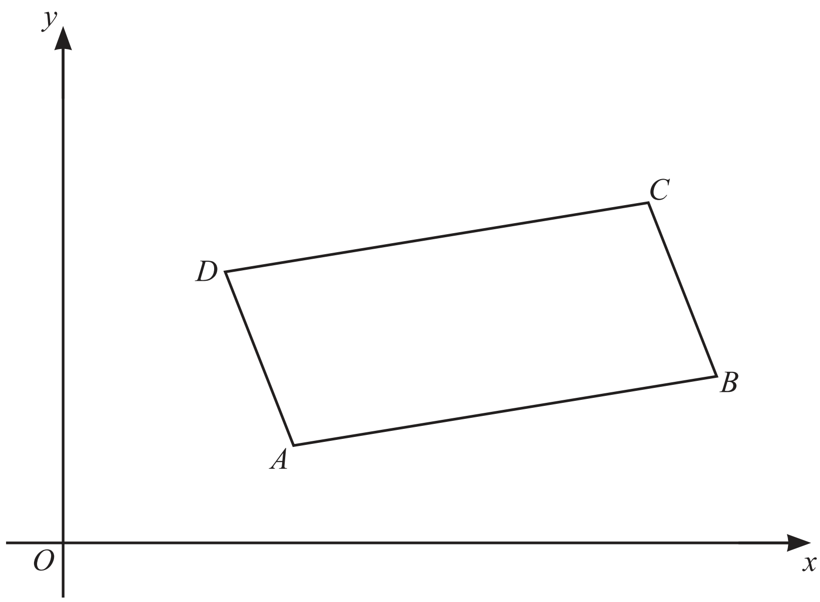
Mass (m kg)	$0 < m \leqslant 1$	$1 < m \leqslant 1.5$	$1.5 < m \leqslant 2$	$2 < m \leqslant 3$	$3 < m \leqslant 4$
Frequency	30	30			

[3]

(b) Use the frequency table to calculate an estimate of the mean.

.... kg [2]

3



NOT TO SCALE

ABCD is a parallelogram.
A is the point (3, 1), *B* is the point (10, 2) and *D* is the point (2, 3).

(a) Find the coordinates of *C*.

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

(b) Calculate the length of *AB*.
Give your answer as a surd in its simplest form.

AB = ... [3]

(c) The diagonals of the parallelogram meet at *X*.

Find the coordinates of *X*.

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

(d) The straight line BA is extended to meet the y-axis at P and the x-axis at Q.

Find the coordinates of P and the coordinates of Q.

P (..................... , ...)

Q (..................... , ...) [5]

4 Find the nth term of each sequence.

(a) 16, 25, 36, 49, 64, ...

.... [2]

(b) 3, 10, 29, 66, 127, ...

.... [2]

(c) 64, 32, 16, 8, 4, ...

.... [2]

5 **(a)** Expand the brackets and simplify.

(i) $5(2-p)-3(3+2p)$

.... [2]

(ii) $(7g-2h)(3g+11h)$

.... [3]

(b) Factorise completely.

(i) $2x^2y^3-4x^3y^2$

.... [2]

(ii) $49t^2-9u^2$

.... [2]

(iii) $6d^2+d-2$

.... [2]

6 **(a)**

(i) On the diagram, sketch the graph of $y = |\log x|$ for $0 < x \leqslant 5$. [2]

(ii) Solve the equations.

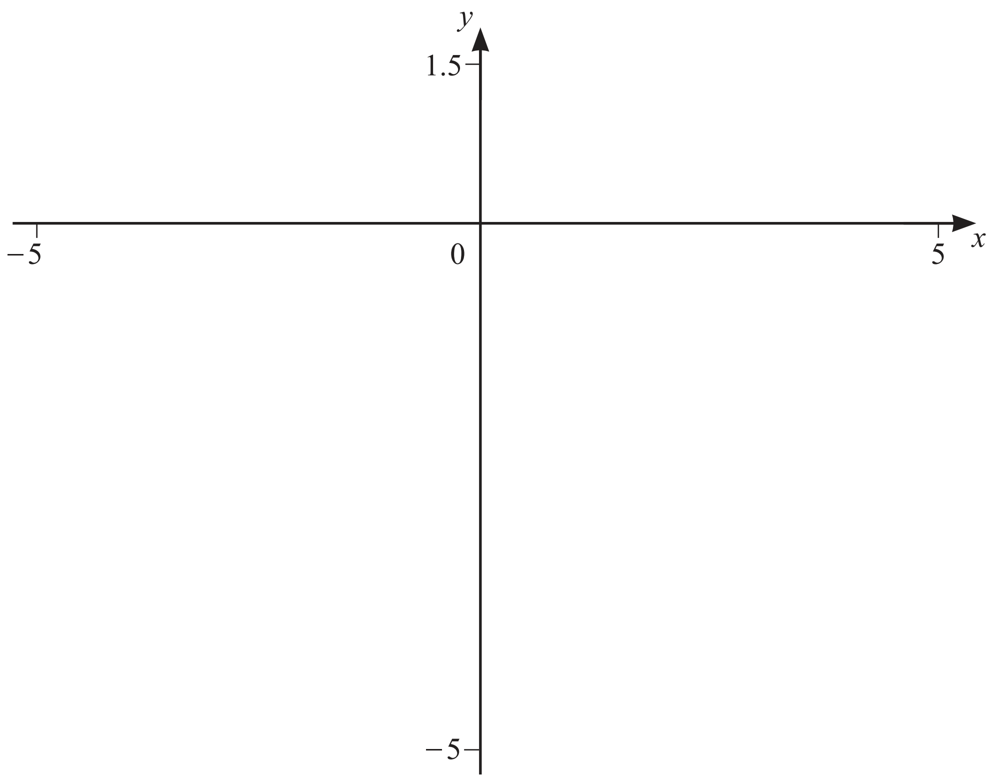
(a) $|\log x| = 0.2$

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

(b) $|\log x| = 1 - \dfrac{x}{4}$

$x =$ .... or $x =$ .... [4]

(b)



(i) On the diagram, sketch the graph of $y = \log|x|$ for values of x between -5 and 5. [2]

(ii) Solve the equation $\log|x| = 0.2$.

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

(c) Write down the range of values of x for which the graph of $y = |\log x|$ is the same as the graph of $y = \log|x|$.

.... [1]

7 **(a)** Louis invests \$500 at a rate of 2.5% per year simple interest.

Calculate the total amount of interest at the end of 8 years.

\$ .... [2]

(b) Martha invests \$500 at a rate of 2.4% per year compound interest.

Calculate the total amount of interest at the end of 8 years.

\$ .... [4]

(c) Naomi invests an amount of money at a rate of 2.1% per year compound interest.

Find the number of complete years it takes for the value of Naomi's investment to double.

.... [4]

(d) Oscar invests an amount of money at a rate of r% per year compound interest.
At the end of 31 years the value of Oscar's investment is 2.5 times greater than the original amount of money.

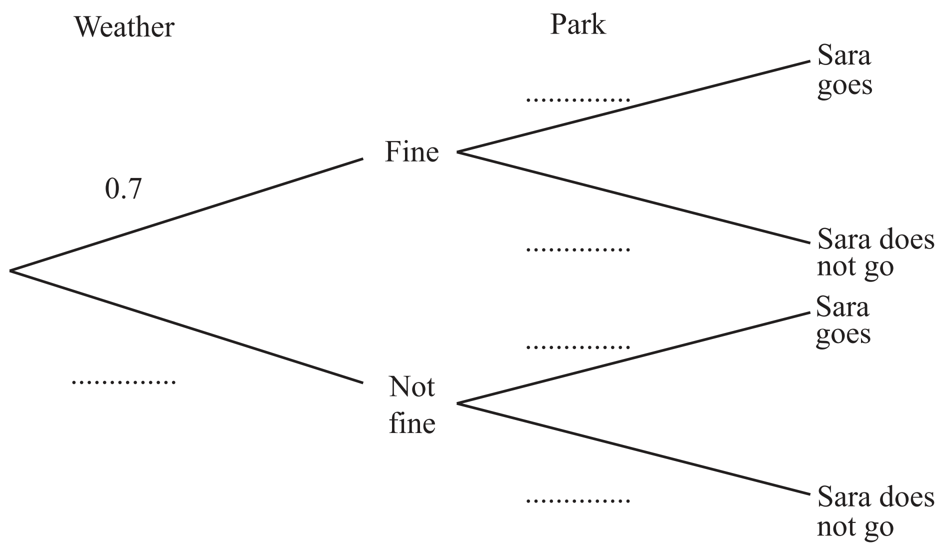
Find the value of r.

r = ... [3]

8 **(a)** When the weather is fine, the probability that Sara goes to the park is 0.9 .
When the weather is not fine, the probability that Sara goes to the park is 0.2 .

On any day, the probability that the weather is fine is 0.7 .

(i) Complete the tree diagram.

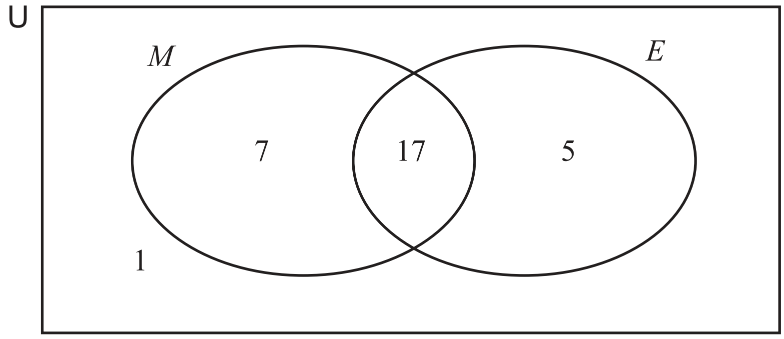


[3]

(ii) Find the probability that, on any day, Sara goes to the park.

.... [3]

(b) 30 students are asked if they like Mathematics (M) and if they like English (E).
The Venn diagram shows the number of students in each subset.



(i) Find $\mathrm{n}(M \cup E')$.

.... [1]

(ii) Two students are chosen at random.

Find the probability that they both like Mathematics but not English.

.... [3]

9

$$f(x) = x^3 - 6x^2 + 8x \quad \text{for} \quad -0.5 \leqslant x \leqslant 4.5$$

(a) On the diagram, sketch the graph of $y = f(x)$. [2]

(b) Solve the inequality $f(x) < 0$.

.... [3]

(c) Find the positive value of k when $f(x) = k$ has two different solutions.

$k =$ .... [2]

10 $\quad f(x) = 2x + 3 \qquad g(x) = 5^x$

(a) Find $f(g(3))$.

.... [2]

(b) Find $f^{-1}(x)$.

$f^{-1}(x) =$ .... [2]

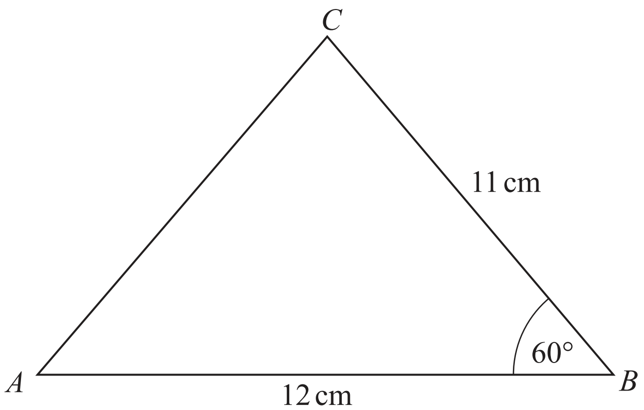
(c) Find x when $g(x) = \dfrac{1}{25\sqrt{5}}$.

$x =$ .... [2]

(d) Find $g^{-1}(x)$.

$g^{-1}(x) =$ .... [2]

11 (a)

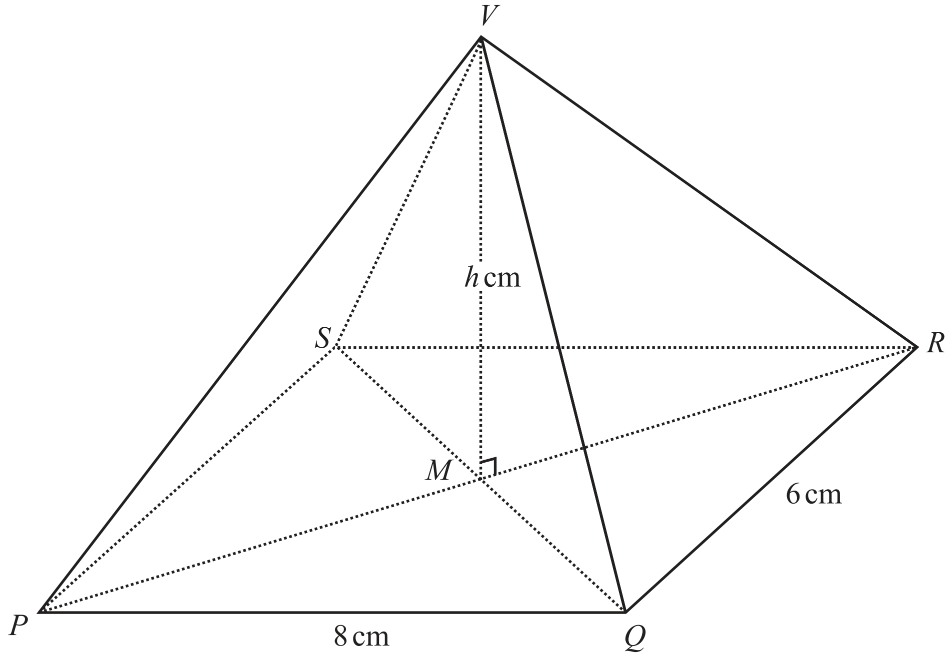


NOT TO SCALE

Calculate the shortest distance from B to AC.

.... cm [7]

(b)



NOT TO SCALE

The diagram shows a pyramid on a rectangular base *PQRS*.
The diagonals of the base meet at *M* and *V* is vertically above *M*.

$PQ = 8$ cm, $QR = 6$ cm and $VM = h$ cm.
The volume of the pyramid is 112 cm^3.

(i) Show that $h = 7$.

[2]

(ii) Calculate the length of *VR*.

VR = ... cm [3]

(iii) *K* is the mid-point of *PS* and *L* is the mid-point of *QR*.

Calculate angle *KVL*.

Angle *KVL* = ... [3]

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