Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
TOTAL	

In the style of

AQA

General Certificate of Secondary Education
Higher Tier

Mathematics
Model Answers

43601H

Example

H

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator.

Time allowed
- 1 hour 15 minutes

Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is.
- The quality of your written communication is specifically assessed in questions indicated with an asterisk (*)
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer booklet.

Advice
- In all calculations, show clearly how you work out your answer.

By Peter Bland

4 (a) Work out the value of $9^{-\frac{3}{2}}$

$$= \frac{1}{\sqrt{9^3}}$$
$$= \frac{1}{\sqrt{729}}$$
$$= \frac{1}{27}$$

Answer $\frac{1}{27}$ ..... *(3 marks)*

4 (b) Work out **all** solutions of the equation

$$8^n = 2^{n^2}$$
$$2^{3n} = 2^{n^2} \quad \left(8 \text{ is } 2\times2\times2 \text{ or } 2^3\right)$$
$$3n = n^2$$
$$n^2 - 3n = 0$$
$$n(n-3) = 0$$
$$n = 0 \text{ or } 3$$

Answer .....0 or 3..... *(3 marks)*

2 The *n*th term of a sequence is $100 - 3n$.

2 (a) Work out the first three terms.

n	$-3n$	$+100$
1	-3	97
2	-6	94
3	-9	91

Answer .....97....., ...94....., ...91.....

(2 marks)

2 (b) Work out the first term of the sequence that is a minus number.

$$100 - 3n = 0$$
$$-3n = -100$$
$$3n = 100$$
$$n = \frac{100}{3}$$
$n = 33.33$ The next whole number after this.

Answer .....34..... *(2 marks)*

2 There are three drinks.

Cola	C
Orange	O
Water	W

They come in three sizes.

Small	S
Medium	M
Large	L

2 (a) List **all** possible combinations of drink and size. The first one has been done for you.

CS	CM	CL
OS	OM	OL
WS	WM	WL

(3 marks)

2 (b) A drink is chosen at random.

What is the probability that a small cola is chosen?

Answer $\frac{1}{9}$ *(1 mark)*

1 (a) Work out 7500 + 1500

Write your answer in words.

Answer ..... nine thousand

(2 marks)

1 (b) Write 5758 to the nearest hundred.

Answer .....5800.....

(1 mark)

1 (c) What is the value of the digit 3 in the number 423 985?

Answer .....3000.....

(1 mark)

1 (d) Write down the positive square root of 100.

Answer .....10.....

(1 mark)

1 (e) Which of these is equal to one million?

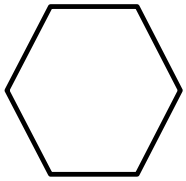
Circle your answer.

10^3 10^4 10^5 (**10^6**) 10^7

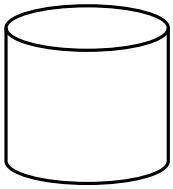
(1 mark)

7 (a) Write down the mathematical name of each of the following.

kite



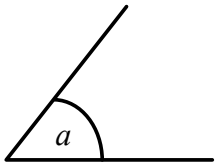
hexagon

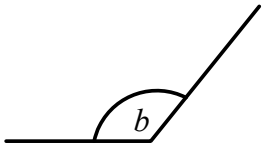


cylinder

(*3 marks*)

Here are two angles, a and b.



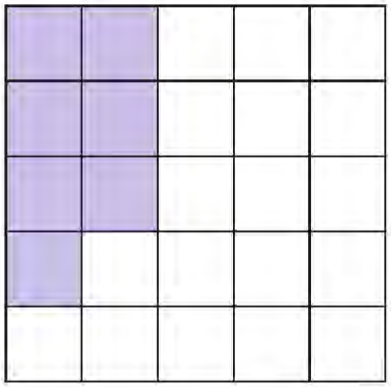


7 (b) What type of angles are they?

Answer a is.....acute.....

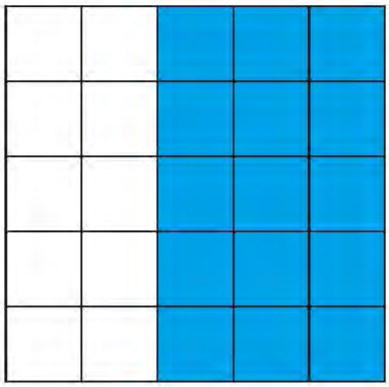
b is .....obtuse..... (*2 marks*)

6 (a) Shade $\frac{7}{25}$ of this square grid.



(1 mark)

6 (b) Shade $\frac{3}{5}$ of this square grid.



(1 mark)

6 (c) Use your answers to part (a) and part (b) to write down the answer to $\frac{3}{5} - \frac{7}{25}$

Answer ..... $\frac{8}{25}$ .....

(1 mark)

6 (d) Work out $\frac{2}{3}$ of 27

$$\frac{2}{3} \times \frac{27}{1} = 18$$

Answer……18……

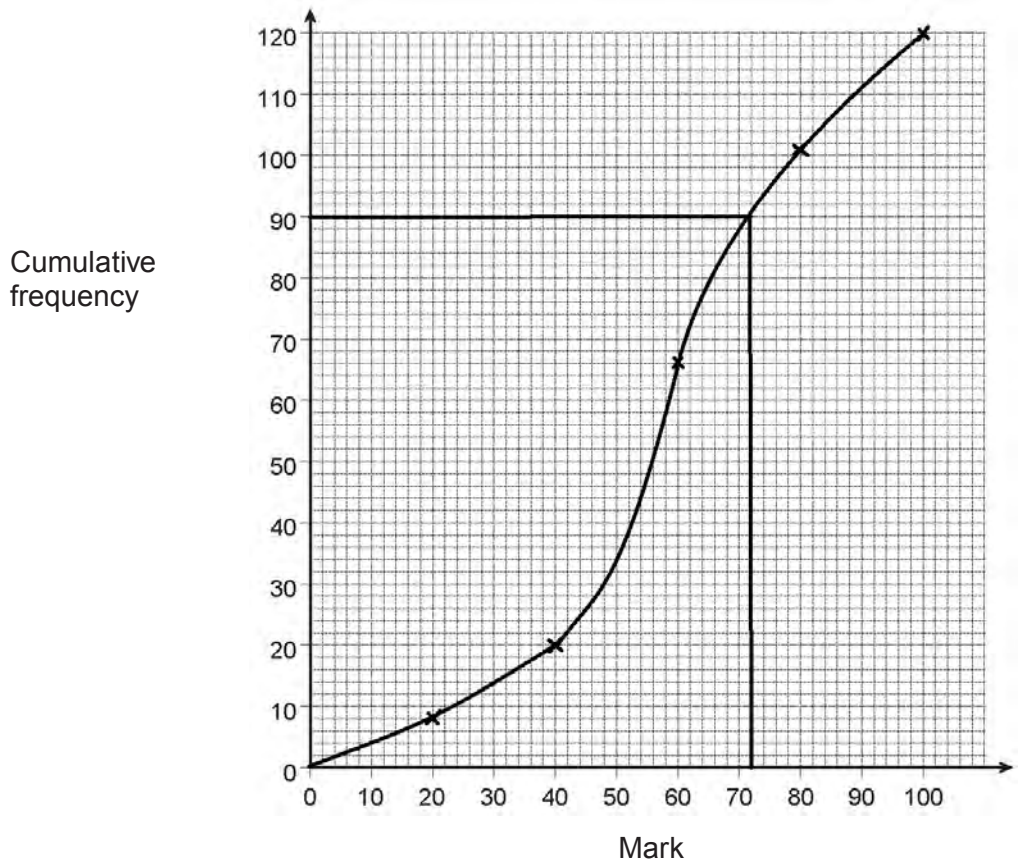
(2 marks)

2 The table shows a summary of the scores of 120 children in an examination.

Mark	Frequency	cumf
$0 < \text{mark} \leqslant 20$	8	8
$20 < \text{mark} \leqslant 40$	12	20
$40 < \text{mark} \leqslant 60$	46	66
$60 < \text{mark} \leqslant 80$	35	101
$80 < \text{mark} \leqslant 100$	19	120

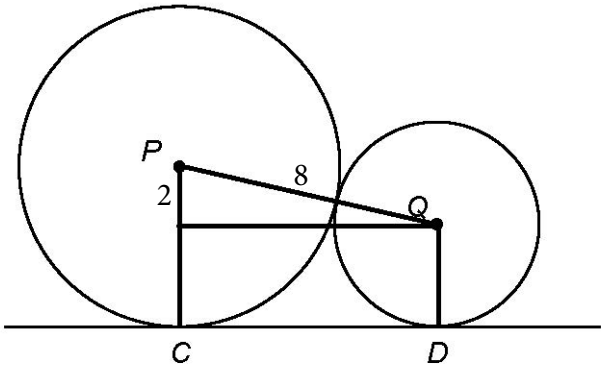
2 (a) Three-quarters of the children pass the test.

Use a cumulative frequency graph to estimate the pass mark.



Answer .....72..... *(5 marks)*

9 The circle, with centre *P*, has a radius of 5 cm.
The circle, with centre *Q*, has a radius of 3 cm.
The circles touch externally.
The circles have a common tangent *CD*.



Not drawn accurately

9 (a) Explain why *CDQP* is a trapezium.

A trapezium is a quadrilateral which has 2 parallel sides

(2 marks)

9 (b) Show that *CD* = 7.75 cm to 3 significant figures.

Pythagoras

$$CD^2 = 8^2 - 2^2$$
$$= 64 - 4$$
$$CD = \sqrt{60}$$
$$= 7.745967$$

7.75 to 3 significant figures

(3 marks)

1 (a) Solve $4(y + 5) = 28$

$$4y + 20 = 28$$
$$4y = 28 - 20$$
$$4y = 8$$
$$y = 2$$

Answer y = ...2.....

(3 marks)

1 (b) Factorise $x^2 + 8x$

Answer .....$x(x + 8)$.....

(1 mark)

2 You are given that 1 tonne = 1000 kilograms and 1 kilogram = 1000 grams

A skip contains half a tonne of magazines when full.
Each magazine weighs about 200 grams.

Approximately how many magazines would fill the skip?

Skip contains half a tonne
$= 500$ kg
$= 500\ 000$ g
$= 5000 \div 2$
$= 2500$

Answer .....2500 magazines.....

(4 marks)