

TOPICAL PAST PAPER QUESTIONS WORKSHEETS

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## IGCSE Mathematics (0580) Paper 3

[Structured questions]

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**Exam Series: May/Jun 2012 - Feb/Mar 2024**

**Format Type B:**

Each question is followed by its answer scheme



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# Introduction

Each Topical Past Paper Questions Workbook contains a comprehensive collection of hundreds of questions and corresponding answer schemes, presented in worksheet format. The questions are carefully arranged according to their respective chapters and topics, which align with the latest IGCSE or AS/A Level subject content. Here are the key features of these resources:

1. The workbook covers a wide range of topics, which are organized according to the latest syllabus content for Cambridge IGCSE or AS/A Level exams.
2. Each topic includes numerous questions, allowing students to practice and reinforce their understanding of key concepts and skills.
3. The questions are accompanied by detailed answer schemes, which provide clear explanations and guidance for students to improve their performance.
4. The workbook's format is user-friendly, with worksheets that are easy to read and navigate.
5. This workbook is an ideal resource for students who want to familiarize themselves with the types of questions that may appear in their exams and to develop their problem-solving and analytical skills.

Overall, Topical Past Paper Questions Workbooks are a valuable tool for students preparing for IGCSE or AS/A Level exams, providing them with the opportunity to practice and refine their knowledge and skills in a structured and comprehensive manner. To provide a clearer description of this book's specifications, here are some key details:

- Title: Cambridge IGCSE Mathematics (0580) Paper 3 Topical Past Papers
- Subtitle: Exam Practice Worksheets With Answer Scheme
- Examination board: Cambridge Assessment International Education (CAIE)
- Subject code: 0580
- Years covered: May/Jun 2012 - Feb/Mar 2024
- Paper: 3
- Number of pages: 1974
- Number of questions: 779



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# Chapter 1

# Numbers

1. 0580\_m24\_qp\_32 Q: 8

- (a) 120 people teach in a university mathematics department. Some information is shown in the table.

	Lecturers	Professors	Total
Part-time		11	
Full-time			
Total			120

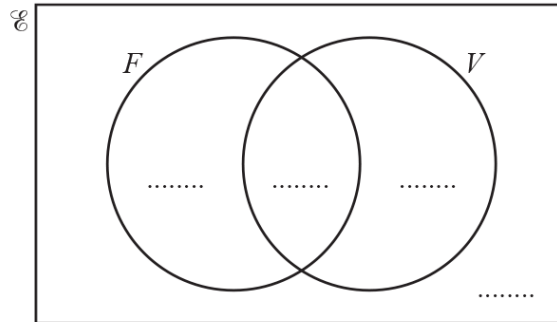
One fifth of the people are professors.  
30% of the people are part-time.

Work out the number of full-time lecturers.

..... [4]

- (b)  $\mathcal{E} = \{\text{children in a school}\}$   
 $F = \{\text{children who like fruit}\}$   
 $V = \{\text{children who like vegetables}\}$

24 children like vegetables but do not like fruit.  
8 children do not like fruit and do not like vegetables.  
 $n(F \cap V) = 9$   
 $n(F) = 3 \times n(V)$



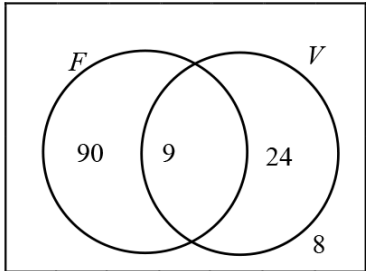
- (i) Complete the Venn diagram. [3]

- (ii) Work out  $n(F \cup V)$ .

..... [1]



Answer:

Question	Answer	Marks	Partial Marks
(a)	71 nfw	4	<b>B3</b> for 13 and 84 or for 25 and 96 OR <b>B1</b> for 24 or 96 <b>B1</b> for 36 or 84
(b)(i)		3	If answer incorrect can score a maximum of 2 from:  <b>B1</b> for 24 and 8 correctly placed  <b>B1</b> for 9 correctly placed  <b>B1FT</b> for <i>their</i> $n(F) = 3 \times \text{their } n(V)$
(b)(ii)	123	1	<b>B1FT</b> for <i>their</i> $n(F \cup V)$

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2. 0580\_m23\_qp\_32 Q: 3

(a) A recipe for making 20 biscuits uses 150 g flour, 125 g butter and 50 g sugar.

(i) Write the ratio flour : butter : sugar in its simplest form.

flour : butter : sugar = ..... : ..... : ..... [2]

(ii) Work out the amount of flour, butter and sugar needed to make 50 biscuits.

flour ..... g

butter ..... g

sugar ..... g [3]

(b) (i) A recipe for making one loaf of bread uses 600 g of flour.  
A sack of flour contains 16 kg of flour.

Complete the statements.

One sack of flour makes a maximum of ..... loaves of bread.

The amount of flour left over is ..... g.

[4]

(ii) The amount of flour in a sack decreases from 16 kg to 15 kg.

Work out the percentage decrease of flour in the sack.

..... % [2]

Answer:

Question	Answer	Marks	Partial Marks
(a)(i)	6 : 5 : 2	2	<b>B1</b> for 150 : 125 : 50 or any correct ratio $6k : 5k : 2k$
(a)(ii)	375, 312.5, 125	3	<b>B2</b> for one correct in the correct place or <b>M1</b> for $\frac{50}{20} \times k$ oe where $k = 1, 150, 125$ or 50
(b)(i)	26, 400	4	<b>B1</b> for 16 000 or 0.6 seen <b>M1</b> for $\frac{\text{figs}16}{\text{figs}6}$ <b>A1</b> for 26  If <b>B0, M1, A0</b> scored, <b>SC1</b> for <i>their</i> $\frac{\text{figs}16}{\text{figs}6}$ seen and rounded down to nearest positive integer
(b)(ii)	6.25	2	<b>M1</b> for $\frac{16-15}{16}[\times 100]$ oe or $(1 - \frac{15}{16})[\times 100]$ oe or $[100 - \frac{15}{16}] \times 100$ oe

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3. 0580\_m23\_qp\_32 Q: 4

(a) Write 6479 correct to the nearest 100.

..... [1]

(b) Write down the multiple of 13 that is between 100 and 110.

..... [1]

(c) Find the reciprocal of 0.6 .

..... [1]

(d) Work out.

$$3 + 4 \times 2$$

..... [1]

(e) Write down an irrational number with a value between 15 and 20.

..... [1]

(f) By writing each number in the calculation correct to 1 significant figure, find an estimate for the value of

$$\frac{423.8 - 78.4}{23.5}$$

You must show all your working.

..... [2]

Answer:

Question	Answer	Marks	Partial Marks
(a)	6500	1	
(b)	104	1	
(c)	$1\frac{2}{3}$ oe	1	
(d)	11	1	
(e)	Any irrational number between 15 and 20	1	

Question	Answer	Marks	Partial Marks
(f)	$\frac{400 - 80}{20}$	<b>M1</b>	
	16 nfw	<b>A1</b>	If 0 scored, <b>SC1</b> for 2 correct roundings or all correct but with trailing zeros

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4. 0580\_s23\_qp\_31 Q: 1

(a) Write the number forty thousand and thirty-three in figures.

..... [1]

(b) Find the value of  $\sqrt[3]{729}$ .

..... [1]

(c) Find the reciprocal of  $\frac{7}{9}$ .

Give your answer as a decimal, correct to 3 decimal places.

..... [2]

(d) Find the value of  $6^5 \div 3^4$ .

..... [2]

(e) Work out  $(-9) \times (-7) \div (-3)$ .

..... [1]

(f) Work out.

(i)  $11 + 9 \times 5 - 4$

..... [1]

(ii)  $(11 + 9) \times 5 - 4$

..... [1]

- (g)                     $-0.67$        $\sqrt{123}$        $\sqrt{49}$        $\frac{5}{9}$        $3.142$

From this list, write down an irrational number.

..... [1]

- (h) (i) Find the lowest common multiple (LCM) of 24 and 104.

..... [2]

- (ii) Find the highest common factor (HCF) of 24 and 104.

..... [2]

Answer:

Question	Answer	Marks	Partial Marks
(a)	40033	1	
(b)	9	1	
(c)	1.286 cao	2	<b>B1</b> for $\frac{9}{7}$ or 1.29 or 1.285 or 1.285.....
(d)	96	2	<b>B1</b> for 7776 or 81
(e)	-21	1	
(f)(i)	52	1	
(f)(ii)	96	1	
(g)	$\sqrt{123}$	1	
(h)(i)	312	2	<b>B1</b> for $312k$ as final answer or <b>M1</b> for $[24 =] 2 \times 2 \times 2 \times 3$ or $2^3 \times 3$ <b>and</b> $[104 =] 2 \times 2 \times 2 \times 13$ or $2^3 \times 13$ or 2 correct factor trees or tables or a list of multiples of both 24 and 104 with at least 3 of each or $2 \times 2 \times 2 \times 3 \times 13$ oe
(h)(ii)	8	2	<b>B1</b> for 2 or 4 or $2 \times 2 \times 2$ or $2^3$ as final answer, or for a complete list of factors of 24 and 104

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5. 0580\_s23\_qp\_31 Q: 5

Antonio buys a restaurant for \$240 000.

This is  $\frac{5}{8}$  of the amount he has available to spend.

(a) Show that he has \$144 000 left after buying the restaurant.

[2]

(b) Some of the \$144 000 is spent on expenses.  
Expenses are wages, equipment and supplies in the ratio

$$\text{wages} : \text{equipment} : \text{supplies} = 9 : 5 : 8.$$

The amount spent on wages is \$45 000.

(i) Find the amount spent on

(a) equipment

\$ ..... [2]

(b) supplies.

\$ ..... [1]

(ii) Work out the amount Antonio has left now.

\$ ..... [2]

- (c) Antonio borrows \$25 400 for 6 years at a rate of 5% per year simple interest.

Calculate the total amount he repays at the end of the 6 years.

\$ ..... [3]

- (d) In one week, the number of customers in the restaurant was 560.  
In the next week, the number of customers in the restaurant was 656.

Calculate the percentage increase.

..... % [2]

Answer:

Question	Answer	Marks	Partial Marks
(a)	$240\,000 \div 5 \times 8 - 240\,000$ or $240\,000 \times \frac{3}{5}$	<b>M2</b>	<b>M1</b> for $240\,000 \div 5 \times 8$
(b)(i)(a)	25 000	<b>2</b>	<b>M1</b> for $45\,000 \div 9$ oe
(b)(i)(b)	40 000	<b>1</b>	
(b)(ii)	34 000	<b>2</b>	<b>FT</b> $99\,000 - (\textit{their } 25\,000 + \textit{their } 40\,000)$ <b>M1</b> for $144\,000 - 45\,000 -$ $(\textit{their } 25\,000 + \textit{their } 40\,000)$ oe
(c)	33 020	<b>3</b>	<b>B2</b> for 7620 or <b>M2</b> for $25\,400 + \frac{25\,400 \times 5 \times 6}{100}$ oe or <b>M1</b> for $\frac{25\,400 \times 5 \times 6}{100}$ oe
(d)	17.1 or 17.1[4...]	<b>2</b>	<b>M1</b> for $\frac{656-560}{560} [\times 100]$ oe or $\left(\frac{656}{560} \times 100\right) [-100]$ oe or $\left(\frac{656}{560} - 1\right) [\times 100]$ oe

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6. 0580\_s23\_qp\_33 Q: 8

- (a) The length,  $l$  m, of a piece of wire is 18.7 metres, correct to the nearest 10 centimetres.

Complete the statement about the value of  $l$ .

.....  $\leq l <$  ..... [2]

- (b) 850 metres of wire has a mass of 130.5 kilograms.

Work out the length of wire, in metres, that has a mass of 900 grams.

..... m [3]

- (c) Aluminium is used to make the wire.  
The mass of  $1 \text{ cm}^3$  of aluminium is 2.7 grams.

Work out the mass, in grams, of  $6000 \text{ cm}^3$  of aluminium.  
Give your answer in standard form.

..... g [2]

- (d) A 12 metre length of wire increases in length to 12.017 metres when its temperature rises.

Calculate the percentage increase in the length of the wire.

..... % [2]

Answer:

Question	Answer	Marks	Partial Marks
(a)	18.65 18.75	2	<b>B1</b> for each If 0 scored, <b>SC1</b> for both correct but reversed or $1865 \leq l < 1875$
(b)	5.86 or 5.862...	3	<b>M2</b> for $\frac{900}{130500} \times 850$ oe  OR  <b>B1</b> for a correct conversion 130.5 kg=130500 [g] or 900 g =0.9 [kg] or <b>M1</b> for $\frac{figs9}{figs130.5} \times 850$
(c)	$1.62 \times 10^4$ cao	2	<b>M1</b> for $2.7 \times 6000$ or <i>their</i> number correctly converted to standard form
(d)	0.142 or 0.1416 to 0.1417	2	<b>M1</b> for $\frac{12.017 - 12}{12} [\times 100]$  or $\left(\frac{12.017}{12} - 1\right) [\times 100]$  or $\frac{12.017}{12} \times 100 [-100]$

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7. 0580\_w23\_qp\_31 Q: 1

(a) Write the number six and a half million in figures.

..... [1]

(b) Write 37 508 correct to the nearest thousand.

..... [1]

(c)                    6    9     $\sqrt{100}$     28    31     $\sqrt{1000}$     32    36

From this list of numbers, write down

(i) a factor of 18

..... [1]

(ii) a multiple of 12

..... [1]

(iii) a square number

..... [1]

(iv) a prime number

..... [1]

(v) an irrational number.

..... [1]

(d) Put one pair of brackets in each statement to make it correct.

(i)  $24 - 4 \times 3 + 2 = 62$  [1](ii)  $24 - 4 \times 3 + 2 = 4$  [1](e) Write  $\frac{3}{4}$  as a decimal.

..... [1]

(f) Work out  $\frac{3}{7}$  of 126.

..... [1]

(g) Write down the value of the reciprocal of 0.5 .

..... [1]

(h) **Without using a calculator**, work out  $5\frac{2}{3} - 2\frac{1}{5}$  .

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Answer:

Question	Answer	Marks	Partial Marks
(a)	6 500 000	1	
(b)	38 000	1	
(c)(i)	6 or 9	1	
(c)(ii)	36	1	
(c)(iii)	9 or 36	1	
(c)(iv)	31	1	
(c)(v)	$\sqrt{1000}$	1	
(d)(i)	$(24 - 4) \times 3 + 2 = 62$	1	
(d)(ii)	$24 - 4 \times (3 + 2) = 4$	1	
(e)	0.75	1	
(f)	54	1	
(g)	2	1	
(h)	$\frac{17}{3}$ or $\frac{11}{5}$	<b>B1</b>	Correct step for dealing with mixed numbers, allow e.g. $\frac{17k}{3k}$ or $\frac{11k}{5k}$
	$\frac{85}{15}$ and $\frac{33}{15}$	<b>M1</b>	FT Correct method to find a common denominator
	$3\frac{7}{15}$ cao	<b>A1</b>	
			Alternative methods $3\frac{2}{3} - \frac{1}{5}$ B1, $\frac{10}{15}$ and $\frac{3}{15}$ M1, $3\frac{7}{15}$ cao A1 $5\frac{10}{15}$ and $2\frac{3}{15}$ M1, $3\frac{7}{15}$ cao B1 A1  $\frac{10}{15}$ and $\frac{3}{15}$ M1, $3\frac{7}{15}$ cao B1A1

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8. 0580\_w23\_qp\_33 Q: 3

- (a) Aneel has 80 tea bags,  $\frac{1}{2}$  kg of sugar and 1 litre of milk.  
To make a cup of tea he uses:

- 1 tea bag
- 8 grams of sugar
- 40 millilitres of milk.

- (i) In the morning, Aneel makes 15 cups of tea.

Work out

- (a) the fraction of the tea bags he uses, in its simplest form

..... [2]

- (b) the mass of sugar, in grams, he has left.

..... g [2]

- (ii) During the day, Aneel uses all of the milk to make cups of tea.

Work out the total number of cups of tea Aneel makes.

..... [1]

- (b) Bobby, Carl and Davood share \$6875 in the ratio Bobby : Carl : Davood = 6 : 8 : 11.

Calculate the amount of money they each receive.

Bobby \$ .....

Carl \$ .....

Davood \$ ..... [3]

(c) (i) Write  $\frac{3^2 \times 3^4}{3^6}$  as a power of 3.

..... [1]

(ii) Write the value of  $2^{-4}$  as a decimal.

..... [1]

(d) Simplify.

(i)  $(b^5)^3$

..... [1]

(ii)  $\left(\frac{4}{m}\right)^{-2}$

..... [1]

(e)  $30 = 2 \times 3 \times 5$        $84 = 2^2 \times 3 \times 7$

Use this information to find the lowest common multiple (LCM) of 30 and 84.

..... [2]

(f)  $\frac{2}{9}$      $\sqrt{7}$      $\frac{5}{4}$      $\sqrt{16}$      $2^3$

Put a ring around the irrational number in this list.

[1]

Answer:

Question	Answer	Marks	Partial Marks
(a)(i)(a)	$\frac{3}{16}$ cao	2	<b>M1</b> for $\frac{15}{80}$ oe
(a)(i)(b)	380	2	<b>B1</b> for 500[g] or 120[g]
(a)(ii)	25	1	
(b)	1650 2200 3025	3	<b>B2</b> for one correct answer in the correct place or <b>M1</b> for $\frac{6875}{6+8+11} \times k$ oe where $k$ is 1, 6, 8 or 11
(c)(i)	$3^0$ final answer	1	
(c)(ii)	0.0625 cao	1	
(d)(i)	$b^{15}$	1	
(d)(ii)	$\frac{m^2}{16}$	1	
(e)	420	2	<b>B1</b> for $2^2 \times 3 \times 5 \times 7$ or $2 \times 2 \times 3 \times 5 \times 7$ or for 2,2,3,5,7 as final answer
(f)	$\sqrt{7}$	1	

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9. 0580\_s22\_qp\_31 Q: 1

**(a)** Write the number six and a half million in figures.

..... [1]

**(b)** Write 6538 correct to the nearest ten.

..... [1]

**(c)** Work out  $6 \times 5 + 12 \div 3$ .

..... [1]

**(d)** 9      16      18      29      57      64      87      96

From this list of numbers, write down

**(i)** a factor of 48,

..... [1]

**(ii)** a cube number,

..... [1]

**(iii)** a prime number.

..... [1]

**(e)** Find the value of  $\sqrt{0.001225}$ .

..... [1]

**(f)** Find the reciprocal of 8.

..... [1]

(g) Find the value of  $8^0$ .

..... [1]

(h) (i) Write 180 as a product of its prime factors.

..... [2]

(ii) Find the lowest common multiple (LCM) of 160 and 180.

..... [2]

(i) The mass of an aircraft,  $m$  tonnes, is 473 tonnes, correct to the nearest tonne.

Complete this statement about the value of  $m$ .

.....  $\leq m <$  ..... [2]

Answer:

Question	Answer	Marks	Partial Marks
(a)	6500000	1	
(b)	6540	1	
(c)	34	1	
(d)(i)	16	1	
(d)(ii)	64	1	
(d)(iii)	29	1	
(e)	0.035	1	
(f)	$\frac{1}{8}$ or 0.125	1	
(g)	1	1	
(h)(i)	$2 \times 2 \times 3 \times 3 \times 5$	2	<b>B1</b> for 2, 2, 3, 3, 5 or <b>M1</b> for correct factor tree or table
Question	Answer	Marks	Partial Marks
(h)(ii)	1440	2	<b>B1</b> for 1440 <i>k</i> as final answer or <b>M1</b> for [160 =] $2 \times 2 \times 2 \times 2 \times 5$ <b>and</b> [180 =] $2 \times 2 \times 3 \times 3 \times 5$ or a list of multiples of 160 and 180 with at least the first three correct or two correct factor trees or tables or 2, 2, 2, 2, 2, 5, 3, 3 or $2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 3 \times 3$ oe
(i)	472.5    473.5	2	<b>B1</b> for each If zero scored, <b>SC1</b> for both correct but reversed

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10. 0580\_s22\_qp\_31 Q: 3

Sachin, his wife and three children go on a coach holiday.

- (a) Each adult ticket costs \$375 and each child ticket costs \$194.

Work out the total cost of the tickets.

\$ ..... [2]

- (b) A meal costs \$110 plus a service charge of 18%.

Calculate the total cost of the meal.

\$ ..... [2]

- (c) One day, the temperature at midday is  $16^{\circ}\text{C}$ .  
At midnight the temperature has fallen by  $23^{\circ}\text{C}$ .

Work out the temperature at midnight.

.....  $^{\circ}\text{C}$  [1]

- (d) Sachin spends \$768 on holiday.  
He spends  $\frac{3}{8}$  of this amount on presents.

Find how much he spends on presents.

\$ ..... [1]

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