

TOPICAL PAST PAPER QUESTIONS WORKBOOK

IGCSE International Mathematics (0607)
Paper 4

May/June 2015 – February/March 2022



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Introduction

Each topical past paper questions book consists of hundreds of questions and their answer schemes in the form of worksheets. Questions are assigned to each chapter according to their related topic. Topics, in turn, are based on the items of the latest Cambridge IGCSE or AS/A level syllabus content. This book's specifications are as follows:

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Chapter 1

Number

1. 0607_s19_qp_41 Q: 3

1 3 5 9 15 45

The list shows the six factors of 45.

This is a method for finding how many factors a number has.

- Write the number as the product of its prime factors in index form.
- Add one to each of the powers and multiply these numbers together.

For example,

$$45 = 3^2 \times 5^1$$

$$(2+1) \times (1+1) = 3 \times 2 = 6$$

So 45 has 6 factors.

(a) $24 = 2^3 \times 3^1$

By listing all the factors of 24, show that the method works for 24.

[3]

(b) Use the method to find how many factors 360 has.

..... [4]

2. 0607_m22_qp_42 Q: 2

(a) Find 12 kg as a percentage of 80 kg.

.....% [1]

(b) Find 19% of \$250.

\$ [2]

(c) Xavier invests \$500 at a rate of 1.5% per year simple interest.
At the end of y years, the value of Xavier's investment is \$612.50 .

Find the value of y .

$y =$ [3]

(d) Each year the value of a car decreases by 12% of its value at the beginning of that year. The original value of the car is \$20 000.

(i) Calculate the value of the car at the end of 3 years.
Give your answer correct to the nearest dollar.

\$ [3]

(ii) Find the number of complete years for the value of \$20 000 to decrease until it is first below \$1000.

..... [4]

(e) Each year the value of another car decreases by $r\%$ of its value at the beginning of that year. At the end of 10 years, the value has decreased from \$12 000 to \$4673.

Find the value of r .

$r =$ [3]

3. 0607_s21_qp_41 Q: 6

Piero invests \$5000 in Bank *A* and \$5000 in Bank *B*.

(a) Bank *A* pays simple interest at a rate of 6.5% each year.

(i) Find the total amount Piero has in Bank *A* at the end of 4 years.

\$ [3]

(ii) Find the number of complete years it takes for the total amount that Piero has in Bank *A* to be greater than \$10 000.

..... [3]

(b) Bank *B* pays compound interest at a rate of 4% each year.

(i) Find the total amount Piero has in Bank *B* at the end of 4 years.

\$ [2]

- (ii) Find the number of complete years it takes for the total amount that Piero has in Bank B to be greater than \$10 000.

..... [4]

- (c) By sketching suitable graphs, find the number of complete years it takes for the total amount that Piero has in Bank B to be greater than the total amount in Bank A .

..... [4]

4. 0607_s21_qp_42 Q: 1

Ernst makes chairs.

- (a) The total cost of making a chair is \$250.

Total cost = cost of materials + \$26 for each hour worked
--

Ernst works for $6\frac{1}{2}$ hours to make a chair.

Calculate the cost of the materials as a percentage of the total cost of \$250.

..... % [3]

- (b) Ernst sells the chairs to a shop.

The shop makes 24% profit when they sell a chair for \$396.80 .

Calculate the amount the shop pays Ernst for a chair.

\$ [2]

- (c) In a sale the shop reduces the price, \$396.80, of each chair by 3% each day until it is sold.

Find the number of days until the price first goes below \$200.

..... [4]

5. 0607_s21_qp_43 Q: 2

(a) Increase \$55 by 250%.

\$ [2]

(b) (i) Beatrice invests \$500 at a rate of 1.5% per year simple interest.

Find the amount Beatrice has at the end of 12 years.

\$ [3]

(ii) Dan invests \$500 at a rate of 1.5% per year compound interest.

Find the difference between Dan's amount and Beatrice's amount at the end of 12 years.

\$ [3]

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

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

..... [4]

- (d) Each year the value of Fred's car reduces by 15% of its value at the start of that year.
The value of the car is now \$5158.65 .

Find the value of Fred's car 3 years ago.

\$ [3]

6. 0607_w21_qp_41 Q: 1

Amir, Bibi and Caitlyn are each given \$1500 to invest.

- (a) Amir invests his \$1500 in an account which pays compound interest. The interest rate is 3% per year for 5 years, after which it is 2% per year.

Find the value of Amir's investment at the end of 11 years.

\$ [3]

- (b) Bibi invests her \$1500 in an account which pays $r\%$ per year **simple** interest. At the end of 11 years, the investment is worth \$1962.

Calculate the value of r .

$r =$ [3]

- (c) Caitlyn invests her \$1500 in an account which pays $t\%$ per year **compound** interest. At the end of 11 years, the investment is worth \$1968.13 .

Calculate the value of t .

$t =$ [3]

7. 0607_w21_qp_42 Q: 1

(a) Stella and Tomas share \$200 in the ratio 11 : 14.

(i) Show that Stella receives \$88.

[1]

(ii) Stella invests her \$88 at a rate of 1.5% per year simple interest.

Calculate the amount of interest Stella has at the end of 6 years.

\$ [2]

(b) Urs buys some clothes in a sale.

(i) He buys a jacket for \$22.
The original price of the jacket was \$25.

Calculate the percentage reduction in the price of the jacket.

..... % [3]

(ii) Urs buys a shirt for \$13.50 .
This is the price after a reduction of 10% of the original price.

Calculate the original price of the shirt.

\$ [2]

Appendix A

Answers

1. 0607_s19_ms_41 Q: 3

Question	Answer	Marks	Partial Marks
(a)	1, 2, 3, 4, 6, 8, 12, 24	B2	B1 for 7 correct and 1 incorrect or 6 or 7 correct and none incorrect or 8 correct and 1 extra
	$(3 + 1) \times (1 + 1) = 8$	B1	soi by $4 \times 2 = 8$

Question	Answer	Marks	Partial Marks
(b)	$360 = 2^3 \times 3^2 \times 5$	B2	M1 for two steps in a factor ladder or tree oe or listing all factors of 360 with no extras or omissions.
	$(3 + 1) \times (2 + 1) \times (1 + 1)$	M1	soi by $4 \times 3 \times 2$ FT dep on factors being prime
	24	B1	


2. 0607_m22_ms_42 Q: 2

Question	Answer	Marks	Partial Marks
(a)	15	1	
(b)	47.5[0]	2	M1 for $\frac{19}{100} \times 250$ oe
(c)	15	3	M2 for $500 + \frac{500 \times 1.5 \times y}{100} = 612.50$ oe or M1 for $\frac{500 \times 1.5 \times y}{100}$ oe or for one year's interest = 7.5[0]
(d)(i)	13629 cao	3	B2 for 13630 or 13629. ... or M1 for $20000 \times \left(1 - \frac{12}{100}\right)^3$ oe

Question	Answer	Marks	Partial Marks
(d)(ii)	24 nfwv	4	<p>B3 for 23.4 or 23.43...</p> <p>OR</p> <p>M3 $y \log\left(1 - \frac{12}{100}\right) = \log\left(\frac{1000}{20000}\right)$ oe</p> <p>or correct trials reaching 23 and 24 or good sketch indicating value between 23 and 24</p> <p>or M2 for $\left(1 - \frac{12}{100}\right)^y = \frac{1000}{20000}$ oe</p> <p>or at least 3 correct trials</p> <p>or suitable graph with $y > 1$</p> <p>or M1 for $20000 \times \left(1 - \frac{12}{100}\right)^y = 1000$ oe soi by at least 2 correct trials with $n > 3$</p>
(e)	9[.00] or 8.999 to 9.000...	3	<p>M2 for $\sqrt[10]{\frac{4673}{12000}}$</p> <p>or M1 for $12000 \times (\dots)^{10} = 4673$</p>

3. 0607_s21_ms_41 Q: 6

Question	Answer	Marks	Partial Marks
(a)(i)	6300	3	<p>M2 for $5000 + 5000 \times 6.5 \times 4 \div 100$ oe</p> <p>or M1 for $5000 \times 6.5 \times 4 \div 100$ oe implied by 1300</p>

Question	Answer	Marks	Partial Marks
(a)(ii)	16	3	B2 for 15.4 or 15.38... or M2 for $\frac{5000 \times 100}{5000 \times 6.5}$ oe or M1 for $\frac{5000 \times 6.5 \times n}{100}$ oe
(b)(i)	5849.29 or 5850	2	M1 for $5000 \times \left(1 + \frac{4}{100}\right)^4$ oe
(b)(ii)	18	4	B3 for 17.7 or 17.67... as answer or M3 for $\log \frac{10000}{5000} = n \log \left(1 + \frac{4}{100}\right)$ oe or correct trials including 17 and 18 or good sketch indicating value between 17 and 18 or M2 for $\frac{10000}{5000} = \left(1 + \frac{4}{100}\right)^n$ oe or at least 3 correct trials with $n > 4$ or sketch that could lead to solution or M1 for $10000 = 5000 \times \left(1 + \frac{4}{100}\right)$ oe or at least 2 trials with $n > 4$ or suitable graph
(c)	Correct sketch 	M3	M2 for suitable graphs, e.g. $y = 1.4^x$ and $y = 1 + 0.065x$ or M1 for one suitable graph, e.g. $y = 1.04x$ or $y = 1 + 0.0656x$
	24	B1	

4. 0607_s21_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	32.4	3	M2 for $\frac{250 - 6.5 \times 26}{250} [\times 100]$ oe or $\frac{6.5 \times 26}{250} \times 100$ or M1 for $250 - 6.5 \times 26$ soi by 81 or $\frac{6.5 \times 26}{250}$
(b)	320	2	M1 for $(\dots) \times \left(1 + \frac{24}{100}\right) = 396.8$ or better
(c)	23	4	B3 for 22.49... or 22.5 or 22 as answer or M3 for $n \log \left(1 - \frac{3}{100}\right) = \log \left(\frac{200}{396.8}\right)$ oe or correct trials as far as 22 and 23 or sketch indicating value between 22 and 23 or M2 for $\left(1 - \frac{3}{100}\right)^n = \frac{200}{396.8}$ oe

5. 0607_s21_ms_43 Q: 2

Question	Answer	Marks	Partial Marks
(a)	192.5[0]	2	M1 for $55 \times \frac{250}{100}$ oe or better
(b)(i)	590	3	M2 for $500 + \frac{500 \times 1.5 \times 12}{100}$ oe or M1 for $\frac{500 \times 1.5 \times 12}{100}$
(b)(ii)	7.81	3	B2 for 597.8..... or 598 seen OR M2 for $500 \left(1 + \frac{1.5}{100}\right)^{12}$ - their (b)(i) oe or M1 for $500 \left(1 + \frac{1.5}{100}\right)^{12}$ oe

Question	Answer	Marks	Partial Marks
(c)	34	4	<p>B3 for 33.4 or 33.35... OR M3 for $n \log \left(1 + \frac{2.1}{100} \right) = \log 2$ oe or for trials reaching 33 and 34 or good sketch indicating value between 33 and 34 or M2 for $\left(1 + \frac{2.1}{100} \right)^n = 2$ oe or for at least 3 correct trials or for suitable graph or M1 for $\left(1 + \frac{2.1}{100} \right)^n$ oe soi by two trials For M2 and M1 oe includes use of a sum of money</p>
(d)	8400	3	<p>M2 for $5158.65 \div \left(\frac{100-15}{100} \right)^3$ oe or M1 for $5158.65 \div \left(\frac{100-15}{100} \right)^n$, including $n = 1$</p>

6. 0607_w21_ms_41 Q: 1

Question	Answer	Marks	Partial Marks
(a)	1958.3[0]	3	<p>M2 $1500 \left(1 + \frac{3}{100} \right)^5 \left(1 + \frac{2}{100} \right)^6$ oe or M1 for $\left(1 + \frac{3}{100} \right)^5$ or $\left(1 + \frac{2}{100} \right)^6$ oe seen</p>
(b)	2.8	3	<p>M2 for $\frac{(1962-1500)}{1500 \times 11} [\times 100]$ oe or $\left(\frac{1962}{1500} \times 100 \right) - 100$ oe or M1 for $[1500 +] \frac{1500 \times r \times 11}{100}$ or $\frac{1962}{1500} \times 100$</p>
(c)	2.5	3	<p>M2 for $\sqrt[11]{\frac{1968.13}{1500}}$ oe M1 for $1500(k)^{11} = 1968.13$</p>

7. 0607_w21_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)(i)	$\frac{11}{11+14} \times 200$ or $\frac{11}{25} \times 200$ oe	M1	
(a)(ii)	7.92	2	M1 for $\frac{88 \times 1.5 \times 6}{100}$ oe
(b)(i)	12	3	M2 for $\frac{25-22}{25}$ oe or $\frac{22}{25} \times 100$ oe or M1 for $\frac{22}{25}$
(b)(ii)	15	2	M1 for $\frac{100-10}{100} \times [\dots] = 13.50$ oe

8. 0607_w21_ms_43 Q: 5

Question	Answer	Marks	Partial Marks
(a)(i)	$\frac{200y}{x+y}$ or $200 - \frac{200x}{x+y}$	1	
(a)(ii)	7	5	M4 for $250x + 50y = 3(50x + 250y)$ oe or M3 for $\frac{250x + 50y}{50x + 250y} = 3$ oe or M2 for $250x + 50y$ or $250y + 50x$ oe or B1 for $\frac{200x}{x+y} + 50$ or $\frac{200y}{x+y} + 50$ OR M4 for $x : y = 175 : 25$ oe or M3 for $225 - 50$ or $75 - 50$ oe or M2 for $\frac{200+100}{3+1}$ oe or B1 for $200 + 100$
(b)(i)	$\frac{1000 \times 4 \times (4 + 3 + 2 + 1)}{100}$ [= 400] oe	M2	M1 for $1000 \times \frac{4}{100}$ oe or better
	$4000 + 400$ [= 4400]	A1	
(b)(ii)	4362.47	3	M2 for $1000 \times (1.035 + 1.035^2 + 1.035^3 + 1.035^4)$ oe or M1 for 1000×1.035 oe

9. 0607_s20_ms_41 Q: 7

Question	Answer	Marks	Partial Marks
(a)	100	2	M1 for $\frac{500 \times 2.5 \times 8}{100}$ oe
(b)	104 or 104.4 to 104.5	4	B3 for 604 or 604.4 to 604.5 or M2 for $500 \times \left(1 + \frac{2.4}{100}\right)^8$ oe or M1 for $500 \times \left(1 + \frac{2.4}{100}\right)^n$ with $n > 1$ oe
(c)	34	4	M3 for $[n =] \frac{\log 2}{\log(1.021)}$ oe or at least two trials with $n > 30$ or graph leading to solution oe (implied by 33.4 or 33.35...) or M2 for $1.021^n = 2$ oe or suitable graph e.g. $y = 1.021^x$ or 3 correct trials or B1 for 1.021^n oe seen
(d)	3[.00] or 2.999...	3	M2 for $\sqrt[3]{2.5}$ oe or sketch of graph leading to answer or M1 for $(\dots)^{31} = 2.5$ oe or sketch of a relevant graph

10. 0607_s20_ms_42 Q: 6

Question	Answer	Marks	Partial Marks
(a)	10 000	3	M2 for $\frac{7392}{(1-0.16)(1-0.12)}$ oe or M1 for $\div(1-0.16)$ or $\div(1-0.12)$ oe or M1 for 88% is 'equivalent' to 7392

Question	Answer	Marks	Partial Marks
(b)	5	4	<p>M3 for $[k =] \frac{\log \frac{5000}{7392}}{\log 0.92}$ oe</p> <p>or correct trials as far as 4 and 5</p> <p>or M2 for $0.92^k = \frac{5000}{7392}$ oe</p> <p>or at least 3 correct trials</p> <p>or M1 for $7392 \times 0.92^k = 5000$ oe</p>

11. 0607_s20_ms_43 Q: 3

Question	Answer	Marks	Partial Marks
(a)(i)	5500	3	<p>M2 for $5000 + \frac{5000 \times 2.5 \times 4}{100}$ oe</p> <p>or M1 for $\frac{5000 \times 2.5 \times 4}{100}$ oe</p>
(a)(i)	12	2	<p>M1 for $\frac{5000 \times 2.5 \times n}{100} = 6500 - 5000$</p> <p>oe</p>
(b)(i)	5412.16	3	<p>M2 for $5000 \times \left(1 + \frac{2}{100}\right)^4$</p> <p>or M1 for $5000 \times \left(1 + \frac{2}{100}\right)^n, n > 1$</p>
(b)(ii)	14	4	<p>M3 for $[n =] \frac{\log \left(\frac{6500}{5000}\right)}{\log 2}$ soi by 13.2</p> <p>or 13.24 to 13.25 or answer 13</p> <p>or correct trials as far as 13 and 14</p> <p>or M2 for $1.02^n = \left(\frac{6500}{5000}\right)$</p> <p>or at least 3 correct trials</p> <p>or suitable graph</p> <p>or M1 for $5000 \times 1.02^n = 6500$ soi.</p>

12. 0607_w20_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	23 500	2	M1 for $x \times \frac{100-15}{100} = 19975$ oe or better
(b)(i)	22697.5[0] final answer	3	M1 for $19975 \times \frac{10}{100}$ soi by 1997.5 M1 for 12×345 [$\times 5$]
(b)(ii)	97.62	4	M2 for $19975 \left(1 + \frac{25}{100}\right)^5$ or M1 for $19975 \left(1 + \frac{25}{100}\right)^n, n > 1$ M1 for <i>their</i> 22 697.5 – <i>their</i> 22 599.88

13. 0607_w20_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)	$\frac{560}{7} \times 4$ oe	M1	
(b)	48	2	M1 for $\frac{15}{100} \times 320$ oe
(c)	195	2	M1 for $x \times \frac{100-8}{100} = 179.40$ oe or better
(d)	$320 - \textit{their} 48 - 29.60 = 242.40$	M1	Clear working to 242.40
	$\textit{their} 240 - 179.40 = 60.60$	M1	Clear working to 60.60
	$60.60 \times 4 = 242.40$ cao	A1	Clear statement using 242.40 and 60.60

14. 0607_w20_ms_43 Q: 5

Question	Answer	Marks	Partial Marks
(a)	679.81 or 680 or 679.8...	3	M2 for $600 \left(1 + \frac{1.8}{100}\right)^7$ or M1 for $600 \left(1 + \frac{1.8}{100}\right)^k, k > 1$
(b)	4.2	4	B3 for 4.16 or 4.161 to 4.162 or B2 for $\sqrt[17]{2}$ oe or M1 for $(P) \times (\dots)^{17} = (2P)$ oe

Question	Answer	Marks	Partial Marks
(c)	6	4	<p>B3 for 5.92 or 5.924...</p> <p>OR</p> <p>M3 for $n \log \left(1 - \frac{4}{100} \right) = \log \left(\frac{2120}{2700} \right)$ oe</p> <p>or correct trials as far as 5 and 6</p> <p>or good sketch indicating value between 5 and 6</p> <p>or M2 for $\left(1 - \frac{4}{100} \right)^n = \frac{2120}{2700}$</p> <p>or at least two trials with $n > 2$</p> <p>or sketch that could lead to solution</p> <p>e.g. $y = 0.96^x$</p> <p>or M1 for $2700 \left(1 - \frac{4}{100} \right)^n = 2120$ oe</p> <p>or at least 2 correct trials</p>

15. 0607_s19_ms_41 Q: 1

Question	Answer	Marks	Partial Marks
(a)	535.5[0] final answer	2	M1 for $630 \times \left(1 - \frac{15}{100} \right)$ oe
(b)	\$1120	3	<p>M2 for $952 \div \left(1 - \frac{15}{100} \right)$ oe</p> <p>or M1 for 85% associated with 952</p>
(c)	12 nfw	4	<p>M3 for $n \log \left(1 - \frac{5}{100} \right) = \log \left(\frac{\frac{1}{2}(630)}{\text{their}535.50} \right)$</p> <p>oe soi by 10.3 or 10.4 or 10.34 to 10.36...</p> <p>or correct trials as far as 10 and 11</p> <p>or suitable sketch(es) e.g. $y = 535.5 \times 0.95^x$</p> <p>and $y = 315$</p> <p>or M2 for $\left(1 - \frac{5}{100} \right)^n = \left(\frac{\frac{1}{2}(630)}{\text{their}535.50} \right)$ oe</p> <p>or at least 3 correct trials</p> <p>or final answer 11 nfw</p> <p>or M1 for $\text{their} 535.5 \times \left(1 - \frac{5}{100} \right)^n = \frac{1}{2}(630)$</p> <p>soi oe</p>

16. 0607_s19_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	$\frac{11}{11+14} \times 50$ or $\frac{11}{25} \times 50$ oe	M1	
(b)	16 : 22 oe isw	2	M1 for 22 – 6 and 50 – 22 – 6 oe If 0 scored, SC1 for 22 : 16 oe
(c)	8.5[0]	1	
(d)(i)	5.4[0]	2	M1 for 0.9×6 oe
(d)(ii)	4.1[0] nfwf	3	M2 for $\frac{3.69}{0.9}$ oe or M1 for associating 3.69 with 90%

17. 0607_s19_ms_42 Q: 5

Question	Answer	Marks	Partial Marks
(a)	224	3	M2 for $200 + \frac{200 \times 1.5 \times 8}{100}$ oe or M1 for $\frac{200 \times 1.5 \times 8}{100}$ oe implied by 24
(b)	223.53	3	M2 for $200 \times \left(1 + \frac{1.4}{100}\right)^8$ oe M1 for $200 \times \left(1 + \frac{1.4}{100}\right)^k$ oe k integer > 1 If 0 scored, SC1 for 23.5 or 23.52 to 23.53
(c)	3 nfwf cao	2	M1 for trials with 1.5% and 1.4% beyond <i>their</i> 224 and <i>their</i> 223.53 respectively, implied by 11, or appropriate equation or graph sketch implied by 10.79..., 2.79...