Topical Past Paper Questions Workbook

IGCSE Mathematics (0580) Paper 4

[Extended]

Exam Series: May/June 2012 – Oct/Nov 2022

Format Type A:
Answers to all questions are provided as an appendix

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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 workbooks:

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 4 Topical Past Paper Questions Workbook
- Subtitle: Exam Practice Worksheets With Answer Scheme
- Examination board: Cambridge Assessment International Education (CAIE)
- Subject code: 0580
- Years covered: May/June 2012 – Oct/Nov 2022
- Paper: 4
- Number of pages: 1717
- Number of questions: 744

Contents

Chapter 1

Numbers

1. 0580_m22_qp_42 Q: 1

A company employed 300 workers when it started and now employs 852 workers.

(a) Calculate the percentage increase in the number of workers.

..... % [2]

(b) Of the 852 workers, the ratio part-time workers : full-time workers = 5 : 7.

Calculate the number of full-time workers.

..... [2]

(c) The company makes 40 600 headphones in one year.

Write this number

(i) in words,

..... [1]

(ii) in standard form.

..... [1]

(d) In one month, the company sells 3 000 headphones.
Of these, 48% are exported, $\frac{3}{8}$ are sold to shops and the rest are sold online.

Calculate the number of headphones that are sold online.

..... [3]

(e) One year, sales increased by 15%.
The following year sales increased by 18%.

Calculate the overall percentage increase in sales.

..... % [3]

2. 0580_s22_qp_41 Q: 2

(a) Alex, Bobbie and Chris share strawberries in the ratio Alex : Bobbie : Chris = 3 : 2 : 2.
Chris receives 12 strawberries.

Calculate the total number of strawberries shared.

..... [2]

(b) In a sale, a shop reduces all prices by 12%.

(i) Dina buys a book which has an original price of $6.50 .

Calculate how much Dina pays for the book.

$ ..... [2]

(ii) Elu pays $11 for a toy.

Calculate the original price of the toy.

$ ..... [2]

(c) Feri invests some money.
The rate of interest for the first year is 2.5%.
At the end of the second year the overall percentage increase of Feri's investment is 6.6%.

Find the rate of interest for the second year.

..... % [2]

(d) A radioactive substance decays at an exponential rate of 2% per day.
The initial mass is 80 g.

(i) Find the mass at the end of 5 days.

..... g [2]

(ii) Find how many **more** whole days, after day 5, it takes for the mass to reduce to less than 67 g.

..... [3]

3. 0580_s22_qp_42 Q: 1

(a) Find the lowest common multiple (LCM) of 30 and 75.

..... [2]

(b) Share \$608 in the ratio 4 : 5 : 7.

\$ .....

\$ .....

\$ ..... [3]

(c) Work out $\frac{6.39 \times 10^4}{2.45 \times 10^6}$.

Give your answer in standard form.

..... [2]

(d) Write $0.\dot{2}\dot{7}$ as a fraction.

..... [1]

(e) A stone has volume $45\,cm^3$ and mass 126 g.
Find the density of the stone, giving the units of your answer.

[Density = mass ÷ volume]

.... [2]

4. 0580_s22_qp_43 Q: 1

Here is part of a bus timetable.

Abbots	06 50	08 25	09 20
Callet	07 12	08 47	09 42
North Moor	07 30	09 05	10 00
South Moor	07 37	09 12	10 07
Centre Point	08 00	09 35	10 30

(a) Rashid catches the 09 20 bus at Abbots.

Find the time the bus arrives at South Moor.

..... [1]

(b) Annisa leaves home at 8.27 am and takes 25 minutes to walk to the bus stop at Callet.
She catches the next bus to Centre Point.

Find the total time, in minutes, for her journey from leaving home to arriving at Centre Point.

..... min [2]

(c) The distance from Abbots to Centre Point is 29.4 km.
Each bus takes the same time for the journey.

Calculate the average speed of a bus for this journey.
Give your answer in kilometres per hour.

..... km/h [2]

(d) On one journey, all 56 seats on the bus are filled.
The ratio of adults to children on this journey is adults : children = 5 : 3.
The cost for an adult ticket is \$2.80 .
The cost for a child ticket is $\frac{3}{4}$ of the adult cost.

Work out the total cost of the tickets for this journey.

\$ ..... [4]

5. 0580_w22_qp_41 Q: 2

(a) Write

(i) 2994.99 correct to the nearest 10,

..... [1]

(ii) 0.983 correct to 1 decimal place,

..... [1]

(iii) 2090 correct to 2 significant figures.

..... [1]

(b) Write down a prime number between 90 and 100.

..... [1]

(c) Write 2^{-6} as a fraction.

..... [1]

(d) Write 0.007 01 in standard form.

..... [1]

(e) Simplify $1.5 \times 10^{x} + 1.5 \times 10^{x-1}$ giving your answer in standard form.

..... [2]

(f) Write $0.3\dot{7}$ as a fraction.
You must show all your working.

..... [2]

6. 0580_w22_qp_41 Q: 4

(a) (i) Zak invests $500 at a rate of 2% per year simple interest.

Calculate the value of Zak's investment at the end of 5 years.

$ ..... [3]

(ii) Yasmin invests $500 at a rate of 1.8% per year compound interest.

Calculate the value of Yasmin's investment at the end of 5 years.

$ ..... [2]

(iii) Zak and Yasmin continue with these investments.

How many **more complete** years is it before the value of Yasmin's investment is greater than the value of Zak's investment?

..... [3]

(b) Xavier buys a car for \$2500.
The value of the car decreases exponentially at a rate of 10% each year.

Calculate the value of Xavier's car at the end of 5 years.
Give your answer correct to the nearest dollar.

\$ ..... [3]

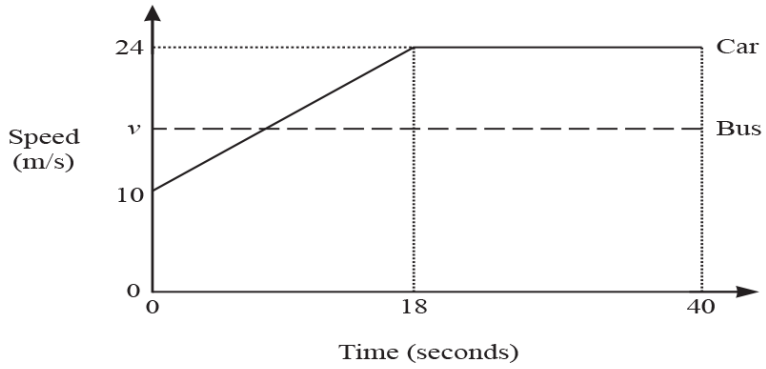
(c) The number of a certain type of bacteria increases exponentially at a rate of r% each day.
After 22 days, the number of this bacteria has doubled.

Find the value of r.

$r =$ ..... [3]

7. 0580_w22_qp_42 Q: 5

(a) The diagram shows the speed–time graph for part of a journey for two vehicles, a car and a bus.



(i) Calculate the acceleration of the car during the first 18 seconds.

..... m/s^2 [1]

(ii) In the first 40 seconds the car travelled 134 m more than the bus.

Calculate the constant speed, v, of the bus.

v = ... m/s [4]

(b) A train takes 10 minutes 30 seconds to travel 16 240 m.

Calculate the average speed of the train.
Give your answer in kilometres per hour.

..... km/h [3]

8. 0580_w22_qp_43 Q: 1

(a) Here are the ingredients needed to make a pasta bake to serve 12 people.

250 g butter
600 g pasta
460 g mushrooms
280 g cheese
800 ml milk

(i) Find the mass of the cheese as a percentage of the mass of the mushrooms.

..... % [1]

(ii) Find the mass of butter needed to make a pasta bake to serve 18 people.

..... g [2]

(iii) Monica has 2.2 litres of milk and 1.5 kg of each other ingredient.

Calculate the greatest number of people she can serve with pasta bake.

..... [3]

(b) In 2019, a packet of pasta cost \$2.40 .
This was an increase of 25% of the cost of a packet in 2018.

(i) Work out the cost in 2018.

\$ ..... [2]

(ii) In 2020, the cost of a packet increased by 15% from the cost in 2019.

Work out the total percentage increase in the cost of a packet from 2018 to 2020.

..... % [3]

(c)

Pasta is sold in packets with width 11.5 cm, correct to the nearest 0.5 cm.
A shop places these packets in a single line on a shelf of length 2 m, correct to the nearest 0.1 m.

Find the maximum number of these packets that will fit along this shelf.
You must show all your working.

..... [3]

9. 0580_m21_qp_42 Q: 1

Painter	Plumber	Electrician
$35 per hour	Fixed charge $40 plus $26.50 per hour	$48 per hour for the first 2 hours then $32 per hour

These are the rates charged by a painter, a plumber and an electrician who do some work for Mr Sharma.

(a) The painter works for 7 hours.

Calculate the amount Mr Sharma pays the painter.

$ ..... [1]

(b) Mr Sharma pays the plumber $252.

Calculate how many hours the plumber works.

..... hours [2]

(c) Mr Sharma pays the electrician $224.

Calculate how many hours the electrician works.

..... hours [2]

(d) Write down the ratio of the amount Mr Sharma pays to the painter, the plumber and the electrician. Give your answer in its lowest terms.

painter : plumber : electrician = ... : ..... : ..... [2]

10. 0580_m21_qp_42 Q: 10

(a) A box is a cuboid with length 45 cm, width 30 cm and height 42 cm.
The box is completely filled with 90.72 kg of sand.

Calculate the density of this sand in kg/m^3.
[Density = mass ÷ volume]

..... kg/m^3 [3]

(b) A bag contains 15 000 cm^3 of sand.
Some of this sand is used to completely fill a hole in the shape of a cylinder.
The hole is 30 cm deep and has radius 10 cm.

Calculate the percentage of the sand from the bag that is used.

..... % [3]

(c) Sand costs $98.90 per tonne.
This cost includes a tax of 15%.

Calculate the amount of tax paid per tonne of sand.

$ ..... [3]

(d) Raj buys some sand for 3540 rupees.

Calculate the cost in dollars when the exchange rate is $1 = 70.8 rupees.

$ ..... [2]

11. 0580_s21_qp_41 Q: 1

(a) The total cost of a taxi journey is calculated as

- \$0.50 per kilometre

plus

- \$0.40 per minute.

(i) Calculate the total cost of a journey of 32 km that takes 30 minutes.

\$ ..... [2]

(ii) The total cost of a journey of 100 km is \$98.

Show that the time taken is 2 hours.

[3]

(b) Three taxi drivers travel a total of 8190 km in the ratio 5 : 2 : 7.

Calculate the distance each driver travels.

Driver 1 ..... km

Driver 2 ..... km

Driver 3 ..... km [3]

(c) After midnight, the cost of any taxi journey increases by 45%.
One journey costs \$84.10 after midnight.

Calculate the cost of the same journey before midnight.

\$ ..... [2]

12. 0580_s21_qp_41 Q: 4

(a) The exchange rate is 1 euro = \$1.142 .

(i) Johann changes \$500 into euros.

Calculate the number of euros Johann receives.
Give your answer correct to the nearest euro.

..... euros [2]

(ii) Johann buys a computer for \$329.
The same computer costs 275 euros.

Calculate the difference in cost in dollars.

\$ ..... [2]

(b) Lucy spends $\frac{3}{8}$ of the money she has saved this month on a book that costs \$5.25 .

Calculate how much money Lucy has saved this month.

\$ ..... [2]

(c) Kamal invests \$6130 at a rate of r% per year compound interest.
The value of his investment at the end of 5 years is \$6669.

Calculate the value of r.

$r =$ ..... [3]

13. 0580_s21_qp_42 Q: 1

(a) A 2.5-litre tin of paint costs $13.50 .
In a sale, the cost is reduced by 14%.

(i) Work out the sale price of this tin of paint.

$ ..... [2]

(ii) Work out the cost of buying 42.5 litres of paint at this sale price.

$ ..... [2]

(b) Henri buys some paint in the ratio red paint : white paint : green paint = 2 : 8 : 5.

(i) Find the percentage of this paint that is white.

..... % [1]

(ii) Henri buys a total of 22.5 litres of paint.

Find the number of litres of green paint he buys.

..... litres [2]

(c) Maria paints a rectangular wall.
The length of the wall is 20.5 m and the height is 2.4 m, both correct to 1 decimal place.

One litre of paint covers an area of exactly $10\,m^2$.

Calculate the smallest number of 2.5-litre tins of paint she will need to be sure all the wall is painted.
Show all your working.

..... [4]

14. 0580_s21_qp_43 Q: 1

(a) (i) Yasmin and Zak share an amount of money in the ratio 21 : 19.
Yasmin receives \$6 more than Zak.

Calculate the total amount of money shared by Yasmin and Zak.

\$ ..... [2]

(ii) In a sale, all prices are reduced by 15%.

(a) Yasmin buys a blouse with an original price of \$40.

Calculate the sale price of the blouse.

\$ ..... [2]

(b) Zak buys a shirt with a sale price of \$29.75 .

Calculate the original price of the shirt.

\$ ..... [2]

(b) Xavier's salary increases by 2% each year.
In 2010, his salary was \$40 100.

(i) Calculate his salary in 2015.
Give your answer correct to the nearest dollar.

\$ ..... [3]

(ii) In which year is Xavier's salary first greater than \$47 500?

..... [3]

(c) In January 2020, the population of a town was 5% **more** than its population in January 2018.
In January 2021, the population of this town was 2% **less** than its population in January 2020.

Calculate the overall percentage increase in the population from January 2018 to January 2021.

..... % [2]

15. 0580_m20_qp_42 Q: 1

Dhanu has a model railway.

(a) He has a train that consists of a locomotive and 4 coaches.
The mass of the locomotive is 87 g and the mass of each coach is 52 g.

(i) Work out the total mass of the train.

..... g [2]

(ii) Work out the mass of the locomotive as a percentage of the total mass of the train.

..... % [1]

(b) The train is 61 cm long and travels at a speed of 18 cm/s.
It takes 4 seconds for the whole of the train to cross a bridge.

Calculate the length of the bridge.

..... cm [2]

(c) A new locomotive costs \$64.

Calculate the cost of the locomotive in rupees when the exchange rate is 1 rupee = \$0.0154 .
Give your answer correct to the nearest 10 rupees.

..... rupees [2]

(d) The cost of a railway magazine increases by 12.5% to \$2.70 .

Calculate the cost of the magazine before this increase.

\$ ..... [2]

(e) Dhanu plays with his model railway from 06 50 to 11 15.
He then rides his bicycle for 3 hours.

Find the ratio time playing with model railway : time riding bicycle.
Give your answer in its simplest form.

..... : ..... [3]

(f) The value of Dhanu's model railway is \$550.
This value increases exponentially at a rate of r% per year.
At the end of 5 years the value will be \$736.

Calculate the value of r.

$r =$ ..... [3]

16. 0580_p20_qp_40 Q: 1

(a) Kristian and Stephanie share some money in the ratio 3 : 2.
Kristian receives \$72.

(i) Work out how much Stephanie receives.

\$ ..... [2]

(ii) Kristian spends 45% of his \$72 on a computer game.

Calculate the price of the computer game.

\$ ..... [1]

(iii) Kristian also buys a meal for \$8.40 .

Calculate the fraction of the \$72 Kristian has left after buying the computer game and the meal.
Give your answer in its lowest terms.

..... [2]

(iv) Stephanie buys a book in a sale for \$19.20 .
This sale price is after a reduction of 20%.

Calculate the original price of the book.

\$ ..... [3]

(b) Boris invests \$550 at a rate of 2% per year simple interest.

Calculate the value of the investment at the end of 10 years.

\$ ..... [3]

(c) Marlene invests \$550 at a rate of 1.9% per year compound interest.

Calculate the value of the investment at the end of 10 years.

\$ ..... [2]

(d) Hans invests \$550 at a rate of x% per year compound interest.
At the end of 10 years, the value of the investment is \$638.30, correct to the nearest cent.

Find the value of x.

$x =$ ..... [3]

17. 0580_s20_qp_41 Q: 1

(a) In 2018, Gretal earned $32 000.

(i) She paid tax of 24% on these earnings.

Work out the amount she paid in tax in 2018.

$ ..... [2]

(ii) In 2019, Gretal's earnings increased by 7%.

Work out her earnings in 2019.

$ ..... [2]

(b) Gretal invests $5000 at a rate of 2% per year compound interest.

Calculate the value of her investment at the end of 3 years.

$ ..... [2]

(c) One month, Gretal spent a total of $360 on presents.
She spent $\frac{1}{5}$ of this total on presents for her parents.
She spent $\frac{2}{3}$ of the remaining money on presents for her friends.
She spent the rest of the money on presents for her sisters.

Calculate the percentage of the $360 that she spent on presents for her sisters.

..... % [4]

(d) Arjun earned \$36 515 in 2019.
This was an increase of 9% on his earnings in 2018.

Work out his earnings in 2018.

\$ ..... [2]

(e) Arjun and Gretal each pay rent.

In 2018, the ratio of the amount each paid in rent was Arjun : Gretal = 5 : 7.
In 2019, the ratio of the amount each paid in rent was Arjun : Gretal = 9 : 13.

Arjun paid the same amount of rent in both 2018 and 2019.
Gretal paid \$290 more rent in 2019 than she did in 2018.

Work out the amount Arjun paid in rent in 2019.

\$ ..... [4]

18. 0580_s20_qp_41 Q: 5

x is an integer.

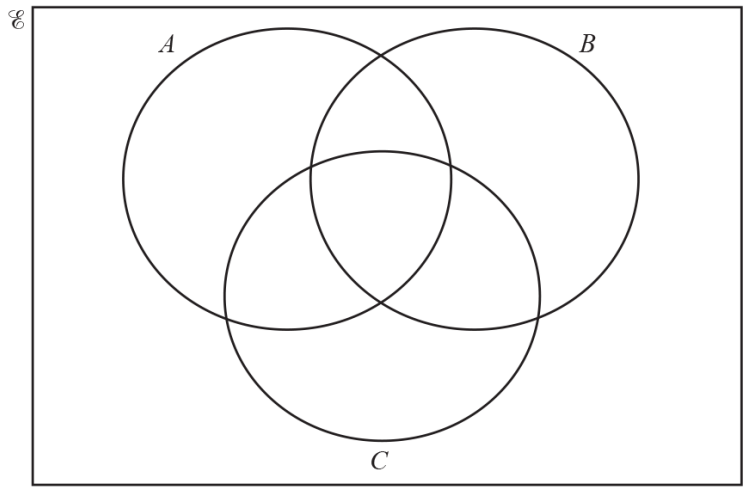
$\mathscr{E} = \{x : 41 \leqslant x \leqslant 50\}$

$A = \{x : x \text{ is an odd number}\}$

$B = \{x : x \text{ is a multiple of } 3\}$

$C = \{x : x \text{ is a prime number}\}$

(a) Complete the Venn diagram to show this information.



[3]

(b) List the elements of

(i) $A \cap C$,

..... [1]

(ii) $(B \cup C)'$.

..... [1]

(c) Find $\text{n}(A \cap B \cap C)$.

..... [1]

19. 0580_s20_qp_42 Q: 1

(a) **(i)** Divide \$24 in the ratio 7 : 5.

\$ ..... , \$ ..... [2]

(ii) Write \$24.60 as a fraction of \$2870.
Give your answer in its lowest terms.

..... [2]

(iii) Write \$1.92 as a percentage of \$1.60 .

..... % [1]

(b) In a sale the original prices are reduced by 15%.

(i) Calculate the sale price of a book that has an original price of \$12.

\$ ..... [2]

(ii) Calculate the original price of a jacket that has a sale price of \$38.25 .

\$ ..... [2]

(c) (i) Dean invests \$500 for 10 years at a rate of 1.7% per year simple interest.

Calculate the total interest earned during the 10 years.

\$ ..... [2]

(ii) Ollie invests \$200 at a rate of 0.0035% **per day** compound interest.

Calculate the value of Ollie's investment at the end of 1 year.
[1 year = 365 days.]

\$ ..... [2]

(iii) Edna invests \$500 at a rate of r% per year compound interest.
At the end of 6 years, the value of Edna's investment is \$559.78 .

Find the value of r.

$r =$ ..... [3]

20. 0580_s20_qp_43 Q: 1

(a)

Campsite fees (per day)	
Tent	$15.00
Caravan	$25.00

The sign shows the fees charged at a campsite.
Today there are 54 tents and 18 caravans on the site.

Calculate the fees charged today.

$ ..... [2]

(b) In September the total income at the campsite was $37 054.
This was a decrease of 4.5% on the total income in August.

Calculate the total income in August.

$ ..... [2]

(c) The visitors to the campsite today are in the ratio

men : women = 5 : 4 and women : children = 3 : 7.

(i) Calculate the ratio men : women : children in its simplest form.

..... : ..... : ..... [2]

(ii) Today there are 224 children at the campsite.

Calculate the total number of men and women.

..... [3]

(d) The space allowed for each tent is a rectangle measuring 8 m by 6 m, each correct to the nearest metre.

Calculate the upper bound for the area of the space allowed for each tent.

..... m^2 [2]

(e) The value of the campsite has increased exponentially by 1.5% every year since it opened 30 years ago.

Calculate the value of the campsite now as a percentage of its value 30 years ago.

..... % [2]

21. 0580_w20_qp_41 Q: 2

(a) A plane has 14 First Class seats, 70 Premium seats and 168 Economy seats.

Find the ratio First Class seats : Premium seats : Economy seats.
Give your answer in its simplest form.

..... : ..... : ..... [2]

(b) **(i)** For a morning flight, the costs of tickets are in the ratio

First Class : Premium : Economy = 14 : 6 : 5.

The cost of a Premium ticket is $114.

Calculate the cost of a First Class ticket and the cost of an Economy ticket.

First Class $ .....

Economy $ ..... [3]

(ii) For an afternoon flight, the cost of a Premium ticket is reduced from $114 to $96.90 .

Calculate the percentage reduction in the cost of a ticket.

..... % [2]

(c) When the local time in Athens is 09 00, the local time in Berlin is 08 00.
A plane leaves Athens at 13 15.
It arrives in Berlin at 15 05 local time.

(i) Find the flight time from Athens to Berlin.

..... h ..... min [1]

(ii) The distance the plane flies from Athens to Berlin is 1802 km.

Calculate the average speed of the plane.
Give your answer in kilometres per hour.

..... km/h [2]

22. 0580_w20_qp_42 Q: 1

Karel travelled from London to Johannesburg and then from Johannesburg to Windhoek.

(a) The flight from London to Johannesburg took 11 hours 10 minutes.
The average speed was 813 km/h.

Calculate the distance travelled from London to Johannesburg.
Give your answer correct to the nearest 10 km.

..... km [3]

(b) The total time for Karel's journey from London to Windhoek was 15 hours 42 minutes.
The total distance travelled from London to Windhoek was 10 260 km.

(i) Calculate the average speed for this journey.

..... km/h [2]

(ii) The cost of Karel's journey from London to Windhoek was $470.

(a) Calculate the distance travelled per dollar.

..... km per dollar [1]

(b) Calculate the cost per 100 km of this journey.
Give your answer correct to the nearest cent.

$ ..... per 100 km [2]

(c) Karel changed $300 into 3891 Namibian dollars.

Complete the statement.

$1 = ... Namibian dollars [1]

23. 0580_w20_qp_42 Q: 3

(a) Beth invests \$2000 at a rate of 2% per year compound interest.

(i) Calculate the value of this investment at the end of 5 years.

\$ ..... [2]

(ii) Calculate the overall percentage increase in the value of Beth's investment at the end of 5 years.

..... % [2]

(iii) Calculate the minimum number of complete years it takes for the value of Beth's investment to increase from \$2000 to more than \$2500.

..... [3]

(b) The population of a village decreases exponentially at a rate of 4% each year.
The population is now 255.

Calculate the population 16 years ago.

..... [3]

24. 0580_w20_qp_43 Q: 1

(a) The Earth has a surface area of approximately 510 100 000 km^2.

(i) Write this surface area in standard form.

..... km^2 [1]

(ii) Water covers 70.8% of the Earth's surface.

Work out the area of the Earth's surface covered by water.

..... km^2 [2]

(b) The table shows the surface area of some countries and their estimated population in 2017.

Country	Surface area (km^2)	Estimated population in 2017
Brunei	5.77×10^3	433 100
China	9.60×10^6	1 388 000 000
France	6.41×10^5	67 000 000
Maldives	3.00×10^2	374 600

(i) Find the total surface area of Brunei and the Maldives.

..... km^2 [1]

(ii) The ratio surface area of the Maldives : surface area of China can be written in the form 1 : n.

Find the value of n.

n = ... [2]

(iii) Find the surface area of France as a percentage of the surface area of China.

..... % [2]

(iv) Find the population density of the Maldives.
[Population density = population ÷ surface area]

..... people/km^2 [2]

(c) The population of the Earth in 2017 was estimated to be 7.53×10^9.

The population of the Earth in 2000 was estimated to be 6.02×10^9.

(i) Work out the percentage increase in the Earth's estimated population from 2000 to 2017.

..... % [2]

(ii) Assume that the population of the Earth increased exponentially by y% each year for these 17 years.

Find the value of y.

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

25. 0580_m19_qp_42 Q: 1

Amol and Priya deliver 645 parcels in the ratio Amol : Priya = 11 : 4.

(a) Calculate the number of parcels Amol delivers.

..... [2]

(b) Amol drives his truck at an average speed of 50 km/h.
He leaves at 0700 and arrives at 1115.

Calculate the distance he drives.

..... km [2]

(c) Priya drives her van a distance of 54 km.
She leaves at 1055 and arrives at 1238.

Calculate her average speed.

..... km/h [3]

(d) Priya has 50 identical parcels.
Each parcel has a mass of 17 kg, correct to the nearest kilogram.

Find the upper bound for the total mass of the 50 parcels.

..... kg [1]

(e) 67 of the 645 parcels are damaged on the journey.

Calculate the percentage of parcels that are damaged.

..... % [1]

(f) **(i)** 29 parcels each have a value of \$68.

By writing each of these numbers correct to 1 significant figure, find an estimate for the total value of these 29 parcels.

\$ ..... [1]

(ii) Without doing any calculation, complete this statement.

The actual total value of these 29 parcels is less than the answer to **part (f)(i)**

because ..... [1]

26. 0580_s19_qp_41 Q: 8

(a) The price of a book increases from \$2.50 to \$2.65 .

Calculate the percentage increase.

..... % [3]

(b) Scott invests \$500 for 7 years at a rate of 1.5% per year simple interest.

Calculate the value of his investment at the end of the 7 years.

\$..... [3]

(c) In a city the population is increasing exponentially at a rate of 1.6% per year.

Find the overall percentage increase at the end of 20 years.

..... % [2]

(d) The population of a village is 6400.
The population is decreasing exponentially at a rate of r% per year.
After 22 years, the population will be 2607.

Find the value of r.

r = ... [3]

27. 0580_s19_qp_41 Q: 11

Brad travelled from his home in New York to Chamonix.

- He left his home at 16 30 and travelled by taxi to the airport in New York.
  This journey took 55 minutes and had an average speed of 18 km/h.

- He then travelled by plane to Geneva, departing from New York at 22 15.
  The flight path can be taken as an arc of a circle of radius 6400 km with a sector angle of 55.5°.
  The local time in Geneva is 6 hours ahead of the local time in New York.
  Brad arrived in Geneva at 11 25 the next day.

- To complete his journey, Brad travelled by bus from Geneva to Chamonix.
  This journey started at 13 00 and took 1 hour 36 minutes.
  The average speed was 65 km/h.
  The local time in Chamonix is the same as the local time in Geneva.

Find the overall average speed of Brad's journey from his home in New York to Chamonix.
Show all your working and give your answer in km/h.

..... km/h [11]

28. 0580_s19_qp_42 Q: 1

(a) The price of a newspaper increased from \$0.97 to \$1.13 .

Calculate the percentage increase.

..... % [3]

(b) One day, the newspaper had 60 pages of news and advertisements.
The ratio number of pages of news : number of pages of advertisements = 5 : 7.

(i) Calculate the number of pages of advertisements.

..... [2]

(ii) Write the number of pages of advertisements as a percentage of the number of pages of news.

..... % [1]

(c) On holiday Maria paid 2.25 euros for the newspaper when the exchange rate was \$1 = 0.9416 euros.
At home Maria paid \$1.13 for the newspaper.

Calculate the difference in price.
Give your answer in dollars, correct to the nearest cent.

\$ ..... [3]

(d) The number of newspapers sold decreases exponentially by x% each year.
Over a period of 21 years the number of newspapers sold decreases from 1 763 000 to 58 000.

Calculate the value of x.

$x =$ ..... [3]

(e) Every page of the newspaper is a rectangle measuring 43 cm by 28 cm, both correct to the nearest centimetre.

Calculate the upper bound of the area of a page.

..... cm^2 [2]

29. 0580_s19_qp_43 Q: 1

Here is part of a train timetable for a journey from London to Marseille.
All times given are in local time.
The local time in Marseille is 1 hour ahead of the local time in London.

London	0719
Ashford	0755
Lyon	1300
Avignon	1408
Marseille	1446

(a) (i) Work out the total journey time from London to Marseille.
Give your answer in hours and minutes.

..... h ..... min [2]

(ii) The distance from London to Ashford is 90 km.
The local time in London is the same as the local time in Ashford.

Work out the average speed, in km/h, of the train between London and Ashford.

..... km/h [3]

(iii) During the journey, the train takes 35 seconds to completely cross a bridge.
The average speed of the train during this crossing is 90 km/h.
The length of the train is 95 metres.

Calculate the length, in metres, of this bridge.

..... m [4]

(b) The fares for the train journey are shown in the table below.

From London to Marseille	Standard fare	Premier fare
Adult	\$84	\$140
Child	\$60	\$96

(i) For the **standard fare**, write the ratio adult fare : child fare in its simplest form.

..... : ..... [1]

(ii) For an **adult**, find the percentage increase in the cost of the standard fare to the premier fare.

..... % [3]

(iii) For one journey from London to Marseille, the ratio

number of adults : number of children = 11 : 2.

There were 220 adults in total on this journey.
All of the children and 70% of the adults paid the standard fare.
The remaining adults paid the premier fare.

Calculate the total of the fares paid by the adults and the children.

\$ ..... [5]

(c) There were 3.08×10^5 passengers that made this journey in 2018.
This was a 12% decrease in the number of passengers that made this journey in 2017.

Find the number of passengers that made this journey in 2017.
Give your answer in standard form.

..... [3]

30. 0580_w19_qp_41 Q: 2

(a) Ali and Mo share a sum of money in the ratio Ali : Mo = 9 : 7.
Ali receives $600 more than Mo.

Calculate how much each receives.

Ali $ .....

Mo $ ..... [3]

(b) In a sale, Ali buys a television for $195.80 .
The original price was $220.

Calculate the percentage reduction on the original price.

..... % [3]

(c) In the sale, Mo buys a jacket for $63.
The original price was reduced by 25%.

Calculate the original price of the jacket.

$ ..... [3]

31. 0580_w19_qp_41 Q: 3

(a) Dina invests \$600 for 5 years at a rate of 2% per year compound interest.

Calculate the value of this investment at the end of the 5 years.

\$ ..... [2]

(b) The value of a gold ring increases exponentially at a rate of 5% per year.
The value is now \$882.

(i) Calculate the value of the ring 2 years ago.

\$ ..... [2]

(ii) Find the number of complete years it takes for the ring's value of \$882 to increase to a value greater than \$1100.

..... [2]

Appendix A

Answers

1. 0580_m22_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	184	2	**M1** for $\frac{852-300}{300}[\times 100]$ oe or for $\frac{852}{300}\times 100[-100]$ oe
(b)	497	2	**M1** for $\frac{852}{5+7}\times k$ oe where $k = 1$, 5 or 7
(c)(i)	Forty thousand six hundred	1	
(c)(ii)	4.06×10^4	1	
(d)	435	3	**M2** for $3000\times\left(1-\frac{48}{100}-\frac{3}{8}\right)$ oe or **B2** for 2565, or 1440 **and** 1125 or 1875 **and** 1440 or 1560 **and** 1125 or **M1** for $1-\frac{48}{100}-\frac{3}{8}$ or $3000\times\left(\frac{48}{100}+\frac{3}{8}\right)$ oe or **B1** for 1440 or 1125 or 1560 or 1875 If 0 scored **SC1** for answer 975
(e)	35.7	3	**M2** for $\frac{100+15}{100}\times\frac{100+18}{100}$ [−1] oe or better or **M1** for $k\times\frac{100+15}{100}\times\frac{100+18}{100}$ oe

2. 0580_s22_ms_41 Q: 2

Question	Answer	Marks	Partial Marks
(a)	42	2	**M1** for 12 ÷ 2 or better
(b)(i)	5.72	2	**M1** for $\frac{100-12}{100}\times 6.50$ oe or **B1** for 0.88 oe
(b)(ii)	12.5[0]	2	**M1** for $\frac{100-12}{100}\times x = 11$ or better oe

Question	Answer	Marks	Partial Marks
(c)	4	2	**M1** for $\frac{100+2.5}{100}\times[...]=\frac{100+6.6}{100}$ oe
(d)(i)	72.3 or 72.31...	2	**M1** for $80\times\left(\frac{100-2}{100}\right)^5$ oe
(d)(ii)	4 nfww	3	**B2** for answer 9 nfww or **M2** for correct trials with values giving either side of 67 or **M1** for $80\times\left(\frac{100-2}{100}\right)^n=67$ or $their(i)\times\left(\frac{100-2}{100}\right)^k=67$ or an evaluated trial with $n\geqslant 6$ or $k\geqslant 1$

3. 0580_s22_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	150	2	**B1** for answer $150k$ or **M1** for prime factors of 30 or 75 seen or a list of multiples of both 30 and 75 with at least 3 of each or for $\frac{30\times 75}{15}$ oe or for answer $2\times 3\times 5^2$
(b)	152 190 266	3	Accept in any order **B2** for two correct answers or **M1** for $\frac{608}{4+5+7}\times k$ oe where k =1, 4, 5, 7
(c)	2.61×10^{-2} 2.61×10^{-2} or $2.608\ldots\times 10^{-2}$	2	**B1** for figs 2608 or 261 seen If 0 scored, **SC1** for answer $2.6[0]\times 10^{-2}$ without more accurate value in standard form seen
(d)	$\frac{27}{99}$ oe fraction	1	
(e)	2.8	1	
	g/cm^3 or $g\ cm^{-3}$	1	

4. 0580_s22_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)	10 07	1	
(b)	123	2	**M1** for 10 30 − 8 27 soi or 10 30 − 8 52 + 25 soi or 25 + 50 + 48
(c)	$25.2, 25\frac{1}{5}$	2	**M1** for figs 29.4 ÷ 70 [× 60] oe
(d)	\$142.1[0] cao	4	**M2** for [adults =] 56 ÷ 8 × 5 and [child =] 56 ÷ 8 × 3 or better or **M1** for 56 ÷ (5 + 3) × k where $k = 1, 3$ or 5 **M1** for *their* 35 × 2.80 + *their* 21 × 2.80 × $\frac{3}{4}$ oe

5. 0580_w22_ms_41 Q: 2

Question	Answer	Marks	Partial Marks
(a)(i)	2990 cao	1	
(a)(ii)	1.0 cao	1	
(a)(iii)	2100 cao	1	
(b)	97	1	
(c)	$\frac{1}{64}$ final answer	1	
(d)	$7.01[0] \times 10^{-3}$	1	
(e)	1.65×10^{x}	2	**M1** for final answer figs 165 or for $15 \times 10^{x-1}$ seen or for 0.15×10^{x} seen

Question	Answer	Marks	Partial Marks
(f)	37.7... − 3.7... [= 34] oe	M1	
	$\frac{34}{90}$ oe fraction	B1	

6. 0580_w22_ms_41 Q: 4

Question	Answer	Marks	Partial Marks
(a)(i)	550 nfww	3	**M2** for $\frac{500 \times 2 \times 5}{100} + 500$ oe or **M1** for $\frac{500 \times 2 \times 5}{100}$ oe
(a)(ii)	546.65	2	**M1** for $500 \times \left(1 + \frac{1.8}{100}\right)^{5}$ oe
(a)(iii)	8 nfww	3	**B2** for final answer 13 OR **M2** for trials correctly comparing both investments to 7 and 8 more years or **M1** for at least two trials correctly comparing both investments

Question	Answer	Marks	Partial Marks
(b)	1476 cao	3	**B2** for 1480 or 1476.2 ... OR **M1** for $2500\times\left(1-\frac{10}{100}\right)^{5}$ oe **B1** for their more accurate answer seen correctly rounded to the nearest dollar.
(c)	3.2[0] or 3.200 to 3.201	3	**M2** for (...) = $\sqrt[22]{2}$ oe isw or **M1** for $[N]\times(\ldots)^{22}=2[N]$

7. 0580_w22_ms_42 Q: 5

Question	Answer	Marks	Partial Marks
(a)(i)	$\frac{14}{18}$ oe	1	
(a)(ii)	17.5	4	**M3** for $\frac{1}{2}(10+24)18+22\times24-134=40v$ oe or **M2** for $\frac{1}{2}(10+24)18+22\times24$ oe or **B2** for [distance covered by bus =] 700 or **M1** for correct method for any partial area for the car or for $40v$
(b)	92.8 or $92\frac{4}{5}$	3	**M1** for $\frac{figs162[4]}{their10\,min30\,sec}$ oe **M1** for correct conversion to km/h, e.g. $\times\frac{60}{1000}$

8. 0580_w22_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)(i)	60.9 or 60.86 to 60.87	1	
(a)(ii)	375	2	**M1** for $\frac{250}{12}$ [× 18] oe
(a)(iii)	30 nfww	3	**M1** for figs2200 ÷ 800 [× 12]oe **M1** for 1500 ÷ 600 [× 12] oe
(b)(i)	1.92	2	**M1** for $k \times \left(1+\frac{25}{100}\right) = 2.4[0]$ oe or better
(b)(ii)	43.75 or $43\frac{3}{4}$	3	**M2** for $\left(\left(1+\frac{25}{100}\right)\times\left(1+\frac{15}{100}\right)[-1]\right)[\times 100]$ oe or $\left(1+\frac{25}{100}\right)\times\left(1+\frac{15}{100}\right)\times 100\,[-100]$ or for $\frac{2.40\times\left(1+\frac{15}{100}\right)}{\textit{their}\textbf{(b)(i)}}\times 100$ [– 100] oe or **M1** for $2.40\times\left(1+\frac{15}{100}\right)$ or $\left(1+\frac{25}{100}\right)\times\left(1+\frac{15}{100}\right)$ oe
(c)	18 nfww	3	**M2** for $\frac{200 \text{ to } 210}{11.5-0.25}$ or $\frac{200+5}{11 \text{ to } 11.5}$ oe or **M1** for 200 + 5, 200 – 5, 11.5 + 0.25 or 11.5 – 0.25

9. 0580_m21_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)	245	1	
(b)	8	2	**M1** for 40 + 26.5x = 252 oe or **B1** for 212 seen
(c)	6	2	**M1** for (224 – 2 × 48) ÷ 32 oe or 2 × 48 + 32 (x – 2) = 224 soi
(d)	35 : 36 : 32 final answer	2	**B1** for *their* (a) : 252 : 224 or equivalent ratio

10. 0580_m21_ms_42 Q: 10

	Answer	Mark	Partial Marks
(a)	1600	**3**	**B2** for answer figs 16 or **M2** for 90.72 ÷ (figs45 × figs3 × figs42) or **M1** for volume = figs 45 × figs 3 × figs 42 isw
(b)	62.8 or 62.83 to 62.84	**3**	**M2** for $\frac{\pi \times 10^2 \times 30}{15000} \times 100$ or **M1** for $\pi \times 10^2 \times 30$
(c)	12.9[0]	**3**	**B2** for 86 OR **M2** for $\frac{98.9}{1+\frac{15}{100}} \times 0.15$ oe or $98.9 - \frac{98.9}{1+\frac{15}{100}}$ oe or **M1** for $\left(1+\frac{15}{100}\right)a = 98.9$ oe isw
(d)	50	**2**	**M1** for 3540 ÷ 70.8

11. 0580_s21_ms_41 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	28	**2**	**M1** for $32 \times 0.50 + 30 \times 0.40$
(a)(ii)	98 – 100 × 0.5 48 ÷ 0.4 = 120 [minutes] = 2 [hrs]	**M3**	**M1** for $100 \times 0.50 + x \times 0.40 = 98$ **M1** for $50 + 0.4x = 98$ or $0.4x = 48$ **M1** for $x = \frac{48}{0.4}$ x = 120 [min] = 2 [hr] OR **M1** for $100 \times 0.5 [= 50]$ **M1** for $98 - 50 [= 48]$ **M1** for $48 \div 0.4 = 120$ [min] = 2 [hr]
(b)	2925 1170 4095	**3**	**B2** for one correct answer or **M1** for 8190 ÷ (5 + 2 + 7)
(c)	58	**2**	**M1** for $\left(1+\frac{45}{100}\right)k = 84.1$ oe

12. 0580_s21_ms_41 Q: 4

	Answer	Mark	Partial Marks
(a)(i)	438 cao	**2**	**M1** for $\frac{500}{1.142}$
(a)(ii)	14.95	**2**	**M1** for [329 –] 275×1.142 oe
(b)	14	**2**	**M1** for $5.25 \times \frac{8}{3}$ oe
(c)	1.7[0] or 1.699…	**3**	**M2** for $\sqrt[5]{\frac{6669}{6130}}$ or **M1** for $6669 = 6130\ (k)^5$

13. 0580_s21_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	11.61 final answer	**2**	**M1** for $13.5[0] \times \left(1 - \frac{14}{100}\right)$ oe or **B1** for 1.89
(a)(ii)	197.37 final answer	**2**	**FT** 17 × *their* (a)(i) exact or correct to nearest cent **M1** for 42.5 ÷ 2.5
(b)(i)	53.3 or 53.33…	**1**	
(b)(ii)	7.5	**2**	**M1** for 22.5 ÷ (2 + 8 + 5) oe soi
(c)	20.55×2.45 oe	**M2**	**M1** for 20.5 + 0.05 oe seen or 2.4 + 0.05 oe seen If 0 scored, **SC1** here for 20.45×2.35 oe
	3 nfww	**A2**	**M1** for *their* area ÷ 10 ÷ 2.5 oe

14. 0580_s21_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	120	**2**	**M1** for $6 \div (21 - 19)$ oe soi or for $\frac{2x}{40} = 6$
(a)(ii)(a)	34	**2**	**M1** for $40 - \frac{15}{100} \times 40$ oe or better or **B1** for 6
(a)(ii)(b)	35	**2**	**M1** for $\left(1 - \frac{15}{100}\right) \times p = 29.75$ or better
(b)(i)	44 274 cao	**3**	**B2** for 44273 to 44274 or 44270 or **M1** for $40100 \times \left(1 + \frac{2}{100}\right)^5$ oe
(b)(ii)	2019 nfww	**3**	**M2** for one correct trial of $n = 8$ or $n = 9$ either to find a salary or, if working with 1.02^n and 47 500 ÷ 40 100 [= 1.1845], to find a value of 1.02^n or **B2** for final answer 9 or 4 nfww or **M1** for *their* $44\,274 \times \left(1 + \frac{2}{100}\right)^n = 47\,500$ oe or $40\,100 \times \left(1 + \frac{2}{100}\right)^n = 47\,500$ oe or for at least one trial giving a value greater than *their* 44 274
(c)	2.9 [increase]	**2**	**M1** for $\left(1 + \frac{5}{100}\right) \times \left(1 - \frac{2}{100}\right)$ oe implied by 1.029 or 102.9[%]

15. 0580_m20_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	295	2	**M1** for [87 +] 4×52 oe
(a)(ii)	29.5 or 29.49…	1	**FT** $\frac{87}{their\textbf{(a)(i)}} \times 100$
(b)	11	2	**M1** for 18×4 [± 61] oe
(c)	4160 cao nfww	2	**M1** for $64 \div 0.0154$ or **B1** for rounding *their* answer to nearest 10
(d)	2.4[0] nfww	2	**M1** for $\left(1+\frac{12.5}{100}\right)x = 2.7[0]$ oe
(e)	53 : 36	3	**M2** for 265 : 180 oe or for answer 36 : 53 or 53 min: 36 min or **M1** for 4h 25 [mins] or 265 [mins] seen
(f)	6[.00] or 5.999…	3	**M2** for $\sqrt[5]{\frac{736}{550}}$ or **M1** for $736 = 550 \times (x)^5$

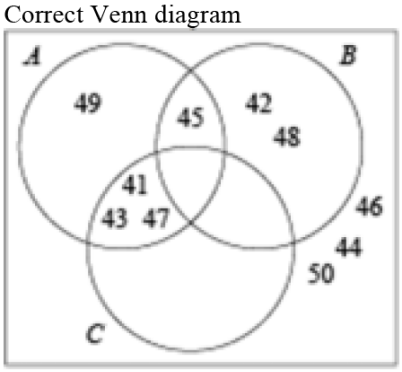
16. 0580_p20_ms_40 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	48	2	**M1** for $\frac{72}{3}$
(a)(ii)	32.4[0]	1	
(a)(iii)	$\frac{13}{30}$	2	**M1** for $\frac{72 - their\ \textbf{(ii)} - 8.4}{72}$ oe
(a)(iv)	24	3	**M2** for $\frac{19.2}{0.8}$ oe or **M1** for recognising 19.2 is 80%
(b)	660	3	**M2** for $\frac{550 \times 2 \times 10}{100} + 550$ oe or **M1** for $\frac{550 \times 2 \times 10}{100}$ oe
(c)	663.9[0]	2	**M1** for 550×1.019^{10} oe
(d)	1.5[0]	3	**M2** for $\sqrt[10]{\frac{638.3[0]}{550}}$ oe or **M1** for $550 \times m^{10} = 638.3[0]$

17. 0580_s20_ms_41 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	7680	**2**	**M1** for $0.24 \times 32\,000$ oe
(a)(ii)	34 240	**2**	**M1** for $32\,000 \times \frac{100+7}{100}$ oe
(b)	5306.04	**2**	**M1** for $5000 \times \left(1+\frac{2}{100}\right)^3$ oe
(c)	26.7 or 26.66... to 26.67	**4**	**B3** for 96 or $\frac{96}{360}$ oe OR **M3** for $(1-\frac{1}{5}) \times (1-\frac{2}{3}) \times 100$ oe or **M2** for $(1-\frac{1}{5})$ and $(1-\frac{2}{3})$ oe OR **M1** for $360 \div 5$ [$\times 4$] oe **M1** for *their* $288 \div 3$ [$\times 2$]
(d)	33 500	**2**	**M1** for $36\,515 \div \frac{100+9}{100}$ oe
(e)	6525	**4**	**M3** for $\left(\frac{65}{45}-\frac{63}{45}\right)[A]=290$ oe or **M2** for $\left(\frac{13}{9}-\frac{7}{5}\right)[A]=290$ oe or **M1** for correct attempt to convert to a common ratio value for Arjun or for $\frac{13}{9}-\frac{7}{5}$ oe

18. 0580_s20_ms_41 Q: 5

	Answer	Mark	Partial Marks
(a)	Correct Venn diagram 	**3**	**B2** for 8 or 9 numbers correct or **B1** for 6 or 7 numbers correct
(b)(i)	41, 43, 47	**1**	**FT** *their* Venn diagram
(b)(ii)	44, 46, 49, 50	**1**	**FT** *their* Venn diagram
(c)	0	**1**	**FT** *their* Venn diagram

19. 0580_s20_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	14, 10	**2**	**M1** for $24 \div (7 + 5)$
(a)(ii)	$\frac{3}{350}$	**2**	**B1** for correct fraction not in lowest terms
(a)(iii)	120	**1**	
(b)(i)	10.2[0]	**2**	**M1** for $\frac{15}{100} \times 12$ oe or better
(b)(ii)	45	**2**	**M1** for $\frac{38.25}{1-\frac{15}{100}}$ oe
(c)(i)	85	**2**	**M1** for $\frac{500 \times 1.7 \times 10}{100}$ oe
(c)(ii)	203 or 202.5 to 202.6	**2**	**M1** for $200 \times \left(1+\frac{0.0035}{100}\right)^{365}$
(c)(iii)	1.9	**3**	**M2** for $\sqrt[6]{\frac{559.78}{500}}$ or **M1** for $500\left(1+\frac{r}{100}\right)^{6} = 559.78$

20. 0580_s20_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)	1260	**2**	**M1** for $15 \times 54 + 25 \times 18$
(b)	38 800	**2**	**M1** for $37054 \div \left(1 - \frac{4.5}{100}\right)$ oe
(c)(i)	15 : 12 : 28	**2**	**M1** for correct attempt to find a common multiple for the women oe
(c)(ii)	216	**3**	**M2** for $224 \div$ *their* $28 \times$ *their* $(15 + 12)$ or **M1** for $224 \div$ *their* 28
(d)	55.25	**2**	**M1** for $8 + 0.5$ or $6 + 0.5$ seen
(e)	156 or 156.3…	**2**	**M1** for $\left(1 + \frac{1.5}{100}\right)^{30}$

21. 0580_w20_ms_41 Q: 2

	Answer	Mark	Partial Marks
(a)	1 : 5 : 12	**2**	**M1** for 2 : 10 : 24 or 7 : 35 : 84 or $\frac{1}{18} : \frac{5}{18} : \frac{12}{18}$
(b)(i)	266 and 95	**3**	**B2** for 266 or 95 or 266 and 95 reversed or **M1** for $\frac{114}{6}$
(b)(ii)	15	**2**	**M1** for $\frac{114 - 96.9}{114}$ [$\times 100$] oe or $\frac{96.9}{114} \times 100$
(c)(i)	2h 50min	**1**	
(c)(ii)	636	**2**	**M1** for $1802 \div$ *their* 2h 50min

22. 0580_w20_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)	9080 cao	**3**	**B2** for 9078 to 9081… or **M1** for 813 × *their* 11h 10min
(b)(i)	654 or 653.5…	**2**	**M1** for 10260 ÷ 15 h 42 min oe
(b)(ii)(a)	21.8 or 21.82 to 21.83	**1**	
(b)(ii)(b)	4.58 or 4.59 cao	**2**	**M1** for 470 ÷ (10260 ÷ 100) oe or 100 ÷ *their* **(b)(ii)(a)**
(c)	12.97	**1**	

23. 0580_w20_ms_42 Q: 3

	Answer	Mark	Partial Marks
(a)(i)	2210 or 2208 or 2208.2, or 2208.16…	**2**	**M1** for $2000 \times \left(1+\frac{2}{100}\right)^5$ oe
(a)(ii)	10.4 or 10.5 or 10.40 to 10.41	**2**	**M1** for $\frac{\textit{their}\,\textbf{(a)(i)} - 2000}{2000}$ [×100] or $\frac{\textit{their}\,\textbf{(a)(i)}}{2000} \times 100$ or $\left(1+\frac{2}{100}\right)^5 - 1$ or $\left(1+\frac{2}{100}\right)^5 \times 100$ oe
(a)(iii)	12	**3**	**B2** for 11.3 or 11.26 to 11.27 **OR** **M2** for [2000 ×] $\left(1+\frac{2}{100}\right)^{11}$ oe or [2000 ×] $\left(1+\frac{2}{100}\right)^{12}$ oe seen or **M1** for [2000 ×] $\left(1+\frac{2}{100}\right)^{n}$ oe, $n > 5$ oe or for $2000 \times \left(1+\frac{2}{100}\right)^{n}$ = or > or ⩾ 2500 oe

	Answer	Mark	Partial Marks
(b)	490 cao	**3**	**M2** for $p\times\left(1-\frac{4}{100}\right)^{16}=255$ oe soi by 490.0... or **M1** for $p\times\left(1-\frac{4}{100}\right)^{n}=255$ oe, $n>1$ oe

24. 0580_w20_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	$5.101[00\ldots]\times10^{8}$ final answer	**1**	
(a)(ii)	361 150 800 oe	**2**	**FT** *their* **(a)(i)** **M1** for $\frac{70.8}{100}\times 510\,100\,000$ or for $\frac{70.8}{100}\times$ *their* **a(i)**
(b)(i)	6070 oe	**1**	
(b)(ii)	32 000 oe	**2**	**B1** for figs 32
(b)(iii)	6.68 or 6.677 …	**2**	**M1** for $\frac{6.41\times10^{5}}{9.6[0]\times10^{6}}$ $[\times 100]$ oe
(b)(iv)	1250 or 1248 to 1249 oe	**2**	**B1** for figs 125 or figs1248 to figs 1249
(c)(i)	25.1 or 25.08…	**2**	**M1** for $\frac{7.53[\times10^{9}]-6.02[\times10^{9}]}{6.02[\times10^{9}]}$ oe or $\frac{7.53[\times10^{9}]}{6.02[\times10^{9}]}\times100$
(c)(ii)	1.33 or 1.325…	**3**	**M2** for $\sqrt[17]{\frac{7.53[\times10^{9}]}{6.02[\times10^{9}]}}$ or $\sqrt[17]{1+\frac{\textit{their}\ \textbf{(c)(i)}}{100}}$ or **M1** for $6.02[\times10^{9}]\times p^{17}=7.53[\times10^{9}]$ or $p^{17}=1+\frac{\textit{their}\ \textbf{(c)(i)}}{100}$

25. 0580_m19_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)	473	2	**M1** for 645 ÷ (11 + 4)
(b)	212.5	2	**M1** for 50×4.25
(c)	31.5 or 31.45 to 31.46	3	**M2** for $54 \div 1\frac{43}{60}$ oe or **M1** for time =1h 43min or 103 [mins] or 54 ÷ *their* time
(d)	875	1	
(e)	10.4 or 10.38 to 10.39	1	
(f)(i)	30 [×] 70 and 2100	1	
(f)(ii)	both numbers rounded up oe	1	

26. 0580_s19_ms_41 Q: 8

	Answer	Mark	Partial Marks
(a)	6 nfww	3	**M2** for $\frac{2.65 - 2.50}{2.50}$[×100] or for $\frac{2.65}{2.50} \times 100$ or **M1** for $\frac{2.65}{2.50}$
(b)	552.5[0]	3	**B2** for 552.5[0] or **M2** for $500 \times \frac{1.5}{100} \times 7 + 500$ oe or **M1** for $500 \times \frac{1.5}{100}$ [× 7] oe
(c)	37.4 or 37.36…	2	**M1** for $\left(1 + \frac{1.6}{100}\right)^{20}$ oe soi 1.37…
(d)	4[.00...]	3	**M2** for $\sqrt[22]{\frac{2607}{6400}}$ or **M1** for $6400 \times x^{22} = 2607$ oe or better

27. 0580_s19_ms_41 Q: 11

	Answer	Mark	Partial Marks
	[Total time =]16 h 6 min or 16.1 h	2	**B1** for 22 h 6 min or 22.1h or 966 mins If 0 scored, **SC1** for 9 h 41 min
	[Distance to airport in New York =] 16.5	2	**M1** for 18×55
	[Arc length =] 6200 or 6199 to 6200. …	3	**M2** for $\frac{55.5}{360} \times 2 \times \pi \times 6400$ or **M1** for $\frac{55.5}{360}$ or $2 \times \pi \times 2400$
	[Distance Geneva to Chamonix =] 104	2	**M1** for 65×1.6 or 65×96 oe
	392 to 393	2	**M1** for $\frac{6316 \text{ to } 6322.4}{\textit{their}16.1}$ Must be correct value in numerator

28. 0580_s19_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)	16.5 or 16.49...	3	**M2** for $\frac{1.13 - 0.97}{0.97}[\times 100]$ oe or $\frac{1.13}{0.97} \times 100$ oe or **M1** for $\frac{1.13}{0.97}$ oe
(b)(i)	35	2	**M1** for $60 \div (5 + 7)$
(b)(ii)	140	1	
(c)	\$1.26 final answer	3	**B2** for 1.259... or 1.26 but not as final answer or **M1** for $2.25 \div 0.9416$ If 0 scored, **SC1** for 1.13×0.9416
(d)	15[.0…]	3	**M2** for $\sqrt[21]{\frac{58000}{1763000}}$ oe or **M1** for $58000 = 1763000\ (k)^{21}$
(e)	1239.75	2	**B1** for 43 + 0.5 or 28 + 0.5 oe seen

29. 0580_s19_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	6h 27 mins	**2**	**B1** for answer .....h 27 mins
(a)(ii)	150 km/h	**3**	**M2** for $\frac{90}{36} \times 60$ or **M1** for $\frac{90}{\textit{their}\ \text{time}}$ or **B1** for 36 [mins] seen
(a)(iii)	780	**4**	**M3** for $\left(90 \times \frac{35}{3600}\right) \times 1000 - 95$ oe or **M2** for $\left(90 \times \frac{35}{3600}\right) \times 1000$ oe or **B1** for figs 875 or **M1** for $90 \times \frac{35}{3600}$ seen or for $90 \times \frac{1000}{3600}$ oe If 0 scored, **SC1** for *their* distance (> 95) – 95
(b)(i)	7 : 5	**1**	
(b)(ii)	66.7 or 66.66 to 66.67	**3**	**M2** for $\frac{140-84}{84}$ [× 100] oe or for $\frac{140}{84} \times 100$ oe or **M1** for $\frac{140}{84}$ oe
(b)(iii)	24 576	**5**	**M4** for complete method, 40 × 60 + 0.7 × 220 × 84 + 0.3 × 220 × 140 oe OR **B1** for 40 [children] **M1** for 0.7 × 220 × 84 oe **M1** for 0.3 × 220 × 140 oe **B1** for 2400 or 12936 or 9240 nfww

	Answer	Mark	Partial Marks
(c)	3.5×10^5 nfww	**3**	**M2** for $3.08 \times 10^5 \div \left(\frac{100-12}{100}\right)$ oe or **M1** for 3.08 [$\times 10^5$] associated with (100–12)%

30. 0580_w19_ms_41 Q: 2

	Answer	Mark	Partial Marks
(a)	[Ali] 2700 [Mo] 2100	**3**	**B2** for one correct or for correct values reversed or **M1** for 600 ÷ (9 – 7) or for any equation that would lead to an answer of 300, 2700 or 2100, or 4800 (for the total)

	Answer	Mark	Partial Marks
(b)	11	**3**	**M2** for $\frac{220-195.8}{220}[\times 100]$ or for $[100 -]\frac{195.8}{220}\times 100$ or **M1** for 220 – 195.8 or for $\frac{195.8}{220}$ or a correct implicit equation for percentage reduction or for $\frac{195.8-220}{220}$
(c)	84	**3**	**M2** for $\frac{63}{1-\frac{25}{100}}$ oe or **M1** for associating 63 with (100 – 25)% or a correct implicit equation for the original price.

31. 0580_w19_ms_41 Q: 3

	Answer	Mark	Partial Marks
(a)	662.45	**2**	**M1** for $600 \times \left(1+\frac{2}{100}\right)^5$ oe
(b)(i)	800	**2**	**M1** for $x\left(1+\frac{5}{100}\right)^2 = 882$ oe or **SC1** for answer 82
(b)(ii)	5 nfww	**2**	**M1** for trial with $882 \times \left(1+\frac{5}{100}\right)^n$ with $n > 1$