TOPICAL PAST PAPER QUESTIONS WORKBOOK

IGCSE Mathematics (0580) Paper 3
[Core]

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

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

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 3 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: 3

- Number of pages: 1561

- Number of questions: 706

Contents

Chapter 1

Numbers

1. 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.

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

2. 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 °C.
At midnight the temperature has fallen by 23 °C.

Work out the temperature at midnight.

.... °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]

(e) There are 604 passengers on the holiday.

(i) The coach company uses coaches which can carry 46 passengers.

Work out the number of coaches needed.

.... [2]

(ii) 268 of the 604 passengers are women.

Find the percentage of the passengers that are women.

.... % [1]

(f) A coach travels at an average speed of 54 km/h.

Find how long, in hours and minutes, this coach takes to travel 126 km.

.... h .... min [3]

3. 0580_s22_qp_33 Q: 3

Mr Zhang, his wife and three children go on a holiday from Shanghai to Auckland.

(a) The flight for an adult costs \$630.
The cost for a child is $\frac{5}{8}$ of the adult cost.

Show that the total cost of the flight for the family is \$2441, correct to the nearest dollar.

[3]

(b) The plane leaves Shanghai at 20 05 local time on 13th November.
The plane stops for 2 hours 30 minutes in Sydney.
The plane lands in Auckland at 17 25 local time on 14th November.
The local time in Auckland is 5 hours ahead of the local time in Shanghai.

(i) Work out how long the plane is flying, in hours and minutes.

.... h .... min [3]

(ii) Write your answer to **part (b)(i)** in hours, correct to 3 decimal places.

.... h [1]

(iii) The flight distance from Shanghai to Sydney is 7882 km.
The flight distance from Sydney to Auckland is 2156 km.

Find the total distance the plane flies.

.... km [1]

(iv) Calculate the average speed of the plane when it is flying.

.... km/h [2]

(c) The holiday expenses are in the ratio

hotel : car hire : food = 8 : 5 : 6.

The cost of the hotel is $2400.

Show that the total of the holiday expenses is $5700.

[2]

4. 0580_s22_qp_33 Q: 5

(a) Work out the number of days in seven weeks.

.... days [1]

(b) The summit of Mount Everest is 8848 metres above sea level.
Ayding Lake is 154 metres below sea level.

Work out the difference in height between these places.

.... m [1]

(c) Find two integers that have a sum of −12 and a product of 32.

.... and .... [1]

(d) Write $\frac{3}{8}$ as

(i) a decimal,

.... [1]

(ii) a percentage.

.... % [1]

(e) Write down the reciprocal of $\frac{1}{9}$.

.... [1]

(f) Find the value of

(i) 4^5,

.... [1]

(ii) $\sqrt[3]{512}$.

.... [1]

(g) (i) Write 587 000 in standard form.

.... [1]

(ii) Calculate $4.9 \times 10^{-3} + 8.1 \times 10^{-4}$.
Give your answer in standard form.

.... [1]

(h) The height, h metres, of a fence post is 2.43 m, correct to the nearest centimetre.

Complete the statement about the value of h.

.... $\leqslant h <$ .... [2]

5. 0580_s22_qp_33 Q: 9

Ahmed owns a company.

(a) (i)   Each year he earns $56 000 plus 3% of the year's profit.

Calculate the amount he earns in a year when the profit is $320 600.

$ .... [2]

(ii)   In the following year the profit is $347 851.

Calculate the percentage increase in the profit.

.... % [2]

(b)   Ahmed employs three people, Budi, Citra and Dian.
Budi earns $17 000, Citra earns $13 600 and Dian earns $6800.

Find the ratio of their earnings in its simplest form.

Budi : Citra : Dian = ... : .... : .... [2]

(c) Ahmed buys materials from China costing 7560 yuan.

Work out the cost of the materials in dollars when the exchange rate is $1 = 7.06 yuan.
Give your answer correct to the nearest dollar.

$ .... [2]

(d) Ahmed borrows $8 000 for 3 years at a rate of 5% per year compound interest.

Calculate the amount of interest he will pay at the end of the 3 years.

$ .... [3]

6. 0580_w22_qp_31 Q: 1

Helga buys some items to do some knitting.

(a) Complete Helga's bill from one shop.

Item	Cost ($)
2 pairs of knitting needles at $4.95 a pair	
6 buttons at $0.65 each	
1 knitting pattern at $3.60	3.60
Total	

[3]

(b) Helga also buys 8 balls of wool from another shop.
Each ball costs $3.12 .
Helga pays with a $50 note.

Work out the amount of change she receives.

$ .... [2]

(c) Helga knits some squares.
Each square is either white, pink or blue.
The number of squares are in the ratio   white : pink : blue = 5 : 3 : 2.
30 squares are blue.

Show that Helga knits 150 squares.

[2]

(d) Helga uses some of the squares to make a rectangular blanket.
The blanket is 6 squares long and 4 squares wide.

(i) Calculate the percentage of the 150 squares she uses to make this blanket.

.... % [2]

(ii) Each square has side length 15 cm.

Work out the perimeter of this blanket.
Give your answer in metres.

.... m [3]

7. 0580_w22_qp_31 Q: 4

(a) Find

    (i) a multiple of 3 between 70 and 80,

.... [1]

    (ii) a factor of 63 between 5 and 10,

.... [1]

    (iii) a cube number between 60 and 90,

.... [1]

    (iv) the reciprocal of 7.

.... [1]

(b) Work out $\frac{2}{7}$ of 84.

.... [1]

(c) Find the value of

    (i) $\sqrt[3]{3375}$,

.... [1]

    (ii) 12^0.

.... [1]

(d) Rana hires a car.
The cost is $74 per day plus a delivery cost of $17.50 .
Rana pays a total of $461.50 .

Calculate the number of days that Rana hires the car.

.... days [2]

(e) A train to town *A* leaves a station every 25 minutes.
A train to town *B* leaves the same station every 45 minutes.
Both trains leave at 08 00.

Find the next time both trains leave together.

.... [3]

8. 0580_w22_qp_31 Q: 9

(a) Sami buys a new car.

(i) She pays a deposit of $2250 and 36 equal monthly payments of $437.50 .

Show that she pays a total amount of $18 000.

[2]

(ii) Sami later sells the car for $13 680.

Calculate the percentage loss.

.... % [2]

(b) Sami invests $12 750 for 6 years at a rate of 1.8% per year compound interest.

Calculate the value of her investment at the end of the 6 years.

$ .... [2]

9. 0580_w22_qp_32 Q: 1

(a)   2   18   27   29   39   49   80   92

From this list of numbers, write down

(i)   a multiple of 8,

.... [1]

(ii)   a factor of 46,

.... [1]

(iii)   a square number,

.... [1]

(iv)   a cube number,

.... [1]

(v)   a prime number.

.... [1]

(b) Write 0.003 857 correct to

(i)   3 decimal places,

.... [1]

(ii)   3 significant figures.

.... [1]

(c) Anna invests $16 000 at a rate of 3.8% per year compound interest.

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

$ .... [2]

(d) (i) Write 48 as the product of its prime factors.

.... [2]

    (ii) Find the lowest common multiple (LCM) of 48 and 126.

.... [2]

(e) The mass of a truck, m tonnes, is 28.5 tonnes, correct to 1 decimal place.

Complete this statement about the value of m.

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

10. 0580_w22_qp_32 Q: 4

Mr and Mrs Perez and their 3 children go on holiday to Tokyo.

(a) The holiday costs $3800 for an adult and $2400 for a child.
8% tax is then added to the cost of the holiday.

Find the total cost of the holiday, including tax, for the Perez family.

$ .... [4]

(b) The plane takes 11 hours 40 minutes to fly from Los Angeles to Tokyo.
The plane leaves on Wednesday at 10 35 local time.
The local time in Tokyo is 17 hours ahead of the local time in Los Angeles.

(i) Find the day and local time in Tokyo when the plane arrives.
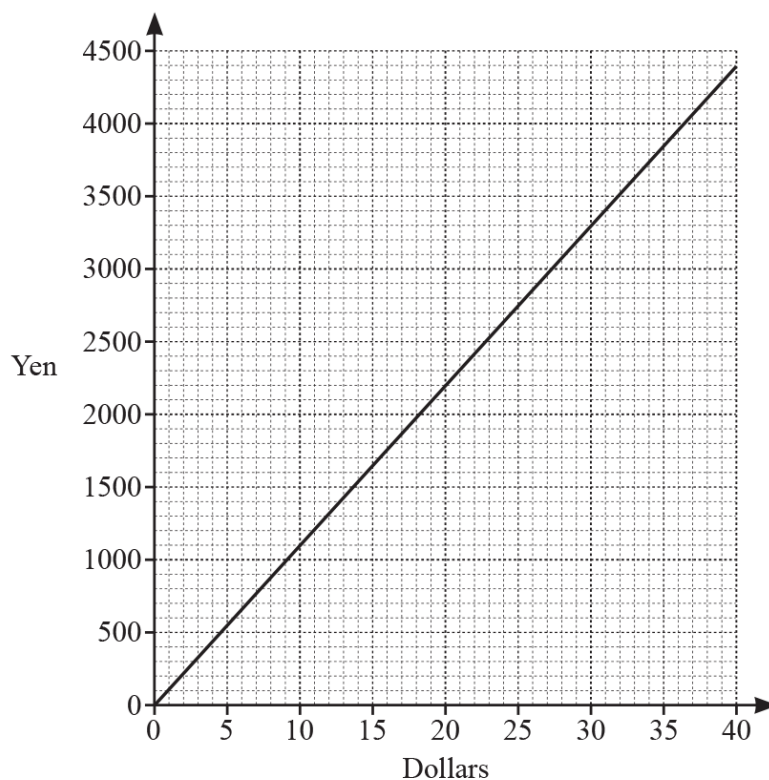
Day .... Time .... [3]

(ii) The distance the plane flies is 8820 km.

Calculate the average speed of the plane.

.... km/h [2]

(c) The diagram shows a conversion graph between dollars and Japanese yen.

A watch costs $100.

Find the cost of this watch in yen.

.... yen [2]

(d) The family go to a restaurant.
The total cost of the food and drinks is $154.
The ratio   cost of food : cost of drinks = 21 : 4.

Work out the cost of drinks.

$ .... [2]

11. 0580_w22_qp_32 Q: 9

(a) Write down the reciprocal of $\frac{1}{3}$.

.... [1]

(b) Write down the value of 3^0.

.... [1]

(c) Find a fraction between $\frac{3}{25}$ and $\frac{4}{25}$.

.... [1]

(d) Find the difference in temperature between $-5\,°C$ and $9\,°C$.

.... $°C$ [1]

(e) Write in standard form.

    (i) 5 600 000

.... [1]

    (ii) 0.000 072

.... [1]

(f) Calculate $(5.2 \times 10^6) \times (3.8 \times 10^{-2})$.
Give your answer in standard form.

.... [1]

12. 0580_w22_qp_33 Q: 1

(a) List all the factors of 68.

.... [2]

(b) Put **one** pair of brackets into each calculation to make it correct.

    (i) $7 + 3 \times 5 - 1 = 19$

[1]

    (ii) $12 + 16 \div 2 + 5 = 19$

[1]

(c) Find

    (i) the reciprocal of $\frac{2}{7}$,

.... [1]

    (ii) the value of 10^0.

.... [1]

(d) Calculate.

    (i) $3^2 + 3^4$

.... [1]

    (ii) $\sqrt{3} \times \sqrt{12}$

.... [1]

    (iii) 5^{-3}

.... [1]

(e) Write these numbers in order of size, starting with the smallest.

$$\sqrt{10} \qquad 3.142 \qquad 1.8^2 \qquad \pi \qquad \frac{22}{7}$$

.... $<$ .... $<$ .... $<$ .... $<$ .... [2]

   smallest

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

$$\frac{136 + 47.2}{62.9 \div 18.1}.$$

You must show all your working.

.... [2]

(g) Write 4.73×10^6 as an ordinary number.

.... [1]

(h) Write down a prime number between 30 and 40.

.... [1]

13. 0580_w22_qp_33 Q: 3

(a) The population of Alaska is 735 720.

  (i) Write this number in words.

  ....

  .... [1]

  (ii) The land area of Alaska is 1 477 300 square kilometres.

  Work out the average number of people per square kilometre.

  .... [1]

  (iii) In Alaska, the city with the highest population is Anchorage with 291 830 people.

  What percentage of the population of Alaska live in Anchorage?

  .... % [1]

(b) The length, L km, of a race is 1569 km, correct to the nearest kilometre.

  Complete this statement about the value of L.

  .... $\leqslant L <$ .... [2]

(c) The table gives some information about two mountains.
The temperatures are taken at the top of each mountain on the same day.

		Height in metres	Maximum temperature	Minimum temperature
Denali	Highest mountain in Alaska	6190	$-9\,°C$	$-20\,°C$
Everest	Highest mountain in the world	8849	.... $°C$	$-38\,°C$

(i) Find the difference between the height of Denali and the height of Everest.

.... m [1]

(ii) Find the difference between the maximum temperature and the minimum temperature at the top of Denali.

....$°C$ [1]

(iii) The maximum temperature at the top of Everest was $27\,°C$ colder than the maximum temperature at the top of Denali.

Complete the table.   [1]

14. 0580_m21_qp_32 Q: 2

A family go on a skiing holiday to America.

(a) The hotel has 840 rooms.
735 rooms are occupied.

Calculate the percentage of rooms that are occupied.

.... % [1]

(b) The temperature in the hotel is 21 °C.
The temperature in the hotel is 26.7 °C warmer than at the top of the mountain.
The temperature at the top of the mountain is 3.2 °C colder than at the bottom of the mountain.

Work out the temperature at the bottom of the mountain.

.... °C [2]

(c)

	Equipment	Hire cost ($)		
		3 days	4 days	7 days
Adult	Ski equipment	80.80	94.60	128.00
	Snowboard equipment	96.80	112.60	151.20
	Helmet	12.80	15.20	20.70
Child	Ski equipment	47.60	55.40	75.80
	Snowboard equipment	59.00	70.20	94.60
	Helmet	10.40	12.00	16.70

There are two adults and one child in the family.
They hire all their equipment.

The child skis for 3 days and snowboards for 4 days.
Both adults ski for 7 days.
All three of them hire a helmet for 7 days.

Work out the total cost of the equipment hire for the family.

$ .... [2]

(d) A ski lift, when full, takes 4000 passengers per hour.
This lift works for 10 hours a day.
One day, this lift is 90% full for 3 hours and 75% full for 7 hours.

Work out the number of passengers who take the lift that day.

.... [3]

(e) The family buy their lift passes before the holiday for a total of 51 400 rupees.
In America, the passes cost a total of $684.
The exchange rate is 1 rupee = $0.0129 .

Show that the family save 1620 rupees, correct to the nearest 10 rupees, by buying the passes before their holiday.

[3]

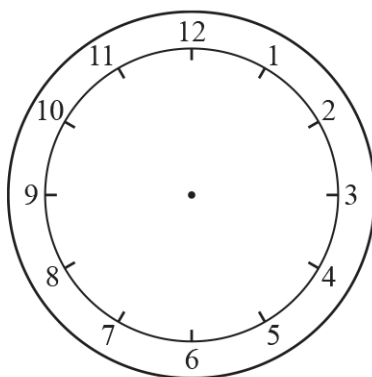**(f)** The height, h metres, of the mountain is 2642 m, correct to the nearest metre.

Complete this statement about the value of h.

.... $\leqslant h <$ .... [2]

15. 0580_m21_qp_32 Q: 8

(a) A baker puts some cakes in the oven at 5.50 pm.
The cakes take 20 minutes to bake.

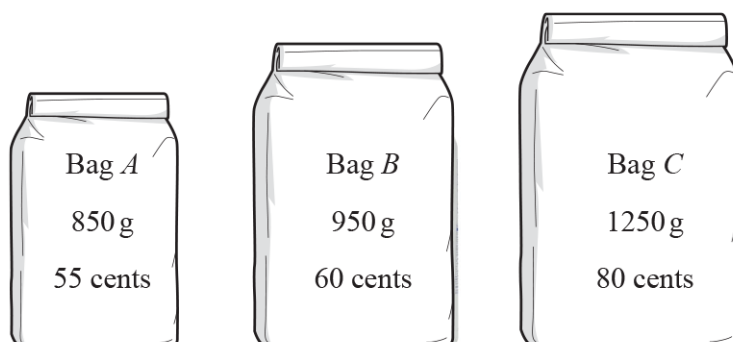Complete the clock diagram to show the time when the cakes are baked.   [1]

(b) A recipe uses 550 g of flour to make 8 cakes.

Work out the amount of flour needed to make 360 cakes.
Give your answer in kilograms.

.... kg [3]

(c)

| Bag A | Bag B | Bag C | NOT TO SCALE |

Work out which bag of flour is the best value.
Show all your working.
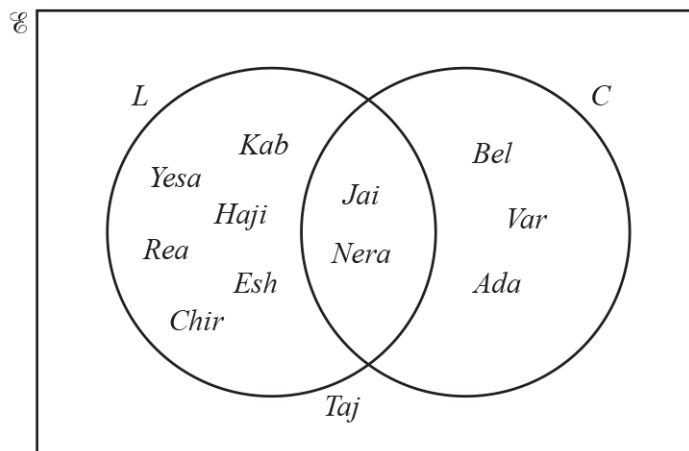
Bag .... [3]

(d) One cake costs 24 cents to make.
The baker sells each cake for 65 cents.

Calculate the percentage profit the baker makes on each cake.

.... % [2]

(e) The baker asks some customers if they like lemon cake (*L*) and if they like chocolate cake (*C*).
The Venn diagram shows the results.

(i) Complete the statement.

n(𝓔) = ...   [1]

(ii) Work out the fraction of the customers who like lemon cake or chocolate cake but not both.

.... [1]

(iii) Use set notation to complete the statement.

{*Jai, Nera*} = ...   [1]

(iv) What does the Venn diagram show about Taj?

.... [1]

16. 0580_s21_qp_31 Q: 1

(a) Strawberries cost $4.20 per kilogram and cream costs $8.56 per litre.
Venus buys 1.2 kg of strawberries and 125 ml of cream.

Work out the total cost.

$ .... [3]

(b) Ravi has $20.
A pineapple costs $1.45 .

Work out the largest number of pineapples Ravi can buy and the change he receives.

Number of pineapples ....

Change $ .... [3]

(c) Abraham has a box of 72 biscuits.
He gives $\frac{2}{9}$ of the biscuits to his grandmother.
He then gives $\frac{3}{7}$ of the biscuits that are left to his cousin.

Work out how many biscuits Abraham has now.

.... [3]

(d) Flo makes 84 cakes.
She sells 35 of these cakes.

Calculate the percentage of the cakes that she sells.

.... % [1]

(e) A bag contains 132 sweets.
The sweets are shared between Beatrix and Volker in the ratio   Beatrix : Volker = 5 : 7.

Work out the number of sweets they each receive.

Beatrix ....

Volker .... [2]

(f) Jed sells desserts for $24 each.
Each dessert costs $12.80 to make.

(i) Work out his percentage profit.

.... % [2]

(ii) The cost to make each dessert increases to $13.60 .
Jed wants to make the same percentage profit.

Work out the new selling price.

$ .... [2]

17. 0580_s21_qp_32 Q: 1

Alex is building a house.

The materials cost $1\frac{1}{2}$ times the cost of the land.

The wages cost $1\frac{1}{4}$ times the cost of the land.

(a) Show that the ratio of costs, in its simplest form, is   land : materials : wages = 4 : 6 : 5.

[2]

(b) The wages cost $47 500.

Show that the total cost of land, materials and wages is $142 500.

[2]

(c) Work out the cost of

   (i) the land,

$ .... [2]

   (ii) the materials.

$ .... [1]

(d) Alex borrows $28 000 for 6 years at a rate of 5.5% per year compound interest.

Calculate the amount he repays at the end of the 6 years.
Give your answer correct to the nearest dollar.

$ .... [3]

(e) When Alex sells the house, he makes a profit of 27% on the $142 500.

Calculate the selling price of the house.

$ .... [2]

18. 0580_s21_qp_32 Q: 3

Pierre travels from his home in Lyon to Singapore.

(a) He travels by train from Lyon to Paris.
The train leaves Lyon at 9.05 am and arrives in Paris at 1.30 pm.

   (i) Write 1.30 pm in the 24-hour clock system.

                                   .... [1]

   (ii) Work out, in hours and minutes, the time the train journey takes.

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

(b) He then travels by plane from Paris to Singapore.
The plane leaves Paris at 16 35 on Thursday and arrives in Singapore 13 hours and 45 minutes later.
The local time in Singapore is 6 hours ahead of the local time in Paris.

Work out the day and time in Singapore when the plane arrives.

               Day .... Time .... [3]

(c) The distance from Paris to Singapore is 10 736 kilometres.

Work out the average speed of the plane.

                                  .... km/h [2]

(d) Pierre buys a watch for 400 Singapore dollars.
The exchange rate is   1 Singapore dollar = 0.658 euros.

Work out the cost of the watch in euros.

.... euros [1]

(e) Pierre stays at a hotel in Singapore for 5 nights.
The cost per night of the room is $170.
His total hotel bill is $975.40 .

Calculate how much Pierre spends on other hotel items.

$ .... [2]

19. 0580_s21_qp_33 Q: 1

Ray owns an electrical shop.

(a) The table shows the opening times of the shop.

Sunday	Closed
Monday	Closed
Tuesday	08 00 to 12 30 and 13 30 to 17 00
Wednesday	08 00 to 12 30 and 13 30 to 17 00
Thursday	08 00 to 12 30 and 13 30 to 17 00
Friday	08 00 to 12 30 and 13 30 to 17 00
Saturday	08 00 to 13 00 and 14 00 to 19 00

Work out how many hours the shop is open in one week.

.... hours [3]

(b) Saeed buys 2 ovens costing $440 each, 4 grills costing $184 each and 3 fridges costing $1280 each.

Calculate the total cost.

$ .... [3]

(c) Alice buys 3 batteries costing $2.85 each.

Work out how much change she receives from $10.

$ .... [2]

(d) Cherie works 32 hours one week and she is paid $8.48 per hour.
In another week she works 37 hours.
For each hour over 32 hours she works, she is paid 1.25 times her hourly rate.

Calculate her pay for the week she works 37 hours.

$ .... [4]

(e) Ray buys a toaster for $36.
When he sells it he makes a profit of 40%.

Calculate the selling price of this toaster.

$ .... [2]

20. 0580_s21_qp_33 Q: 5

(a) Find.

   (i) $\sqrt{320.41}$

                                 .... [1]

   (ii) $6.4^2 + 1.2^3$

                                   .... [1]

   (iii) the reciprocal of 2

                                   .... [1]

   (iv) 9^0

                                   .... [1]

   (v) $\frac{3}{7}$ of \$42

                              \$ .... [1]

   (vi) 12% of \$62

                              \$ .... [1]

(b) Insert one pair of brackets in each statement to make it correct.

   (i) $20 - 5 \div 5 - 3 = 0$ [1]

   (ii) $20 - 5 \div 5 - 3 = 17.5$ [1]

(c) Write one of the symbols $<$, $>$ or $=$ in each statement to make it correct.

$\dfrac{7}{10}$ 0.07

$\dfrac{1}{5}$ 20%

$\dfrac{3}{8}$ 0.38

[2]

(d) (i) Write 90 as the product of its prime factors.

.... [2]

(ii) Find the lowest common multiple (LCM) of 35 and 90.

.... [1]

(iii) Find the highest common factor (HCF) of 35 and 90.

.... [1]

21. 0580_s21_qp_33 Q: 7

Rita and Henry own an investment business.

(a) They share the profit in the ratio Rita : Henry = 3 : 5.
In one year they make a profit of $2 400 000.

Calculate Rita's share of the profit.

$ .... [2]

(b) Henry invests $160 000 at a rate of 2.5% per year compound interest.

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

$ .... [2]

(c) Rita invests $12 000 at a rate of r% per year.
The value of her investment at the end of one year is $12 408.

Work out the value of r.

$r = $ .... [2]

(d) Rita and Henry decorate their office.
The cost, c, is $10 800, correct to the nearest hundred dollars.

Complete this statement about the value of c.

.... $\leqslant c <$ .... [2]

22. 0580_W21_qp_31 Q: 1

(a)   14   17   25   27   30   36   48

From the list, write down

(i) the square root of 289,

.... [1]

(ii) a factor of 81,

.... [1]

(iii) a common multiple of 3 and 5.

.... [1]

(b) A, B and C are three **consecutive** whole numbers.

   •   A is a prime number.

   •   B is a cube number.

   •   C is a square number.

   •   A + B + C is less than 40.

Find A, B and C.

A = ...

B = ...

C = ... [2]

(c) Put **one** pair of brackets into each of these calculations to make them correct.

(i) $4 \times 3 + 7 \div 2 = 20$

[1]

(ii) $51 - 12 \div 3 + 6 = 19$

[1]

(d) Write down

(i) the reciprocal of 8,

.... [1]

(ii) the value of 14^0.

.... [1]

(e) Calculate.

(i) 5^4

.... [1]

(ii) $\sqrt[3]{6859}$

.... [1]

(iii) $16^{-\frac{1}{2}}$

.... [1]

23. 0580_W21_qp_32 Q: 2

(a)   8   17   26   35   49   51   72

From this list of numbers, write down

(i)   a multiple of 24,

.... [1]

(ii) a square number,

.... [1]

(iii) a cube number,

.... [1]

(iv) a prime number.

.... [1]

(b) Write 420 as a product of its prime factors.

.... [2]

(c) Find the lowest common multiple (LCM) of 30 and 84.

.... [2]

(d) By writing each number correct to 1 significant figure, show that an estimate for this calculation is 40.

$$\frac{9.875 + 18.305}{3.418} + 27.837$$

[2]

Appendix A

Answers

1. 0580_s22_ms_31 Q: 1

Question	Answer	Marks	Partial Marks
(a)	6 500 000	**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**	**B1** for 2, 2, 3, 3, 5 or **M1** for correct factor tree or table

Question	Answer	Marks	Partial Marks
(h)(ii)	1440	**2**	**B1** for 1440k as final answer or **M1** for [160 =] $2 \times 2 \times 2 \times 2 \times 2 \times 5$ **and** [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**	**B1** for each If zero scored, **SC1** for both correct but reversed

2. 0580_s22_ms_31 Q: 3

Question	Answer	Marks	Partial Marks
(a)	1332	**2**	**M1** for $2 \times 375 + 3 \times 194$ oe
(b)	129.8[0]	**2**	**M1** for $110 \times \left(1 + \frac{18}{100}\right)$ oe or **B1** for 19.8[0]
(c)	−7	**1**	
(d)	288	**1**	
(e)(i)	14	**2**	**M1** for $604 \div 46$ or 13.1[3…]
(e)(ii)	44.4 or 44.37…	**1**	

Question	Answer	Marks	Partial Marks
(f)	2 (h) 20 (min)	**3**	**M1** for $126 \div 54$ **A1** for 2.33… or 140 mins If **A0** scored, **SC1** for *their* (decimal time) correctly changed to hours and minutes

3. 0580_s22_ms_33 Q: 3

Question	Answer	Marks	Partial Marks
(a)	$2 \times 630 + 3 \times \dfrac{5}{8} \times 630$	**M2**	**M1** for $[3 \times] \dfrac{5}{8} \times 630$
	2441.25	**A1**	
(b)(i)	13 [h] 50 [min]	**3**	**B2** for 16[h] 20[min] or 18[h] 50[min] as final answer or 13[h] 50[min] not as final answer or 16[h] 20[min] with − 2[h] 30[min] attempted or 18[h] 50[min] with − 5[h] attempted or **B1** for 21[h] 20[min] seen or 16[h] 20[min] or 18[h]50 [min] seen or 23[h] 50[min] as final answer or an attempt made to find a time of flight
(b)(ii)	13.833 cao	**1**	**FT** *their* time correct to 3 decimal places
(b)(iii)	10 038	**1**	
(b)(iv)	726 or 725.6 to 725.7	**2**	**FT** *their* **(b)(iii)** ÷ *their* **(b)(ii)** correctly evaluated **M1** for *their* **(b)(iii)** ÷ *their* **(b)(ii)**
(c)	$2400 \div 8 \times (8 + 5 + 6)$ [=5700]	**M2**	**M1** for $2400 \div 8$

4. 0580_s22_ms_33 Q: 5

Question	Answer	Marks	Partial Marks
(a)	49	**1**	
(b)	9002	**1**	

Question	Answer	Marks	Partial Marks
(c)	−8 and −4	1	
(d)(i)	[0].375	1	
(d)(ii)	37.5	1	
(e)	9	1	
(f)(i)	1024	1	
(f)(ii)	8	1	
(g)(i)	5.87×10^5 cao	1	
(g)(ii)	5.71×10^{-3} cao	1	
(h)	2.425 2.435	2	**B1** for each If zero scored, **SC1** for $242.5 \leqslant h < 243.5$ or for both correct but reversed

5. 0580_s22_ms_33 Q: 9

Question	Answer	Marks	Partial Marks
(a)(i)	65 618	2	**M1** for $\dfrac{3}{100} \times 320\,600$ oe
(a)(ii)	8.5	2	**M1** for $\dfrac{347851 - 320600}{320600}[\times 100]$ or $\dfrac{347851}{320600} - 1[\times 100]$ or $\dfrac{347851}{320600} \times 100\,[-\,100]$
(b)	5 : 4 : 2	2	**B1** for any correct partial simplification of the ratio
(c)	1071 cao	2	**M1** for $7560 \div 7.06$ If zero scored, **SC1** for their decimal answer correctly rounded to the nearest dollar
(d)	1261 cao	3	**B2** for 9261 as final answer or **M2** for $8000 \times \left(1 + \dfrac{5}{100}\right)^3 - 8000$ oe or **M1** for $8000 \times \left(1 + \dfrac{5}{100}\right)^3$ oe

6. 0580_w22_ms_31 Q: 1

Question	Answer	Marks	Partial Marks
(a)	9.9[0] 3.9[0]	**2**	**B1** for each
	17.4[0]	**1**	**FT** *their* table
(b)	25.04	**2**	**M1** for $50 - (8 \times 3.12)$ or **B1** for 24.96
(c)	$\dfrac{30}{2} \times (5 + 3 + 2)$	**2**	**M1** for $\dfrac{30}{2}$ or $\dfrac{5+3+2}{2}$
(d)(i)	16	**2**	**M1** for 6×4 soi by 24
(d)(ii)	3	**3**	**M2** for $2(6 \times 15 + 4 \times 15)$ oe or $2(6 \times 0.15 + 4 \times 0.15)$ oe or **M1** for 6×15 or 4×15 oe or 6×0.15 or 4×0.15 oe or $2 \times (6 + 4)$ oe

7. 0580_w22_ms_31 Q: 4

Question	Answer	Marks	Partial Marks
(a)(i)	72 or 75 or 78	**1**	
(a)(ii)	7 or 9	**1**	
(a)(iii)	64	**1**	
(a)(iv)	$\frac{1}{7}$ or 0.143 or 0.142[8..]	**1**	
(b)	24	**1**	
(c)(i)	15	**1**	
(c)(ii)	1	**1**	
(d)	6 nfww	**2**	**M1** for $\frac{(461.5 - 17.5)}{74}$ oe
(e)	11 45	**3**	**B2** for 225 or 3 hr 45 mins or **M1** for 225k or $3 \times 3 \times 5 \times 5$ or [25 =] 5×5 and [45 =] $3 \times 3 \times 5$ or two correct factor trees/tables of both 25 and 45 OR **M2** for listing times/multiples of both 25 and 45 to at least 11 45 or 225 or **M1** for listing at least 3 consecutive times/multiples of each correctly or one full list

8. 0580_w22_ms_31 Q: 9

Question	Answer	Marks	Partial Marks
(a)(i)	2250 + 437.5 × 36 [= 18 000]	**2**	**M1** for 437.5 × 36

Question	Answer	Marks	Partial Marks
(a)(ii)	24	2	**M1** for $\dfrac{18000-13680}{18000}[\times 100]$ oe or $1-\left(\dfrac{13680}{18000}\right)[\times 100]$ oe or $[100-]\dfrac{13680}{18000}\times 100$ oe
(b)	14 200 or 14 190 or 14 190.5 or 14 190.47…	2	**M1** for $12\,750\left(1+\dfrac{1.8}{100}\right)^6$ oe

9. 0580_w22_ms_32 Q: 1

Question	Answer	Marks	Partial Marks
(a)(i)	80	1	
(a)(ii)	2	1	
(a)(iii)	49	1	
(a)(iv)	27	1	
(a)(v)	2 or 29	1	
(b)(i)	0.004 cao	1	
(b)(ii)	0.00386 cao	1	
(c)	19 300 or 19 280 or 19 279.98 to 19 279.99	2	**M1** for $16\,000\times(1+\dfrac{3.8}{100})^5$ oe
(d)(i)	$2\times 2\times 2\times 2\times 3$ or $2^4\times 3$	2	**B1** for 2, 2, 2, 2, 3 or **M1** for a correct factor tree / diagram / list / table
(d)(ii)	1008	2	**B1** for 1008k as final answer or **M1** for $2\times 2\times 2\times 2\times 3\times 3\times 7$ oe or 2, 2, 2, 2, 3, 3, 7 or for [126=] 2×3×3×7 or 2, 3, 3, 7 or [126=] 6×21 and [48=] 6×8 or 6, 21 and 6, 8 or correct factor tree / diagram / list / table for 126 or a list of consecutive multiples of both 48 and 126 with at least 3 of each
(e)	28.45 28.55	2	**B1** for each If 0 scored, **SC1** for both correct but reversed

10. 0580_w22_ms_32 Q: 4

Question	Answer	Marks	Partial Marks
(a)	15 984 cao	4	**M3** for $(2 \times 3800 + 3 \times 2400) \times (1 + \frac{8}{100})$ oe or **M2** for $[2 \times]3800 \times (1 + \frac{8}{100})$ oe or $[3 \times]2400 \times (1 + \frac{8}{100})$ oe or $(2 \times 3800 + 3 \times 2400) \times \frac{8}{100}$ oe or **M1** for $2 \times 3800 + 3 \times 2400$ oe or $[k \times]3800 \times \frac{8}{100}$ oe or $[k \times]2400 \times \frac{8}{100}$ oe where k is any integer If **0** scored, **SC1** for $j \times (1 + \frac{8}{100})$ where j is any value

Question	Answer	Marks	Partial Marks
(b)(i)	Thursday and 15 15 or 3 15 pm	3	**B1** for Thursday as final answer **B2** for 15 15 as final answer or **B1** for 22 15, [0]3 35, 28h 40, 39 15 If 0 scored, **SC1** for 10 35 + 11 40 + 17
(b)(ii)	756	2	**M1** for 8820 ÷ *their* time
(c)	11 000 or 10 875 to 11 125	2	**B1** for 10 000 to 12 000 as answer or **M1** for 110 × 100 or for a valid method e.g. look up '40' × 2.5
(d)	24.64 cao	2	**M1** for $\frac{154}{21+4} \times k$ where k is 1, 4 or 21 oe

11. 0580_w22_ms_32 Q: 9

Question	Answer	Marks	Partial Marks
(a)	3	1	
(b)	1	1	
(c)	Correct fraction e.g. $\frac{7}{50}$	1	
(d)	14	1	
(e)(i)	5.6×10^6	1	
(e)(ii)	7.2×10^{-5}	1	
(f)	1.976×10^5	1	

12. 0580_w22_ms_33 Q: 1

Question	Answer	Marks	Partial Marks
(a)	1, 2, 4, 17, 34, 68	2	**B1** for 4 or 5 correct and no extras or 6 correct and one extra
(b)(i)	$7 + 3 \times (5 - 1) = 19$	1	
(b)(ii)	$(12 + 16) \div 2 + 5 = 19$	1	
(c)(i)	$\frac{7}{2}$ or 3.5 or $3\frac{1}{2}$	1	
(c)(ii)	1	1	
(d)(i)	90	1	
(d)(ii)	6	1	
(d)(iii)	$\frac{1}{125}$ or 0.008	1	
(e)	π, 3.142, $\frac{22}{7}$, $\sqrt{10}$, 1.8^2	2	**B1** for 4 in correct order or **M1** for $[\sqrt{10} =]$ 3.16…, $[1.8^2=]$ 3.24, $[\pi =]$ 3.141…, $[\frac{22}{7} =]$ 3.1428 to 3.1429 or 3.143
(f)	$\dfrac{100 + 50}{60 \div 20}$	**M1**	
	50 cao nfww	**A1**	If 0 scored, **SC1** for 3 correct roundings or for all correct but with any trailing zeros
(g)	4 730 000	1	
(h)	31 or 37	1	

13. 0580_w22_ms_33 Q: 3

Question	Answer	Marks	Partial Marks
(a)(i)	Seven hundred [and] thirty-five thousand, seven hundred [and] twenty	1	
(a)(ii)	0.498 or 0.4980…	1	
(a)(iii)	39.7 or 39.66 to 39.67	1	
(b)	1568.5, 1569.5	2	**B1** for each If 0 scored, **SC1** for both values correct but reversed
(c)(i)	2659	1	
(c)(ii)	11	1	
(c)(iii)	−36	1	

14. 0580_m21_ms_32 Q: 2

Question	Answer	Marks	Partial Marks
(a)	87.5	1	
(b)	−2.5	2	**M1** for $21-26.7$ or $26.7-3.2$
(c)	431.9[0]	2	**M1** for $47.6+70.2+16.7$ oe or $2\times128+2\times20.7$ oe or **B1** for 134.5, 148.7, 297.4, 58.1 or 373.8 or 283.2

Question	Answer	Marks	Partial Marks
(d)	31 800	3	**M2** for $3\times\dfrac{90}{100}\times4000$ oe or $7\times\dfrac{75}{100}\times4000$ oe or **M1** for $\dfrac{90}{100}\times4000$ oe or $\dfrac{75}{100}\times4000$ oe
(e)	$\dfrac{684}{0.0129}$	**M1**	or $684-51400\times0.0129$
	$53023-51400$	**M1**	or $\dfrac{20.94}{0.0129}$
	1623	**A1**	
(f)	2641.5 2642.5	2	**B1** for each If 0 scored, **SC1** for answers correct but reversed

15. 0580_m21_ms_32 Q: 8

Question	Answer	Marks	Partial Marks
(a)	10 past 6 shown on clock face diagram	1	
(b)	24.75	3	**M2** for $\dfrac{550 \times 360}{8 \times 1000}$ oe or **M1** for $\dfrac{550 \times 360}{8}$ oe or **B1** for figs 2475 or figs 248
(c)	*B* With correct comparisons made of the 3 bags with suitable accuracy shown	3	**M2** for 3 correct divisions shown but either not evaluated to enough accuracy or wrong bag selected or **M1** for 2 correct divisions shown for 2 bags
(d)	171 or 170.8…	2	**M1** for $\dfrac{65-24}{24}$ [$\times 100$] or $\dfrac{65}{24} \times 100$ [-100] or $\dfrac{65}{24} - 1$ [$\times 100$]
(e)(i)	12	1	
(e)(ii)	$\dfrac{3}{4}$ or equivalent fraction	1	
(e)(iii)	$L \cap C$	1	
(e)(iv)	Correct statement	1	

16. 0580_s21_ms_31 Q: 1

Question	Answer	Marks	Partial Marks
(a)	6.11	3	**M2** for $1.2 \times 4.2 + 0.125 \times 8.56$ oe or **M1** for 1.2×4.2 oe or figs 125×8.56 or **B1** for 0.125
(b)	13 1.15	3	**M1** for $\dfrac{20}{1.45}$ **M1** for $20 - 1.45 \times k$ where k integer $\leqslant 13$
(c)	32	3	**M2** for $\dfrac{7}{9} \times \dfrac{4}{7} \times 72$ OR **M1** for $\dfrac{2}{9} \times 72$ or $\dfrac{7}{9} \times 72$ and **M1dep** for $\dfrac{4}{7} \times their\ 56$ or $\dfrac{3}{7} \times their\ 56$
(d)	41.7 or 41.66 to 41.67	1	
(e)	55 77	2	**M1** for $\dfrac{132}{5+7} \times k$ oe where k is 1 or 5 or 7
(f)(i)	87.5	2	**M1** for $\dfrac{24}{12.8} \times 100 \,[-100]$ or $\dfrac{24-12.8}{12.8}[\times 100]$ or $\dfrac{24}{12.8} - 1[\times 100]$

Question	Answer	Marks	Partial Marks
(f)(ii)	25.5[0] nfww	2	**FT** *their* **(f)(i)** **M1** for $13.6 \times \left(1 + \dfrac{their\,(\mathbf{f})(\mathbf{i})}{100}\right)$ oe or **B1FT** for 11.90 or **M1** for $\dfrac{13.6}{x} = \dfrac{12.8}{24}$ or better

17. 0580_s21_ms_32 Q: 1

Question	Answer	Marks	Partial Marks
(a)	$1 : 1.5 : 1.25$ or $1 : 1\frac{1}{2} : 1\frac{1}{4}$	B1	
	Working shown leading to $4 : 6 : 5$	M1	
(b)	$47\,500 \div 5 \times (4 + 6 + 5)$	M2	M1 for $47\,500 \div 5$
(c)(i)	38000	2	M1 for $142\,500 \div 15\ [\times 4]$ or $47\,500 \div 5\ [\times 4]$ oe soi
(c)(ii)	57000	1	FT for $95\,000 -$ *their* (c)(i)
(d)	38608 cao	3	M1 for $28\,000 \times \left(1 + \frac{5.5}{100}\right)^{6}$ oe A1 for $38\,607.5\ldots$ or $38\,607.6$ or $38\,607$ or $38\,610$ or $38\,600$ B1 for *their* correctly rounded answer
(e)	180975	2	M1 for $142\,500 \times \left(1 + \frac{27}{100}\right)$ oe or B1 for $38\,475$

18. 0580_s21_ms_32 Q: 3

Question	Answer	Marks	Partial Marks
(a)(i)	1330	1	
(a)(ii)	4 [h] 25 [min]	1	
(b)	Friday 1220	3	B1 for Friday, as final answer B2 for 1220, as final answer or B1 for [0]620 or 2235 or 19h 45 min or 1220 seen then spoilt or M1 for *their* arrival time of flight + 6 hours
(c)	780.8	2	M1 for $10\,736 \div$ time of flight
(d)	263.2[0] cao	1	
(e)	125.4[0] cao	2	M1 for $975.4 - 5 \times 170$ or better

19. 0580_s21_ms_33 Q: 1

Question	Answer	Marks	Partial Marks
(a)	42	**3**	**M1** for $4.5 + 3.5$ or $9 - 1$ **M1** for $5 + 5$ or $11 - 1$ or **M1** for $4.5 \times 4 + 5$ or $18 + 5$ oe **M1** for $3.5 \times 4 + 5$ or $14 + 5$ oe
(b)	5456	**3**	**B2** for 880, 736 and 3840 or **B1** for one of these or **M1** for 2×440 or 4×184 or 3×1280
(c)	1.45	**2**	**M1** for $10 - 3 \times 2.85$
(d)	324.36 cao	**4**	**M1** for 32×8.48 **M1** for 8.48×1.25 oe **M1** for $(37 - 32) \times$ *their* 10.6[0] Accept alternative methods
(e)	50.4[0]	**2**	**M1** for 36×1.4 oe or **B1** for 14.4[0]

20. 0580_s21_ms_33 Q: 5

Question	Answer	Marks	Partial Marks
(a)(i)	17.9	**1**	
(a)(ii)	42.688 cao	**1**	
(a)(iii)	$\frac{1}{2}$ or 0.5	**1**	
(a)(iv)	1	**1**	
(a)(v)	18	**1**	
(a)(vi)	7.44	**1**	
(b)(i)	$(20 - 5) \div 5 - 3 = 0$	**1**	
(b)(ii)	$20 - 5 \div (5 - 3) = 17.5$	**1**	

Question	Answer	Marks	Partial Marks
(c)	$\dfrac{7}{10} > 0.07$ $\dfrac{1}{5} = 20\%$ $\dfrac{3}{8} < 0.38$	2	**B1** for 2 correct
(d)(i)	$2 \times 3 \times 3 \times 5$ or $2 \times 3^2 \times 5$	2	**B1** for 2, 3, 3, 5 or **M1** for correct factor tree / diagram / table
(d)(ii)	630	1	
(d)(iii)	5	1	

21. 0580_s21_ms_33 Q: 7

Question	Answer	Marks	Partial Marks
(a)	900 000	2	**M1** for $\dfrac{2\,400\,000}{3+5} \times k$
(b)	172 302.5[0] cao	2	**M1** for $160\,000 \times (1 + \frac{2.5}{100})^3$ oe
(c)	3.4	2	**M1** for $\dfrac{12\,408 - 12\,000}{12\,000}$ [$\times 100$] oe or $\dfrac{12\,408}{12\,000} - 1$ [$\times 100$] oe or $\dfrac{12\,408}{12\,000} \times 100$ [-100] oe
(d)	10 750 10 850	2	**B1** for each If 0 scored, **SC1** for both correct but reversed

22. 0580_W21_ms_31 Q: 1

Question	Answer	Marks	Partial Marks
(a)(i)	17	**1**	
(a)(ii)	27	**1**	
(a)(iii)	30	**1**	
(b)	7, 8, 9	**2**	**M1** for any 2 conditions in final answer from: A prime or B cube or C square or consecutive A + B + C < 40
(c)(i)	$4 \times (3 + 7) \div 2 = 20$	**1**	
(c)(ii)	$(51 - 12) \div 3 + 6 = 19$	**1**	
(d)(i)	$\dfrac{1}{8}$ or 0.125	**1**	
(d)(ii)	1	**1**	
(e)(i)	625	**1**	
(e)(ii)	19	**1**	
(e)(iii)	$\dfrac{1}{4}$ or 0.25	**1**	

23. 0580_W21_ms_32 Q: 2

Question	Answer	Marks	Partial Marks
(a)(i)	72	**1**	
(a)(ii)	49	**1**	
(a)(iii)	8	**1**	
(a)(iv)	17	**1**	
(b)	$2^2 \times 3 \times 5 \times 7$	**2**	**B1** for 2, 2, 3, 5, 7 or **M1** for correct factor tree/diagram/list/ table
(c)	420	**2**	**B1** for $420k$ as final answer or **M1** for $[30=]\ 2 \times 3 \times 5$ and $[84 =]\ 2^2 \times 3 \times 7$ or for list of multiples of 30 and 84 with at least 3 of each or 2 correct factor trees or tables or $2 \times 2 \times 3 \times 5 \times 7$ oe
(d)	$\dfrac{10+20}{3} + 30$	**M1**	
	$\dfrac{30}{3} + 30\ [= 40]$	**A1**	If 0 scored, **SC1** for 3 correctly rounded numbers or for all 4 correct but with any trailing zeros