Chapter 1

Number

1. 0607_s24_qp_41 Q: 4

(a) The price of a coat is \$84.
The price is reduced by 12%.

Find the new price of the coat.

\$ ..... [2]

(b) The price of a table is reduced by 25%.
The price is now \$960.

Find the original price of the table.

\$ ..... [2]

(c) Samir invests \$600 in a bank that pays compound interest at a rate of 5.1% each year.

(i) Find the value of Samir's investment after 4 complete years.

\$ ..... [2]

(ii) Find the number of complete years for the value of Samir's investment to be first worth more than \$1000.

..... [4]

(d) Amir and Bob work together and share their earnings in the ratio $3 : 5$.

(i) Find the amount Bob receives when their earnings are \$120.

\$ ..... [2]

(ii) They decide to change the ratio for all further earnings.
Amir's share of the earnings is increased by 20% of his original share.
Bob's share of the earnings is decreased by 20% of his original share.

Show that the ratio of their earnings is now $9 : 10$.

[3]

2. 0607_s24_qp_42 Q: 2

(a) Yuri and Zoe share some money in the ratio 8 : 7.
Zoe receives $210.

Show that Yuri receives $240.

[1]

(b) Yuri uses some of his money to buy a set of books and a concert ticket.

(i) He spends 21% of his $240 on the set of books.

Calculate the cost of the set of books.

$ ..... [1]

(ii) He spends $75.50 on the concert ticket.

Calculate the amount Yuri has remaining as a percentage of the $240.

..... % [2]

(c) Zoe spends $140 on software.
She is given a discount of 20% on the original price of the software.

Calculate the original price of the software.

$ ..... [2]

(d) Find the ratio Yuri's remaining money : Zoe's remaining money.
Give your answer in the form n : 1.

..... : 1 [2]

3. 0607_s24_qp_42 Q: 6

Xavier started a new job in 2000.
His annual pay increases each year by 2.5% of his pay in the previous year.

(a) Calculate the number of complete years it took for Xavier's annual pay to be 30% greater than his annual pay in 2000.

..... [4]

(b) In 2024 Xavier's annual pay is $25 215.

Calculate the amount Xavier's pay will increase from his annual pay in 2022 to his annual pay in 2027.
Give your answer correct to the nearest dollar.

$ ..... [4]

4. 0607_s24_qp_43 Q: 2

(a) Ameera and Bertrand share some money in the ratio 4 : 5.
Bertrand gets $3000.

Calculate Ameera's share.

$ ..... [2]

(b) Bertrand invests $3000 at a rate of r% per year simple interest.
At the end of 10 years the value of the investment is $3840.

Find the value of r.

r = ... [3]

(c) Claudia invests $6000 at a rate of s% per year compound interest.
At the end of 8 years the value of the investment is $7367.67 .

Find the value of s.

s = ... [3]

(d) Dieter invests \$4000 at a rate of 1.8% per year compound interest.
At the end of n complete years the value of the investment is more than \$6000.

Calculate the smallest value of n.

$n =$ ..... [4]

5. 0607_m23_qp_42 Q: 9

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

(a) Bank *A* pays compound interest at a rate of 3.5% each year.

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

\$ ..... [2]

(ii) Calculate the number of complete years it takes for the value of Henryk's investment of \$5000 in Bank *A* to be first greater than \$8000.

..... [4]

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

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

\$ ..... [3]

(ii) Calculate the number of complete years it takes for the value of Henryk's investment of \$5000 in Bank *B* to be \$8000.

..... [2]

(c) At the end of x complete years, the total amount that Henryk has in Bank A is greater than the total amount he has in Bank B.

Given that $5 < x < 10$, use a graphical method to find the value of x.

$x =$ ..... [4]

6. 0607_s23_qp_41 Q: 4

(a) Alex invests \$650 at a rate of 2% per year compound interest.

(i) Calculate the value of this investment at the end of 10 years.

\$ ..... [2]

(ii) Calculate the number of complete years it takes for the value of this investment of \$650 to be first greater than \$1000.

..... [4]

(b) 2 years ago Chris invested $\$x$ at a rate of 3% per year compound interest.
The value of this investment is now \$607.90 correct to the nearest cent.

Calculate the value of x.

$x =$ ..... [2]

(c) Sam invested \$200 at a rate of r% per year compound interest.
At the end of 18 years, the value of this investment is \$247.90 correct to the nearest cent.

Find the value of r.

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

7. 0607_s23_qp_41 Q: 11

(a) **(i)** Write 0.000 021 in standard form.

..... [1]

(ii) Calculate $\left(7.3\times10^{-11}\right)\times\left(4.7\times10^{-7}\right)$, giving your answer in standard form.

..... [1]

(iii) Calculate $\left(3.2\times10^{-200}\right)\div\left(4\times10^{-100}\right)$, giving your answer in standard form.

..... [2]

(iv) Simplify $\left(5\times10^{p}\right)^{2}$, giving your answer in standard form.

..... [2]

(b) $y = 10^x$

Write x in terms of y.

$x =$ ..... [1]

(c) Solve $7^x = 14$.

$x =$ ..... [1]

(d) $\log y = 1 + 3\log x - \frac{1}{2}\log w$

Find y in terms of x and w.

$y =$ ..... [4]

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8. 0607_s23_qp_42 Q: 2

The population of a species of bird is estimated to be decreasing by 4% per year.
At the end of 2020 the population was 4.32 million.

(a) Find the population at the end of 2019.

..... million [2]

(b) Calculate an estimate for the population at the end of 2025.

..... million [2]

(c) Find the year in which the population is first expected to be below 2 million.

..... [4]

9. 0607_s23_qp_43 Q: 2

A triathlon race consists of three parts:

- a 1500 m swim
- a 40 km bike ride
- a 10 km run.

(a) John swims the 1500 m in 25 minutes.

Find his average speed, in km/h, for this swim.

..... km/h [2]

(b) John completes the 40 km bike ride at an average speed of 32 km/h.

Find the time, in minutes, for John to complete this bike ride.

..... min [2]

(c) John completes the whole race at an average speed of 20.6 km/h.

Find the average speed, in km/h, for John to complete his 10 km run.

..... km/h [3]

10. 0607_s23_qp_43 Q: 4

(a) $\$x$ is divided in the ratio 3 : 5.
The larger share is \$42.

Find the value of x.

$x =$ ..... [2]

(b) **(i)** Increase 124 by 16%.

..... [2]

(ii) The price of a coat is reduced by $\frac{2}{9}$ in a sale.
The new price of the coat is \$73.50 .

Find the original price of the coat.

\$ ..... [2]

(c) Xiong invests \$2000 in Bank *A* which pays simple interest at a rate of 3% each year.

Find the total amount of interest Xiong receives at the end of 5 years.

\$ ..... [2]

(d) Wendi invests \$400 in Bank *B* which pays compound interest at a rate of 1.6% each year.

Find the total amount of interest Wendi receives at the end of 3 years.

\$ ..... [3]

(e) Pedro invests \$1000 in Bank C for 18 years.
Pedro also invests \$1000 in Bank D for 18 years.

Bank C pays simple interest at a rate of x% each year.
Bank D pays compound interest at a rate of $0.7x$% each year.
At the end of 18 years Pedro has exactly the same amount of money in Bank C and Bank D.

(i) Show that $1+\frac{18x}{100}=\left(1+\frac{0.7x}{100}\right)^{18}$.

[2]

(ii) Given that $5 < x < 7$, use a graphical method to find x.

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

11. 0607_w23_qp_41 Q: 1

(a) Find \$2.40 as a percentage of \$1.60 .

..... % [1]

(b) Calculate 7.2% of 2.5 g.

..... g [2]

(c) Amir invests \$400 at a rate of 1.8% per year compound interest.

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

\$ ..... [2]

(d) Each year the population of a small town increases by 4% of its value in the previous year. The population is now 29 640.

(i) Calculate the population last year.

..... [2]

(ii) Calculate the number of complete years it will take for the population of 29 640 to be first greater than 40 000.

..... years [4]

12. 0607_w23_qp_41 Q: 6

(a) Jade and Kim share \$160.
Jade receives \$8 more than Kim.

Find the ratio Jade's money : Kim's money.
Give your answer in its simplest form.

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

(b) Each year the height of a bush increases by x% of its height at the start of the year.
It takes 6 years for the bush to grow from 1.2 m to 1.664 m.

Find the value of x.

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

(c) Work out, giving each answer in standard form.

(i) $(4.5 \times 10^{85}) \times (3 \times 10^{36})$

..... [2]

(ii) $(2 \times 10^{n}) + (2 \times 10^{n-2})$

..... [2]

13. 0607_w23_qp_42 Q: 6

(a) **(i)** Kayla walks from A to B on a bearing of 105°.
She then walks back to A.

Calculate the bearing Kayla walks from B to A.

..... [2]

(ii) The distance from A to B is 1.5 km.

(a) It takes Kayla 24 minutes to walk from A to B.

Calculate her average speed in km/h.

..... km/h [2]

(b) Kayla has a map with a scale of 1 : 25 000 showing A and B.

Work out the length of AB on the map.
Give your answer in centimetres.

..... cm [2]

(b) A train is 770 m long.
The train takes 2 minutes and 36 seconds to travel completely through a tunnel.
Its speed through the tunnel is 120 km/h.

Work out the length of the tunnel.
Give your answer in metres.

..... m [4]

14. 0607_w23_qp_42 Q: 11

(a) Simplify fully $(64x^6y^3)^{\frac{2}{3}}$.

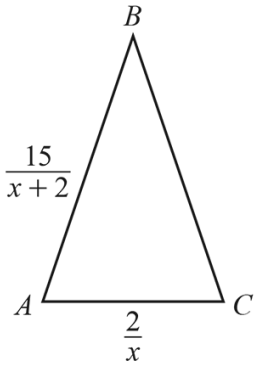
..... [3]

(b) $3^x \times 2^x = 279\,936$

Find the value of x.

$x =$ ..... [2]

(c)



NOT TO SCALE

In triangle ABC, $AB = BC$.
The perimeter of triangle ABC is 16 cm.

(i) Show that $4x^2 - 1 = 0$.

[5]

(ii) Find the length of AB.

$AB =$ ..... cm [2]

15. 0607_w23_qp_43 Q: 1

(a) In 1911 the men's world record for the triple jump was 15.52 m.
In 2021 the record was 18.29 m.

Find 15.52 m as a percentage of 18.29 m.

..... % [1]

(b) In 2021 the women's world record for running 800 m was 1 minute 53 seconds.

Find the average speed for this run in m/s.

.....m/s [2]

(c) In 2021 the men's world record speed for running 100 m was 37.58 km/h.

Find the time taken, in seconds, for this run.

.....s [3]

16. 0607_w23_qp_43 Q: 5

A museum records the value of a picture every 5 years.
The picture increases in value by 60% **every 5 years**.
The value the museum recorded in 2020 was $20 000.

(a) Calculate the value recorded in 2015.

$ ..... [2]

(b) Show that the value recorded in 2040 will be $131 072 .

[1]

(c) Calculate the year in which the value recorded will first be over $1 000 000.

..... [4]

17. 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]

18. 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]

19. 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]

20. 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]

21. 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]

22. 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]

23. 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]

24. 0607_w21_qp_43 Q: 5

(a) Alana and Beau share \$200 in the ratio $x : y$.

An expression for the amount of money Alana receives is $\frac{200x}{x+y}$.

(i) Write down an expression for the amount of money Beau receives.

..... [1]

(ii) Alana and Beau are each given an extra \$50.
The ratio of the total amount of money that each person now has is 3 : 1.

Find the value of $\frac{x}{y}$.

$\frac{x}{y}$ = ... [5]

(b) (i) On 1 January **each year** Bruno invests \$1000 in Bank A.
Bank A pays simple interest at a rate of 4% per year.

Show that the total value of Bruno's investment in Bank A at the end of 4 years is \$4400.

[3]

(ii) On 1 January **each year** Bruno also invests \$1000 in Bank B.
Bank B pays compound interest at a rate of 3.5% per year.

Find the total value of Bruno's investment in Bank B at the end of 4 years.

\$ ..... [3]

25. 0607_s20_qp_41 Q: 7

(a) Louis invests \$500 at a rate of 2.5% per year simple interest.

Calculate the total amount of interest at the end of 8 years.

\$ ..... [2]

(b) Martha invests \$500 at a rate of 2.4% per year compound interest.

Calculate the total amount of interest at the end of 8 years.

\$ ..... [4]

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

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

..... [4]

(d) Oscar invests an amount of money at a rate of r% per year compound interest.
At the end of 31 years the value of Oscar's investment is 2.5 times greater than the original amount of money.

Find the value of r.

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

26. 0607_s20_qp_42 Q: 6

Herman bought a motorbike on 1 January 2014.
By 1 January 2015 the value of the motorbike had reduced by 16%.
By 1 January 2016 the value of the motorbike had reduced by 12% of the value on 1 January 2015.
The value of the motorbike on 1 January 2016 was $7392.

(a) Find how much Herman paid for the motorbike.

$ ..... [3]

(b) From 2016, the value of the motorbike reduced by 8% each year.

Calculate the number of complete years it will take for the value of the motorbike to decrease from $7392 to $5000.

..... [4]

27. 0607_s20_qp_43 Q: 3

(a) Riaz invests \$5000 at a rate of 2.5% per year simple interest.

(i) Calculate the value of the investment at the end of 4 years.

\$ ..... [3]

(ii) Calculate the number of complete years it will take for the value of the investment to be \$6500.

..... [2]

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

(i) Calculate the value of Yasmin's investment at the end of 4 years.

\$ ..... [3]

(ii) Calculate the number of complete years it will take for the value of Yasmin's investment to first be worth more than \$6500.

..... [4]

28. 0607_w20_qp_42 Q: 1

Asif buys a one-year old car.
He pays \$19975 which is 15% less than its price when it was new.

(a) Calculate the price when it was new.

\$ ..... [2]

(b) Option 1 Pay 10% of the \$19975 and then pay \$345 per month for 5 years.

Option 2 Borrow \$19975 and pay this back at the end of 5 years at a rate of 2.5% per year compound interest.

Asif can pay for the car using Option 1 or Option 2.

(i) Using Option 1, find how much Asif would pay in total for the car.

\$ ..... [3]

(ii) By how much is Option 2 cheaper than Option 1?

\$ ..... [4]

29. 0607_w20_qp_43 Q: 1

Adam and Brenda share $560 in the ratio Adam : Brenda = 4 : 3.

(a) Show that Adam receives $320.

[1]

(b) Adam spends 15% of his $320 on some software.

Calculate how much Adam spends on this software.

$ ..... [2]

(c) In a sale, Brenda buys a computer for $179.40 .
This is 8% less than the original price.

Calculate the original price of the computer.

$ ..... [2]

(d) Adam spends a further $29.60 on a train ticket.
Adam and Brenda then work out how much money each of them has left.

Show that Adam has 4 times as much left as Brenda.

[3]

30. 0607_w20_qp_43 Q: 5

(a) Carla invests \$600 at a rate of 1.8% per year compound interest.

Calculate the value of Carla's investment at the end of 7 years.

\$ ..... [3]

(b) Dominic wants to invest his money so that it will double its value in 17 years.

Find the lowest possible rate of compound interest per year that will give Dominic this result.
Give your answer correct to 1 decimal place.

..... % [4]

(c) Each year, the population of a village is decreasing at a rate of 4% of its value at the beginning of that year.
The population is now 2120.

Find the number of complete years since the population was last greater than 2700.

..... [4]

31. 0607_s19_qp_41 Q: 1

In a sale, a shop reduces all its prices by 15%.

(a) Calculate the sale price of a television originally costing \$630.

\$ ..... [2]

(b) The price of a fridge in the sale is \$952.

Calculate the original price.

\$ ..... [3]

(c) After one week the shop reduces the price of the television in **part (a)** by a further 5% each week until it is sold.

Calculate the number of weeks from the start of the sale until the television reaches half the original price.

..... [4]

32. 0607_s19_qp_42 Q: 1

Louis and Maria share \$50 in the ratio 11 : 14.

(a) Show that Louis receives \$22.

[1]

(b) Louis and Maria each spend \$6 from their share of the \$50.

Find the new ratio Louis' money : Maria's money.

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

(c) Louis spends $\frac{17}{32}$ of his **remaining** money to buy a bus ticket.

Calculate the cost of the bus ticket.

\$ ..... [1]

(d) In a sale, a bookshop reduces the price of each book by 10%.
Maria buys two of these books.

(i) The first book Maria buys has an original price of \$6.

Calculate how much Maria pays for this book.

\$ ..... [2]

(ii) Maria pays \$3.69 for her second book.

Calculate the original price of this book.

\$ ..... [3]

33. 0607_s19_qp_42 Q: 5

(a) Karl invests \$200 at a rate of 1.5% per year simple interest.

Calculate the value of Karl's investment at the end of 8 years.

\$ ..... [3]

(b) Lena invests \$200 at a rate of 1.4% per year compound interest.

Calculate the value of Lena's investment at the end of 8 years.

\$ ..... [3]

(c) The rates of interest remain the same as in **part (a)** and **part (b)**.

Find how many **more** complete years it will take for the value of Lena's investment to be greater than the value of Karl's investment.

..... [2]

34. 0607_s19_qp_43 Q: 7

(a) Sergio invests \$2000 at a rate of 3% per year compound interest.

(i) Find the value of his investment at the end of 5 years.

\$ ..... [3]

(ii) After how many complete years is the value of his investment greater than \$4000?

..... [3]

(b) Anna invests \$2000 at a rate of 0.24% per **month** compound interest.

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

\$ ..... [3]

(c) Calculate the **monthly** compound interest rate that is equal to a compound interest rate of 3% per year.

.....% [3]

35. 0607_w19_qp_41 Q: 2

(a) Increase 4.5 kg by 16%.

..... kg [2]

(b) Find the percentage profit when the cost price of a book is \$8.50 and the selling price is \$11.05 .

.....% [3]

(c) The price of a loaf of bread increases by \$0.06 .
This is a 5% increase.

Find the original price of this loaf of bread.

\$..... [2]

36. 0607_w19_qp_41 Q: 5

Each year the value of a motor bike **decreases** by 10% of its value at the start of the year.
At the start of 2019, the value of the motor bike was $2025.

(a) Find the value at the end of 4 years.
Give your answer correct to the nearest dollar.

$..... [4]

(b) Find the value at the start of 2017.

$..... [2]

(c) Find the number of complete years it takes for the value of $2025 to decrease to a value less than $500.

..... [4]

37. 0607_w19_qp_42 Q: 3

Alana and Bill share some money in the ratio 5 : 4.
Alana's share is \$160.

(a) Show that Bill's share is \$128.

[1]

(b) Alana spends \$$x$.
The ratio of Alana's money : Bill's money is now 4 : 5.

Find the value of x.

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

(c) A shop has a sale.
Bill buys a jacket in the sale for \$32.

(i) Write \$32 as a percentage of \$128.

.....% [1]

(ii) The original price of the jacket was reduced by 20% to \$32.

Work out the original price.

\$..... [3]

38. 0607_w19_qp_43 Q: 1

(a) Aisha invests \$12 000 at a compound interest rate of 3.5% per year.

Calculate the value of her investment at the end of 4 years.

\$..... [3]

(b) 2 years ago, Byron invested \$$P$ at a compound interest rate of 3% per year.
The value of his investment is now \$10 078.55 .

Calculate the value of P.

P = ... [3]

(c) 5 years ago Cheng invested \$$Q$ at a **simple** interest rate of 4% per year.
The value of his investment is now \$20 400.

Calculate the value of Q.

Q = ... [3]

39. 0607_s18_qp_41 Q: 2

Conrad, Delia and Eli share \$8000 in the ratio Conrad : Delia : Eli = 5 : 7 : 8 .

(a) Show that Eli receives \$3200.

[2]

(b) Conrad buys a toy for \$65.
He sells it for \$55.

Calculate the percentage loss.

..... % [3]

(c) Delia invests \$2500 at a rate of 2.5% per year simple interest.

Calculate the interest Delia has at the end of 8 years.

\$ ..... [2]

(d) Eli invests \$2400 at a rate of 2.4% per year compound interest.

Calculate the interest Eli has at the end of 8 years.

\$ ..... [3]

(e) Conrad buys a coat in a sale.
The sale price is \$79.80 after a reduction of 5%.

Calculate the original price of the coat.

\$ ..... [3]

40. 0607_s18_qp_41 Q: 8

Every year the value of Xavier's car decreases by 10%.
The value is now $12 960.

(a) Calculate the value of the car 2 years ago.

$ ..... [2]

(b) Calculate the number of complete years it will take for the value to decrease from $12 960 to less than $6480.

..... [3]

41. 0607_s18_qp_43 Q: 2

Flavia makes china cats.
They each cost $22.60 to make.

(a) Flavia sells some of them to Ari.
She makes a profit of 35% on each cat.

Calculate the price Ari pays for each cat.

$ ..... [2]

(b) Ari sells each cat for $43.

Calculate Ari's percentage profit.

.....% [3]

(c) Jean buys 92 of Flavia's cats.
This is 15% more than the number Ari bought.

Calculate the number of cats that Ari bought.

..... [3]

(d) Jean bought the cats for $32 each.
He sells some of the cats for $45 each.
For the rest of the cats he reduces the price by 5% each day.

Find the number of reductions he has made when the price first falls below $32.

..... [3]

42. 0607_w18_qp_41 Q: 5

The number of fish in a lake decreases by 4% each year.
In January 2018 there are 30 000 fish in the lake.

(a) Calculate the number of fish in the lake in

(i) January 2019,

..... [2]

(ii) January 2029,

..... [3]

(iii) January 2017.

..... [3]

(b) Find the last year in which there were at least 50 000 fish in the lake.

..... [4]

(c) Philip runs a fishing business and he works 50 weeks every year.
In 2018, he catches 800 kg of fish in each of these weeks.
He sells all the fish he catches at a price of \$3.50 for each kilogram.

(i) Calculate the total amount he receives in 2018.

\$ ..... [3]

(ii) For each of the 50 weeks, Philip's business costs \$2240 to run.

Calculate his profit as a percentage of \$2240.

..... % [3]

(d) In 2019, Philip's business costs 8% more to run than in 2018.
The selling price of fish decreases by 10%.

Find the amount of fish, in kilograms, Philip will need to catch each week to keep the percentage profit found in **part (c)(ii)** the same.

..... kg [4]

43. 0607_w18_qp_42 Q: 1

Adila has $10 000.

(a) She uses some of the money to buy a car.
The salesman reduces the price from $3800 to $3610.

Calculate the percentage reduction.

.....% [3]

(b) Adila invests the remaining $6390 at a rate of 3% per year compound interest.

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

$ ..... [3]

(ii) Find the least number of complete years after which the value of the investment is more than $9000.

..... [4]

44. 0607_w18_qp_43 Q: 1

(a) In a school there are 225 girls and 190 boys.

(i) Work out the number of boys as a fraction of the total number of students.
Give your answer in its lowest terms.

..... [2]

(ii) Write the ratio number of girls : number of boys in its simplest form.

..... [2]

(b) In a mathematics class there are 15 boys.
The ratio number of girls : number of boys = 6 : 5.

Find the number of girls in this class.

..... [2]

(c) In a science class of 33 students there are 15 boys.

(i) Find the number of boys as a percentage of the number of students in the class.

..... % [1]

(ii) 20% of these boys did not complete an experiment.

Work out the number of boys who did not complete the experiment.

..... [2]

(d) This year the number of students studying mathematics is 390.
This is an increase of 4% on the number of students who studied mathematics last year.

Work out the number of students who studied mathematics last year.

..... [3]

45. 0607_w18_qp_43 Q: 7

(a) The population of a small town is decreasing at a rate of 5% every 10 years.
The population is now 26 010.

Calculate the population in 20 years time.
Give your answer correct to the nearest 100.

..... [3]

(b) The population was previously **increasing** at a rate of 2% each year.
The population is now 26 010.

(i) Calculate the population 2 years ago.

..... [2]

(ii) Find the number of complete years since the population was last less than 20 000.

..... [4]

46. 0607_s17_qp_42 Q: 1

In 2016, Carla's salary was $23 970 per year.

(a) From her salary she pays tax at a rate of 20%.
She is paid monthly in equal amounts.

Calculate the amount Carla receives each **month** after tax has been paid.

$ ..... [3]

(b) Carla's salary of $23 970 was 2% more than her salary in 2015.

(i) Calculate her yearly salary in 2015.

$ ..... [3]

(ii) From 2016, Carla's employer agrees to pay her an increase of 3% each year.

Calculate the year in which her salary is first greater than $30 000.

..... [3]

47. 0607_s17_qp_43 Q: 4

(a) Marie has $260.50 and Luk has $208.40 .

(i) Find, in its simplest form, the ratio Marie's money : Luk's money.

Marie's money : Luk's money = ... : ..... [2]

(ii) Marie spends 16% of her money to buy a new coat.

Calculate the cost of the coat.

$ ..... [2]

(iii) In a sale, the prices of all books are reduced by 10%.
Luk buys a book for $11.25 .

Calculate the original price of the book.

$ ..... [3]

(iv) Marie invests $200 at a rate of 2% per year **simple** interest.

Calculate the total value of this investment at the end of 25 years.

$ ..... [3]

(v) Luk invests \$190 at a rate of 2% per year **compound** interest.

Calculate the value of this investment at the end of 25 years.

\$ ..... [3]

(b) Fredrik invests \$120 at a rate of 5.7% per year **compound** interest.

Calculate the number of complete years it will take until the value of this investment is first greater than \$300.

..... [3]

48. 0607_w17_qp_41 Q: 2

Two banks pay interest in the following ways.

Bank A Simple interest at a rate of 2.5% per year for the first year and then compound interest at a rate of 1.5% per year for each year after that.

Bank B Simple interest at 1.6% per year.

(a) Cherie invested $3000 in Bank A on 1st January 2016.

Find how much the investment will be worth on 1st January 2019.

$ ..... [3]

(b) Dieter invested $3000 in Bank B on 1st January 2016.

Find how much the investment will be worth on 1st January 2019.

$ ..... [3]

(c) Show that Cherie's investment will be the first to be worth $3500.

[4]

49. 0607_w17_qp_42 Q: 2

In a sale, a shop reduces all of its prices by 15%.

(a) Jake buys a jacket which had an original price of \$65.

(i) Calculate how much Jake pays for the jacket.

\$ ..... [2]

(ii) After paying for the jacket, Jake has \$24.75 left.

Work out \$24.75 as a fraction of the total amount of money Jake had before he bought the jacket. Give your answer in its lowest terms.

..... [2]

(b) In the sale, Amy pays \$80.75 for a coat.

Calculate the original price of the coat.

\$ ..... [3]

(c) One day the shop reduces its **sale** prices by 10%.

Calculate the overall percentage reduction of the original prices.

..... % [2]

50. 0607_w17_qp_42 Q: 5

(a) Carlos owns a vintage car.
Each year the value of the car increases by 4% of its value at the start of the year.
At the start of 2012 the value of the car was \$17 500.

Calculate the value of the car at the start of 2018.
Give your answer correct to the nearest \$100.

\$ ..... [4]

(b) Alex invests \$200 at a rate of r % per year compound interest.
After 12 years, Alex has a total amount of \$239.12 .

Find the value of r.

r = ... [3]

51. 0607_w17_qp_43 Q: 2

Alan, Brendan and Cieran work as gardeners.

(a) The total amount of money they earn is shared in the ratio of the time each person works.
One day Alan works for 2 hours 40 minutes, Brendan works for 5.5 hours and
Cieran works for 200 minutes.
They earn, in total, \$379.50 .

By changing all the times into minutes, find the amount of money each person earns.

Alan \$ .....

Brendan \$ .....

Cieran \$ .....

[5]

(b) **(i)** Alan needs to buy some gardening tools.
In shop A, the price of the tools is \$70.20 .
In shop B, the price of the tools is 5% less than in shop A.

Find the price of the tools in shop B.

\$ ..... [2]

(ii) The price of \$70.20 is 8% higher than it was last year.

Find the price last year.

\$ ..... [3]

(c) **(i)** Brendan invests \$450 for 5 years at a rate of 3.5% per year simple interest.

Show that the total value of this investment after 5 years is \$528.75 .

[2]

(ii) Cieran invests \$450 for 5 years at a rate of x % compound interest.
The value of Cieran's investment after 5 years is \$530.60 .

Find the value of x.

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

52. 0607_s16_qp_41 Q: 1

(a) Annelise buys a car that is one year old for $13 600.
The value of this car has reduced by 15% of the value when it was new.

(i) Calculate the value of the car when it was new.

$ ..... [3]

(ii) After the first year the car reduces in value by 11% each year for the next 3 years.

Calculate the value of the car after these 3 years.

$ ..... [3]

(b) Boris buys a car for $23 000.
The value of this car reduces by 8% each year.

Find the number of complete years it takes for the value of the car to fall below $11 500.

..... [3]

53. 0607_s16_qp_42 Q: 2

Nikhil and Padma share $630 in the ratio 5 : 4.

(a) Show that Nikhil receives $350 and that Padma receives $280.

[2]

(b) **(i)** In a sale, prices are reduced by 18%.
Padma buys a jacket for $98.40 in this sale.

Calculate the original price of the jacket.

$ ..... [3]

(ii) Padma decides that she does not like the jacket and sells it for $30.

Calculate the percentage loss made by Padma.

..... % [3]

(iii) Calculate how much of the $280 Padma now has.

$ ..... [1]

(iv) Padma invests \$150 at a rate of 2% per year compound interest.

Calculate the total value of this investment after 10 years.
Give your answer correct to the nearest dollar.

\$ ..... [4]

(c) On January 1st 2016, Nikhil invested all of his \$350 at a rate of 0.15% per **month** compound interest.

Find in which month and in which year Nikhil's investment will first have a total value of at least \$500.

month ..... year ..... [5]

54. 0607_s16_qp_43 Q: 7

Sasha bought a house on 1st January 2013.
By 1st January 2014 the value of the house had increased by 10%.
By 1st January 2015 the value of the house had increased by a further 5% of its value on 1st January 2014.
The value of the house on 1st January 2015 was $103 950.

(a) Find how much Sasha paid for the house in 2013.

$ ..... [4]

(b) By 1st January each year, from 2015, the value of the house increases by 5% of its value on 1st January the previous year.
The value of the house on 1st January 2015 was $103 950.

Find the year in which the value of the house will first be greater than $200 000.

..... [3]

55. 0607_w16_qp_41 Q: 12

(a) In 2015, Ahmed had a monthly salary of \$1375.
In 2016, his monthly salary is \$1540.

(i) Calculate the percentage increase in Ahmed's monthly salary.

..... % [3]

(ii) Work out \$1375 as a percentage of \$1540.

..... % [1]

(iii) In 2015, Ahmed's monthly salary of \$1375 was 10% more than his monthly salary in 2014.

Calculate Ahmed's monthly salary in 2014.

\$ ..... [3]

(b) Samia invested $500 in each of two Schemes.

Scheme A 3% per year simple interest.

Scheme B 2.5% per year compound interest.

(i) Calculate the difference between the value of Scheme A and the value of Scheme B after 5 years. Show all your working.

$ ..... [5]

(ii) Find the number of complete years it will take for the value of Scheme B to be greater than the value of Scheme A.

..... [4]

56. 0607_w16_qp_43 Q: 2

Gennaro has $276 480 in his Pension Fund.

(a) Gennaro has two options.

Option A Receive 25% of the $276 480 now
plus
5.5% of the remaining 75% each year.

Option B Receive 5.5% of the whole $276 480 each year.

(i) Show that the total amount Gennaro will have received at the end of 10 years, if he chooses option A, is $183 168.

[3]

(ii) After how many whole years will the total amount received using option B become more than the total amount received under option A?

..... [4]

(b) The $276 480 is 8% more than the amount the Pension Fund was worth one year ago.

Calculate how much it was worth one year ago.

$ ..... [3]

57. 0607_s15_qp_41 Q: 11

Paula invests \$3000 in Bank *A* and \$3000 in Bank *B*.

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

(i) Find the total amount that Paula has in Bank *A* at the end of 3 years.

Answer(a)(i) \$ ..... [2]

(ii) After how many complete years is the total amount that Paula has in Bank *A* greater than \$4000?

Answer(a)(ii) ..... [3]

(b) Bank *B* pays simple interest at a rate of 5% each year.

(i) Find the total amount that Paula has in Bank *B* at the end of 3 years.

Answer(b)(i) \$ ..... [1]

(ii) After how many complete years is the total amount that Paula has in Bank *B* greater than \$4000?

Answer(b)(ii) ..... [1]

(c) After how many complete years will the total amount that Paula has in Bank *A* be greater than the total amount that Paula has in Bank *B*?

Answer(c) ..... [3]

58. 0607_s15_qp_42 Q: 1

An art gallery values its paintings every five years.
The value of one painting increased by 90% every five years from 1990.
The value in 1995 was $76 000.

(a) Calculate the exact value of the painting in

(i) 1990,

Answer(a)(i) $ ..... [3]

(ii) 2010.

Answer(a)(ii) $ ..... [3]

(b) The value of the painting continues to increase by 90% every five years.

In which year's valuation will the value of the painting first be over $10 million?

Answer(b) ..... [2]

59. 0607_s15_qp_43 Q: 3

Sinitta makes necklaces.
Each necklace costs Sinitta $56 to make.
They are sold through an internet shop at a selling price of $80.

(a) (i) The internet shop charges her 7% of the selling price.

Find the amount that Sinitta receives from the shop for a necklace.

Answer(a)(i) $ ..... [2]

(ii) The shop increases the charge to 12% of the selling price of $80.

Calculate the percentage reduction in Sinitta's **profit**.

Answer(a)(ii) ..... % [4]

(b) Sinitta also makes silver rings.
Each ring contains 22 g of silver.
In the last year the cost of silver has increased by 8% to $143.10 per 100 grams.

(i) Find the cost of each 100 g of silver before the increase.

Answer(b)(i) $ ..... [2]

(ii) Find the increase in the cost of the silver in a ring.

Answer(b)(ii) $ ..... [2]

60. 0607_w15_qp_41 Q: 1

Sunil has \$80 and Asha has \$75.

(a) Write the ratio 80 : 75 in its simplest form.

Answer(a)..... : .....[1]

(b) **(i)** Sunil spends \$24.

Work out \$24 as a percentage of \$80.

Answer(b)(i) .....% [1]

(ii) Sunil invests \$50 at a rate of 2% per year compound interest.

Calculate the **interest** Sunil has after 20 years.

Answer(b)(ii) \$ .....[4]

(c) During each month, Asha spends $\frac{1}{5}$ of the money that she had at the beginning of the month.

(i) Work out how much of the \$75 Asha has at the end of the 2nd month.

Answer(c)(i) \$ .....[2]

(ii) Calculate the number of **whole** months it takes for Asha to have less than \$5.

Answer(c)(ii) .....[3]

61. 0607_w15_qp_42 Q: 9

(a) A coat costs \$100.
The price is increased by 10% and then decreased by 10%.

Find the new price of the coat.

Answer(a) \$ ..... [2]

(b) A chair costs \$1000.
The price is increased by 20% and then decreased by 20%.

Find the new price of the chair.

Answer(b) \$ ..... [2]

(c) A car costs \$10 000.

The price is increased by x% and then decreased by x%.

Find an expression, in terms of x, for the new price of the car.
Give your answer in its simplest form.

Answer(c) \$ ..... [3]

62. 0607_w15_qp_43 Q: 2

(a) Jay buys a bicycle for \$220.
He later sells it for \$160.

Calculate his percentage loss.

Answer(a) ..... % [3]

(b) A television has a sale price of \$216 after a reduction of 10%.

Calculate the original price of the television.

Answer(b) \$ ..... [3]

(c) The population of a village is 2180.
The population decreases by 3% each year.

(i) Calculate the population in 20 years time.

Answer(c)(i) ..... [3]

(ii) Calculate the number of whole years it takes for the population to decrease from 2180 to less than 1000.

Answer(c)(ii) ..... [2]

63. 0607_s18_qp_42 Q: 1

(a) Work out.

$$\frac{\sqrt[3]{402}}{3.15^2}$$

..... [1]

(b) Write 130.47 correct to

(i) one decimal place,

..... [1]

(ii) one significant figure.

..... [1]

(c) Work out 23% of \$76.80 .

\$ ..... [2]

(d) \$4200 is shared in the ratio 3 : 4 : 6 : 8 .

Find the difference between the largest share and the smallest share.

\$ ..... [3]

(e) Write down an irrational number less than 10.

..... [1]

(f) Work out $7.31 \times 10^{-2} + 1.56 \times 10^{-1}$.
Give your answer in standard form.

..... [2]

64. 0607_w16_qp_43 Q: 1

(a) Work out.

(i) $\sqrt[3]{79\,507}$

..... [1]

(ii) $3.6^2 + \frac{1}{0.63}$

..... [1]

(b) $p = 5.62 \times 10^5$ $q = 6.83 \times 10^{-3}$

Work out, giving your answers in standard form.

(i) p^2

..... [2]

(ii) $\frac{p}{q}$

..... [2]

65. 0607_m21_qp_42 Q: 2

(a) Write 260 512 correct to 3 significant figures.

..... [1]

(b) Write 0.000 000 576 in standard form.

..... [1]

(c) Calculate $\sqrt{27^2 - 6 \times 31^{0.3}}$.
Give your answer correct to 1 decimal place.

..... [2]

(d) **(i)** Work out 37% of $820.

$ ..... [2]

(ii) Work out $36 as a percentage of $150.

..... % [1]

(e) An amount of money is shared between Alan, Bjorn and Carlo in the ratio 3 : 7 : 5.
Carlo receives $695.

(i) Find the total amount of money shared.

$ ..... [3]

(ii) Carlo invests 40% of his $695 at a rate of 1.2% per year compound interest.

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

$ ..... [3]

(f) Dana invests \$2100 for 12 years at a rate of x% per year compound interest.
At the end of the 12 years, the value of her investment is \$2663.31 .

Calculate the value of x.

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

---

66. 0607_s16_qp_43 Q: 1

(a) Write the number 13205.17268

(i) correct to 1 decimal place,

..... [1]

(ii) correct to 3 significant figures,

..... [1]

(iii) correct to the nearest 10,

..... [1]

(iv) correct to the nearest 0.001.

..... [1]

(b) Write the number 120 correct to the nearest 10.

..... [1]

---

67. 0607_w15_qp_42 Q: 1

(a) By writing each number correct to 1 significant figure, find an estimate for

$$\frac{\sqrt[3]{987}}{5.13}+\frac{(16.3+1.91^2)}{\sqrt{9.12}}.$$

You must show your working.

Answer(a) ..... [2]

(b) Explain why your answer to **part (a)** is greater than the actual answer.

Answer(*b*) .....

..... [2]

(c) Work out.

$$\frac{\sqrt[3]{987}}{5.13}+\frac{(16.3+1.91^2)}{\sqrt{9.12}}.$$

Answer(c) ..... [1]

68. 0607_s20_qp_43 Q: 1

For each sequence, write down the next two terms and find an expression for the nth term.

(a) 15, 11, 7, 3, −1, ...

Next two terms ..... , ...

nth term ..... [3]

(b) 1, 2, 4, 8, 16, ...

Next two terms ..... , ...

nth term ..... [3]

(c) 4, 10, 18, 28, 40, ...

Next two terms ..... , ...

nth term ..... [3]

69. 0607_w20_qp_41 Q: 6

Find the next term and the nth term in each of these sequences.

(a) 125, 64, 27, 8, 1, …

Next term .....

nth term ..... [3]

(b) 6, 12, 20, 30, 42, …

Next term .....

nth term ..... [4]

---

70. 0607_w21_qp_43 Q: 3

Anna flies by plane from Manchester (UK) to Goa (India).
The plane flies a distance of 7650 km.

(a) The flight takes 8.5 hours.

(i) Calculate the average speed of the plane.

..... km/h [1]

(ii) The plane leaves Manchester at 2045.
The local time in Goa is 5 hours 30 minutes ahead of the local time in Manchester.

Find the local time in Goa when the plane lands.

..... [2]

(b) The exchange rate is 1 pound (£) = 90 Indian rupees (INR).

(i) The cost of the flight is £299.

Calculate the cost of the flight in Indian rupees.

INR ..... [1]

(ii) Anna returns to Manchester with 4014 Indian rupees.
She changes this money into pounds.

Calculate this amount in pounds.

£ ..... [1]

71. 0607_w20_qp_42 Q: 5

Naomi flies non-stop from London, England, to Perth, Australia.
The flight takes 16 hours 45 minutes.
The distance is 14 498 km.

(a) Find the average speed of the plane in km/h.

..... km/h [2]

(b) The plane leaves London at 13 15.
The time in Perth is 8 hours ahead of the time in London.

Find the time in Perth when the plane lands.

..... [3]

(c) The cost, in pounds (£), of the flight is £827.75 .
The exchange rate is 1 Australian dollar = £0.55 .

Calculate the cost of the flight in Australian dollars.

..... Australian dollars [2]

72. 0607_s18_qp_41 Q: 10

(a) Sam walks for 30 minutes at 4 km/h and then runs 5 km in 25 minutes.

Calculate his average speed.
Give your answer in km/h.

..... km/h [3]

(b) **(i)** Tami walks for 10 minutes at x km/h and then runs y kilometres in z minutes.

Find her average speed in terms of x, y and z.
Give your answer in km/h, in its simplest form.

..... km/h [3]

(ii) When Tami walks for 10 minutes at 3 km/h and then runs for 20 minutes, her average speed is 11 km/h.

Find the distance Tami runs.

..... km [2]

(c) Urs walks for t minutes at 3 km/h and then runs for $(t+10)$ minutes at 7 km/h.

(i) Show that his average speed is $\frac{5t+35}{t+5}$ km/h.

[3]

(ii) When the average speed is $5\frac{1}{2}$ km/h, find the value of t.

$t =$ ..... [2]

73. 0607_w18_qp_42 Q: 7

The length of the Jinghu high speed railway from Beijing to Shanghai is 1318 km.

(a) A train travels at an average speed of 252 km/h.
This train leaves Beijing at 12 49.
The local time in Beijing is the same as the local time in Shanghai.

Find the time, correct to the nearest minute, that this train arrives in Shanghai.

..... [4]

(b) On the journey this train passes over a bridge of length 6772 m at 252 km/h.
The train is 401 m long.

(i) Change 252 kilometres per hour to metres per second.

..... m/s [2]

(ii) Calculate the time, in seconds, for the train to completely cross the bridge.

..... s [2]

74. 0607_s17_qp_42 Q: 5

Nitini flies from New Delhi to Singapore for a holiday.

(a) Nitini changes 119 050 Indian rupees (INR) to Singapore dollars (SGD).
The exchange rate is 1 SGD = 47.62 INR.

Find how many Singapore dollars he receives.

..... SGD [2]

(b) The flight from New Delhi to Singapore takes 5 hours and 45 minutes.
The distance of the flight is 4150 km.

(i) The time in New Delhi when the flight leaves is 21 55.
The time in Singapore is $2\frac{1}{2}$ hours ahead of the time in New Delhi.

Find the time in Singapore when the flight arrives.

..... [2]

(ii) Find the average speed of the aircraft.

..... km/h [3]

(iii) On the return flight the average speed is 750 km/h.

Find the time of this flight in hours and minutes.

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

75. 0607_w17_qp_41 Q: 7

Javier starts a journey at 22 50.

(a) For the first part of the journey he drives for 2 hours 45 minutes at 70 km/h.

Find the distance he travels.

..... km [3]

(b) Javier then stops for 30 minutes.
He then drives the remaining 180 km of his journey at 85 km/h.

(i) Find his average speed for the whole journey.

..... km/h [4]

(ii) Find the time he arrives at his destination.

..... [2]

76. 0607_s16_qp_41 Q: 9

Hamish travels from Perth to London by train.
During the journey, the train stops in Edinburgh.

(a) The distance from Perth to Edinburgh is 65 km.
The train travels at an average speed of 48.75 km/h for this part of the journey.

Find the time taken to travel from Perth to Edinburgh.
Give your answer in hours and minutes.

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

(b) The average speed for the whole journey from Perth to London is 119.5 km/h.
The distance from Edinburgh to London is 632 km.

Find the average speed for the journey from Edinburgh to London.

..... km/h [5]

(c) During the journey, the train travels through a tunnel of length 800 m.
The train travels through this tunnel at 120 km/h.
The train is 130 m long.

Calculate the time taken for the train to pass completely through the tunnel.
Give your answer in seconds.

..... s [3]

77. 0607_w16_qp_41 Q: 1

Toby takes a journey from Johannesburg to Zurich.

(a) He changes 2500 rand into Swiss francs (CHF).
1 Swiss franc = 12.43 rand.

Calculate the amount Toby receives in Swiss francs.
Give your answer correct to the nearest Swiss franc.

..... CHF [2]

(b) Toby leaves Johannesburg at 1930 and arrives in Zurich at 0610 the next morning.
Local time in Zurich is the same as local time in Johannesburg.
The distance from Johannesburg to Zurich is 8350 km.

(i) Calculate the average speed of the journey.

.....km/h [3]

(ii) After arriving at 0610, Toby takes a further 1 hour 55 minutes to reach his office.

Work out the time he arrives at his office.

..... [1]

(iii) Later, Toby takes a taxi from his office to a hotel.
The taxi fare is made up of a fixed charge of 20 CHF plus 2.40 CHF per kilometre.
Toby paid 36.80 CHF altogether.

Work out the distance of Toby's taxi journey.

.....km [3]

78. 0607_s15_qp_42 Q: 3

Jean-Paul goes on holiday and drives 780 km.
He leaves at 0645 and arrives at 1610.

(a) Find the average speed for the whole journey.

Answer(a) ..... km/h [3]

(b) He travels partly on autoroutes and partly on other roads.
He travels for 520 km on autoroutes at an average speed of 105 km/h.

Find the average speed for the part of the journey on other roads.

Answer(b) ..... km/h [3]

(c) For every 100 km travelled on autoroutes, Jean-Paul's car uses 6 litres of fuel.
For every 100 km travelled on other roads, it uses 8 litres of fuel.
Fuel costs 1.63 euros per litre.
The total autoroute toll charges are 15.20 euros.

Find the total cost of the journey.

Answer(c) ..... euros [4]

79. 0607_s15_qp_43 Q: 1

Sancha flew from Santiago to Paris, a distance of 11 585 km.
The average speed of the flight was 852.9 km/h.

(a) Find the length of time for the flight.
Give your answer in hours and minutes.

Answer(a) ..... h ..... min [3]

(b) The journey back from Paris to Santiago took 14 hours 30 minutes.
The plane left Paris at 23 20.
The local time in Santiago is 6 hours behind the local time in Paris.

Find the local time this plane arrived in Santiago.

Answer(b) ..... [2]

(c) Find the overall average speed for the total journey from Santiago to Paris and back to Santiago.

Answer(c) ..... km/h [3]

80. 0607_w15_qp_42 Q: 8

Freddo lives in Manchester. He drives to Cambridge for a meeting.
The distance from Manchester to Cambridge is 300 km.

(a) Freddo leaves Manchester at 07 05 and arrives in Cambridge at 10 50.

Calculate his average speed.

Answer(a) ..... km/h [3]

(b) After the meeting Freddo drives back to Manchester.
His average speed for this journey is 5% more than his average speed driving to Cambridge.
He leaves Cambridge at 17 45.

Find the time Freddo arrives in Manchester.

Answer(b) ..... [3]

(c) Freddo's car uses fuel at the rate of 8.1 km per litre.
Fuel costs £1.45 per litre.

Find the total cost of fuel for Freddo's journey from Manchester to Cambridge and back to Manchester.

Answer(c) £ ..... [2]

81. 0607_w15_qp_43 Q: 7

(a) Kim walks 10 km at 4 km/h and then a further 6 km at 3 km/h.

Calculate Kim's average speed.

Answer(a) ..... km/h [3]

(b) Chung runs at x km/h for 45 minutes and then at $(x - 2)$ km/h for 30 minutes.

Find an expression, in terms of x, for Chung's average speed in km/h.
Give your answer in its simplest form.

Answer(b) ..... km/h [4]

Appendix A

Answers

1. 0607_s24_ms_41 Q: 4

Question	Answer	Marks	Partial Marks
(a)	73.92	**2**	**M1** for $84\times\frac{(100-12)}{100}$ soi or **B1** for 10.08
(b)	1280	**2**	**M1** for $x\times\frac{100-25}{100}=960$ oe
(c)(i)	732.09	**2**	**M1** for 600×1.051^4 oe
(c)(ii)	11	**4**	**B3** for 10.3 or 10.26 to 10.27 or **M3** for $n\log1.051=\log\frac{1000}{600}$ or good sketch indicating value between 10 and 11 or correct trials reaching 10 and 11 or **M2** for $1.051^n=\frac{1000}{600}$ oe or sketch that could lead to solution e.g. $y=1.051^x$, $y=1.67$ or at least 3 correct trials with $n>4$ or **M1** for $600\times1.051^n=1000$ oe or suitable graph e.g. $y=1.051^x$ or at least 2 trials with $n>4$
(d)(i)	75	**2**	**M1** for $[120\times]\frac{5}{5+3}$ oe
(d)(ii)	$3[k](1+0.2):5[k](1-0.2)$	**M2**	**M1** for $5[k](1-0.2)$ or $3[k](1+0.2)$ or for *their* **(d)(i)**$(1-0.2)$
	Leading to 9 : 10	**A1**	No errors seen

2. 0607_s24_ms_42 Q: 2

Question	Answer	Marks	Partial Marks
(a)	$\frac{210}{7}\times 8$ oe	**M1**	
(b)(i)	50.4[0]	**1**	
(b)(ii)	47.5 or 47.54...	**2**	**M1** for $\frac{75.50+their\textbf{(i)}}{240}\times 100$ or $\frac{240-(75.50+their\textbf{(i)})}{240}$
(c)	175	**2**	**M1** for $X\times\frac{100-20}{100}=140$ oe or better
(d)	1.63 [: 1]	**2**	**M1** for (240 – 75.50 – *their* **(b)(i)**) : (210 – 140) or $\frac{8}{7}\times 47.5$: 33.3 oe

3. 0607_s24_ms_42 Q: 6

Question	Answer	Marks	Partial Marks
(a)	11 cao	4	**B3** for 10.6 or 10.62 to 10.63 OR or **M3** for $n\log\left(1+\frac{2.5}{100}\right)=\log\left(\frac{130}{100}\right)$ oe or good sketch indicating value between 10 and 11 or correct trials reaching 10 and 11 or **M2** for $\left(1+\frac{2.5}{100}\right)^n=\frac{130}{100}$ oe or suitable graph with $n>1$ or at least 3 correct trials or **M1** for $[...]\times\left(1+\frac{2.5}{100}\right)^n=\frac{130}{100}\times[...]$ oe soi by at least 2 trials with $n>1$
(b)	3154 cao	4	**B3** for 3153.7 to 3153.8 OR **M3** for $25215\times1.025^3-\frac{25215}{1.025^2}$ oe OR **M1** for $X\times\left(1+\frac{2.5}{100}\right)^2=25215$ **M1** for $25215\times\left(1+\frac{2.5}{100}\right)^3$ or for *their* $24000\times\left(1+\frac{2.5}{100}\right)^5$ oe provided *their* 2027 amount is greater than 25215

4. 0607_s24_ms_43 Q: 2

Question	Answer	Marks	Partial Marks
(a)	2400	**2**	**M1** for $\frac{3000}{5}$
(b)	2.8	**3**	**M2** for $\frac{3000\times r\times 10}{100} = 840$ oe or **M1** for $\frac{3000\times r\times 10}{100}$ or **B1** for [1 year interest] = 84
(c)	2.6[0]	**3**	**M2** for $\sqrt[8]{\frac{7367.67}{6000}}$ oe or **M1** for $6000(.....)^8 = 7367.67$
(d)	23 cao	**4**	**B3** for 22.7 or 22.72 to 22.73 OR **M3** $n\log\left(1+\frac{1.8}{100}\right)=\log\left(\frac{6000}{4000}\right)$ oe or good sketch indicating value between 22 and 23 or correct trials reaching 22 and 23 or **M2** for $\left(1+\frac{1.8}{100}\right)^n=\frac{6000}{4000}$ oe or suitable graph with $n > 1$ or at least 3 correct trials or **M1** for $4000\times\left(1+\frac{1.8}{100}\right)^n = 6000$ oe soi by at least 2 correct trials with $n > 1$

5. 0607_m23_ms_42 Q: 9

Question	Answer	Marks	Partial Marks
(a)(i)	5737.62	**2**	**M1** for 5000×1.035^4 oe

Question	Answer	Marks	Partial Marks
(a)(ii)	14	**4**	**B3** for 13.6 to 13.7 OR **M3** for $n\log 1.035 = \log\frac{8000}{5000}$ oe or good sketch indicating value between 13 and 14 or correct trials reaching 13 and 14 or **M2** for $1.035^n = \frac{8000}{5000}$ oe or exponential sketch or at least 3 correct trials with $n > 4$ or **M1** for $5000 \times 1.035^n = 8000$ oe or at least 2 correct trials If 0 scored, **SC3** for answer 2 coming from use of 1.35
(b)(i)	5800	**3**	**M2** for $5000 + \frac{5000 \times 4 \times 4}{100}$ oe or **M1** for $\frac{5000 \times 4 \times 4}{100}$ oe
(b)(ii)	15	**2**	**M1** for $5000 + \frac{5000 \times 4 \times n}{100} = 8000$ oe
(c)	9	**4**	**B3** for 8.556… or 8.56 OR **M1** for $5000 \times 1.035^n = 5000(1 + 0.04n)$ oe soi **M1** for sketch of 1.035^n **M1** for sketch of $1 + 0.04n$

6. 0607_s23_ms_41 Q: 4

Question	Answer	Marks	Partial Marks
(a)(i)	792 or 792.35	2	**M1** for $650\times\left(1+\frac{2}{100}\right)^{10}$
(a)(ii)	22	4	**B3** for 21.8 or 21.75... OR **M3** for $n\log\left(1+\frac{2}{100}\right)=\log\left(\frac{1000}{650}\right)$ oe or sketch indicating value between 21 and 22 or correct trials as far as 21 and 22 or **M2** for $\left(1+\frac{2}{100}\right)^{n}=\frac{1000}{650}$ oe or graph which could lead to solution, e.g. $y=1.02^{x}$ and $y=\frac{1000}{650}$ or at least 3 correct trials with $n>10$ or **M1** for $650\left(1+\frac{2}{100}\right)^{n}=1000$ oe or at least 2 correct trials
(b)	573	2	**M1** for $(...)\times\left(1+\frac{3}{100}\right)^{2}=607.90$ oe
(c)	1.2[0] or 1.199 to 1.200	3	**M2** for $\sqrt[18]{\frac{247.9}{200}}$ or **M1** for $200\times[\ldots]^{18}=247.90$ oe or better

7. 0607_s23_ms_41 Q: 11

Question	Answer	Marks	Partial Marks
(a)(i)	2.1×10^{-5}	1	
(a)(ii)	3.431×10^{-17}	1	
(a)(iii)	8×10^{-101}	2	**B1** for 0.8×10^{-100} seen
(a)(iv)	$2.5\times10^{2p+1}$	2	**B1** for 25×10^{2p} or $2.5\times10\times10^{2p}$ seen
(b)	$\log y$ or $\log_{10} y$ final answer	1	

Question	Answer	Marks	Partial Marks
(c)	1.36 or 1.356… or $\frac{\log 14}{\log 7}$ or $\log_7 14$ final answer	1	
(d)	$\frac{10x^3}{\sqrt{w}}$ or $\frac{10x^3}{w^{\frac{1}{2}}}$ or $10x^3w^{-\frac{1}{2}}$ or $\frac{10x^3\sqrt{w}}{w}$ final answer	4	**M1** log10 soi **M1** for $\log w^{\frac{1}{2}}$ or $\log \sqrt{w}$ or $\log x^3$ **M1** for correct use of $\log p - \log q = \frac{p}{q}$ or correct use of $\log p + \log q = \log pq$

8. 0607_s23_ms_42 Q: 2

Question	Answer	Marks	Partial Marks
(a)	4.5 nfww	2	**M1** for $P\left(1-\frac{4}{100}\right) = 4.32$ oe or better
(b)	3.52 or 3.522... nfww	2	**M1** for $4.32\left(1-\frac{4}{100}\right)^5$ oe
(c)	2039 nfww	4	**B3** for answer 18.9 or 18.86 to 18.87 or 19 nfww OR **M3** for $n\log\left(1-\frac{4}{100}\right) = \log\left(\frac{2}{4.32}\right)$ oe or good sketch indicating value between 18 and 19 or correct trials as far as 18 and 19 or **M2** for $\left(1-\frac{4}{100}\right)^n = \frac{2}{4.32}$ oe or sketch that could lead to solution or at least 3 correct trials or **M1** for $4.32 \times \left(1-\frac{4}{100}\right)^n = 2$ soi. or at least 2 correct trials

9. 0607_s23_ms_43 Q: 2

Question	Answer	Marks	Partial Marks
(a)	3.6 oe	2	**M1** for $\frac{1500}{25}$ or $\frac{1.5}{25}$ or figs$15 \div \frac{25}{60}$
(b)	75	2	**M1** for $\frac{40}{32}$
(c)	12	3	**M1** for $51.5 \div 20.6$ oe **M1** for $10 \div (their150 - 25 - their(b))[\times 60]$ oe

10. 0607_s23_ms_43 Q: 4

Question	Answer	Marks	Partial Marks
(a)	67.2[0]	2	**M1** for $42 \div 5[\times k]$ where k is 8 or 3 or 1
(b)(i)	143.84 cao	2	**M1** for $124 \times (1 + \frac{16}{100})$ oe or **B1** for 19.84 or 143.84 seen
(b)(ii)	94.5 [0]	2	**M1** for $\left(1 - \frac{2}{9}\right)x = 73.5$ oe
(c)	300	2	**M1** for $2000 \times [0].03 \times 5$ oe

Question	Answer	Marks	Partial Marks
(d)	19.51	**3**	**M2** for $400\times\left(1+\frac{1.6}{100}\right)^3-400$ oe or **M1** for $400\times\left(1+\frac{1.6}{100}\right)^3$ oe
(e)(i)	$1000+\frac{1000\times x\times 18}{100}$ oe	**M1**	
	$1000\left(1+\frac{0.7x}{100}\right)^{18}$ oe	**M1**	
(e)(ii)	5.76 or 5.756...	**3**	**M2** for sketch of $[y=]\left(1+\frac{18x}{100}\right)$ and $[y=]\left(1+\frac{0.7x}{100}\right)^{18}$ oe with distinct curve and line with clear point of intersection or **M1** for sketch of $[y=]\left(1+\frac{18x}{100}\right)$ or $[y=]\left(1+\frac{0.7x}{100}\right)^{18}$ oe

11. 0607_w23_ms_41 Q: 1

Question	Answer	Marks	Partial Marks
(a)	150	**1**	
(b)	[0].18	**2**	**M1** for $\frac{7.2}{100}\times 2.5$ oe
(c)	445.19 or 445 or 445.19...	**2**	**M1** for $400\times\left(\frac{100+1.8}{100}\right)^6$ oe
(d)(i)	28 500	**2**	**M1** for [...] $\times\left(\frac{100+4}{100}\right)=29640$ oe
(d)(ii)	8 nfww	**4**	**B3** for 7.64 or 7.642 to 7.643 or **M3** $n\log\left(1+\frac{4}{100}\right)=\log\left(\frac{40000}{29640}\right)$ oe or for good sketch indicating value between 7 and 8 or for correct trials reaching 7 and 8 or **M2** for $\left(1+\frac{4}{100}\right)^n=\frac{40000}{29640}$ oe or suitable graph with $n > 1$ or at least 3 correct trials or **M1** for $29640\times\left(1+\frac{4}{100}\right)^n=40000$ oe soi by at least 2 trials with $n > 1$

12. 0607_w23_ms_41 Q: 6

Question	Answer	Marks	Partial Marks
(a)	21 : 19 cao	2	**B1** for answer 84 : 76 or **M1** for $\frac{1}{2}(160)+4$ or $\frac{1}{2}(160)-4$ If 0 scored, **SC1** for final answer of 19 : 21
(b)	5.6[0] or 5.599 to 5.600	3	**M2** for $\sqrt[6]{\frac{1.664}{1.2}}$ oe or **M1** for $1.2 \times [...]^6 = 1.664$
(c)(i)	1.35×10^{122} cao	2	**B1** for 13.5×10^{121} oe seen
(c)(ii)	2.02×10^{n} cao	2	**B1** for figs 202

13. 0607_w23_ms_42 Q: 6

Question	Answer	Marks	Partial Marks
(a)(i)	285	2	**M1** for 360 – (180 – 105) oe or a sketch with correct indication of 75 or 105 at B
(a)(ii)(a)	3.75 oe	2	**M1** for $\frac{1.5\times[60]}{24}$
(a)(ii)(b)	6	2	**M1** for $\frac{1.5 \times [1000 \times 100]}{25000}$ oe
(b)	4430	4	**B3** for 5200 OR **M1** for $2+\frac{36}{60}$ or $(2 \times 60)+36$ or $\frac{\left(2+\frac{36}{60}\right)}{60}$ **M1** for $their 2\frac{36}{60} \times 120 \times [\ ]$ or $their((2 \times 60)+36) \times 120 \times [\ ]$ **M1** for $their 2\frac{36}{60} \times \frac{120 \times 1000}{60}$ or $their((2 \times 60)+36) \times \frac{120 \times 1000}{60 \times 60}$

14. 0607_w23_ms_42 Q: 11

Question	Answer	Marks	Partial Marks
(a)	$16x^4y^2$ final answer	3	**B2** for final answer kx^4y^2 or $16x^ky^2$ or $16x^4y^k$ or $\left(4x^2y\right)^2$ **B1** for 16 or x^4 or y^2 correct in 3 term final answer or **M1** for $4\times x^2\times y$ or $4096\times x^{12}\times y^6$ seen
(b)	7 nfww	2	**M1** for 128 or 6^x or 2187 seen OR **M1** for $x=\dfrac{\log 279936}{\log 6}$

Question	Answer	Marks	Partial Marks
(c)(i)	$\dfrac{15}{x+2}+\dfrac{15}{x+2}+\dfrac{2}{x}=16$ or $\dfrac{30}{x+2}+\dfrac{2}{x}=16$	M1	
	$\dfrac{30x+2(x+2)}{x(x+2)}[=16]$ or better	M2	**M1** for $30x+2(x+2)$ **M1** for common denominator $x(x+2)$ oe
	$30x+2x+4=16x(x+2)$	M1	**FT** *their* numerator with correct denominator to fraction removed
	rearranging to get to $4x^2-1=0$	A1	no errors or omissions
(c)(ii)	6	2	**M1** for $x=\dfrac{1}{2}$ or for 6 and 10 as answers

15. 0607_w23_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)	84.9 or 84.85 to 84.86	1	
(b)	7.08 or 7.079 to 7.08	2	**M1** for distance divided by time. or **B1** for 113
(c)	9.58 or 9.579 to 9.580	3	**M1** for distance divided by speed **M1** for ÷ 1000 and × 60 × 60

16. 0607_w23_ms_43 Q: 5

Question	Answer	Marks	Partial Marks
(a)	12 500	**2**	**M1** for $P\left(1+\frac{60}{100}\right) = 20\,000$ oe
(b)	$20\,000 \times \left(1+\frac{60}{100}\right)^4$ oe [= 131 072]	**1**	
(c)	2065 nfww	**4**	**B3** for 9 or 8.32 or 8.323... or for 45 or 41 to 42 OR **M3** for $n\log\left(1+\frac{60}{100}\right) = \log\left(\frac{1000000}{20000}\right)$ oe or good sketch indicating value between 8 and 9 or correct trials as far as 8 and 9 or **M2** for $\left(1+\frac{60}{100}\right)^n = \frac{1000000}{20000}$ oe or sketch that could lead to solution e.g. $y = 1.6^x$ and $y = \frac{1000000}{20000}$ or at least 3 correct trials or **M1** for $20\,000 \times \left(1+\frac{60}{100}\right)^n = 1\,000\,000$ soi or at least 2 correct trials

17. 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) × (1 + 1) = 8	**B1**	soi by 4 × 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**	

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

19. 0607_s21_ms_41 Q: 6

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

Question	Answer	Marks	Partial Marks
(a)(ii)	16	**3**	**B2** for 15.4 or 15.38... or **M2** for $\frac{5000\times100}{5000\times6.5}$ oe or **M1** for $\frac{5000\times6.5\times n}{100}$ 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**	

20. 0607_s21_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	32.4	3	**M2** for $\frac{250-6.5\times26}{250}[\times100]$ oe or $\frac{6.5\times26}{250}\times100$ or **M1** for $250 - 6.5 \times 26$ soi by 81 or $\frac{6.5\times26}{250}$
(b)	320	2	**M1** for $(\ldots)\times\left(1+\frac{24}{100}\right)=396.8$ 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 or at least 3 correct trials or a sketch that could lead to solution e.g. $y=0.97^x$ and $y=200$ or **M1** for $396.8\times\left(1-\frac{3}{100}\right)^n=200$ soi. or at least 2 correct trials

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 $500\left(1+\frac{1.5}{100}\right)^{12} - \textit{their}$ (b)(i) oe or **M1** for $500\left(1+\frac{1.5}{100}\right)^{12}$ oe

Question	Answer	Marks	Partial Marks
(c)	34	4	**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
(d)	8400	3	**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 $n = 1$

22. 0607_w21_ms_41 Q: 1

Question	Answer	Marks	Partial Marks
(a)	1958.3[0]	3	**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
(b)	2.8	3	**M2** for $\frac{(1962-1500)}{1500\times11}[\times100]$ oe or $\left(\frac{1962}{1500}\times100\right)-100$ oe or **M1** for [1500 +] $\frac{1500\times r\times11}{100}$ or $\frac{1962}{1500}\times100$
(c)	2.5	3	**M2** for $\sqrt[11]{\frac{1968.13}{1500}}$ oe **M1** for $1500(k)^{11} = 1968.13$

23. 0607_w21_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)(i)	$\frac{11}{11+14}\times200$ or $\frac{11}{25}\times200$ oe	M1	
(a)(ii)	7.92	2	**M1** for $\frac{88\times1.5\times6}{100}$ oe
(b)(i)	12	3	**M2** for $\frac{25-22}{25}$ oe or $\frac{22}{25}\times100$ oe or **M1** for $\frac{22}{25}$
(b)(ii)	15	2	**M1** for $\frac{100-10}{100}\times[...]=13.50$ oe

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)	$\frac{1000\times4\times(4+3+2+1)}{100}$ [= 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

25. 0607_s20_ms_41 Q: 7

Question	Answer	Marks	Partial Marks
(a)	100	2	**M1** for $\frac{500\times2.5\times8}{100}$ 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 $\sqrt[31]{2.5}$ oe or sketch of graph leading to answer or **M1** for $(...)^{31}=2.5$ oe or sketch of a relevant graph

26. 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	**M3** for $[k=]\dfrac{\log\frac{5000}{7392}}{\log 0.92}$ oe or correct trials as far as 4 and 5 or **M2** for $0.92^k=\dfrac{5000}{7392}$ oe or at least 3 correct trials or **M1** for $7392\times0.92^k=5000$ oe

27. 0607_s20_ms_43 Q: 3

Question	Answer	Marks	Partial Marks
(a)(i)	5500	3	**M2** for $5000+\dfrac{5000\times2.5\times4}{100}$ oe or **M1** for $\dfrac{5000\times2.5\times4}{100}$ oe
(a)(i)	12	2	**M1** for $\dfrac{5000\times2.5\times n}{100}=6500-5000$ oe
(b)(i)	5412.16	3	**M2** for $5000\times\left(1+\dfrac{2}{100}\right)^4$ or **M1** for $5000\times\left(1+\dfrac{2}{100}\right)^n$, $n>1$
(b)(ii)	14	4	**M3** for $[n=]\dfrac{\log\left(\frac{6500}{5000}\right)}{\log 2}$ soi by 13.2 or 13.24 to 13.25 or answer 13 or correct trials as far as 13 and 14 or **M2** for $1.02^n=\left(\dfrac{6500}{5000}\right)$ or at least 3 correct trials or suitable graph or **M1** for $5000\times1.02^n=6500$ soi.

28. 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 *their* 22 697.5 – *their* 22 599.88

29. 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 – *their* 48 – 29.60 = 242.40	M1	Clear working to 242.40
	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

30. 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 $(P) \times (...)^{17} = (2P)$ oe

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

31. 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	**M2** for $952\div\left(1-\frac{15}{100}\right)$ oe or **M1** for 85% associated with 952
(c)	12 nfww	4	**M3** for $n\log\left(1-\frac{5}{100}\right)=\log\left(\frac{\frac{1}{2}(630)}{their 535.50}\right)$ oe soi by 10.3 or 10.4 or 10.34 to 10.36… or correct trials as far as 10 and 11 or suitable sketch(es) e.g. $y = 535.5\times0.95^x$ and $y = 315$ or **M2** for $\left(1-\frac{5}{100}\right)^n=\left(\frac{\frac{1}{2}(630)}{their 535.50}\right)$ oe or at least 3 correct trials or final answer 11 nfww or **M1** for *their* $535.5\times\left(1-\frac{5}{100}\right)^n=\frac{1}{2}(630)$ soi oe

32. 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] nfww	**3**	**M2** for $\frac{3.69}{0.9}$ oe or **M1** for associating 3.69 with 90%

33. 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 nfww cao	**2**	**M1** for trials with 1.5% **and** 1.4% beyond *their* 224 **and** *their* 223.53 respectively, implied by 11, or appropriate equation or graph sketch implied by 10.79..., 2.79...

34. 0607_s19_ms_43 Q: 7

Question	Answer	Marks	Partial Marks
(a)(i)	2318.55	3	**M2** for $2000\times\left(1+\frac{3}{100}\right)^5$ or **M1** for $2000\times\left(1+\frac{3}{100}\right)^k$, $k>1$ If 0 scored, **SC1** for 318.5... or 319 or 320
(a)(ii)	24	3	**B2** for 23.4 or 23.44 to 23.45 or **M2** for $n=\frac{\log\left(\frac{4000}{2000}\right)}{\log 1.03}$ oe or **M1** for $2000\times1.03^n=4000$ oe
(b)	2309.37	3	**M2** for $2000\times\left(1+\frac{0.24}{100}\right)^{60}$ or **M1** for $2000\times\left(1+\frac{0.24}{100}\right)^k$, $k>1$
(c)	0.247 or 0.2466…	3	**M2** for $\sqrt[12]{1+\frac{3}{100}}$ implied by 1.00246[6..] or **M1** for $x^{12}=1+\frac{3}{100}$ oe

35. 0607_w19_ms_41 Q: 2

Question	Answer	Marks	Partial Marks
(a)	5.22	2	**M1** for $4.5\times\frac{16}{100}$ or better If 0 scored **SC1** for figs 522
(b)	30	3	**M2** for $\frac{11.05-8.5}{8.5}$[×100] or $\frac{11.05}{8.5}\times100$ or **M1** for $\frac{11.05}{8.5}$[×100]

Question	Answer	Marks	Partial Marks
(c)	1.2[0]	2	**M1** for $\frac{0.06}{5}\times100$

36. 0607_w19_ms_41 Q: 5

Question	Answer	Marks	Partial Marks
(a)	1329	**4**	**B3** for 1328.6 ... or 1330 or **M2** for 2025×0.9^4 oe or **M1** for 2025×0.9^k, $k > 1$ oe
(b)	2500	**2**	**M1** for $2025 \div 0.9^2$ oe

Question	Answer	Marks	Partial Marks
(c)	14	**4**	**B3** for 13.3 or 13.27 to 13.28 seen or **M3** for $n \log 0.9 = \log \frac{500}{2025}$ oe implied by or for correct trials reaching 13 and 14 or good sketch indicating value between 13 and 14 or **M2** for $0.9^n = \frac{500}{2025}$ oe or at least three correct trials with $n > 4$ or sketch that could lead to the solution or **M1** for $2025 \times 0.9^n = 500$ oe or at least two correct trials with $n > 4$ If 0 scored, **SC1** for answer 16 or for 15.3 or 15.27 to 15.28 seen

37. 0607_w19_ms_42 Q: 3

Question	Answer	Marks	Partial Marks
(a)	$160 \times \frac{4}{5}$ oe	**1**	
(b)	57.60	**3**	**M2** for $128 \times \frac{4}{5}$ or $\frac{160-x}{128} = \frac{4}{5}$ or **M1** for $\frac{128}{5}$ or $\frac{160-x}{4}$ or $160-x : 128 = 4:5$
(c)(i)	25	**1**	
(c)(ii)	40	**3**	**M2** for $32 \times \frac{100}{80}$ oe or **M1** equating 32 to 80%

38. 0607_w19_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)	13 770.28	3	**M2** for $12000 \times \left(1+\frac{3.5}{100}\right)^4$ oe or **M1** for $12000 \times \left(1+\frac{3.5}{100}\right)^k$, $k>1$ oe
(b)	9500	3	**M2** for $10078.55 \div \left(1+\frac{3}{100}\right)^2$ oe or **M1** for $10078.55 \div \left(1+\frac{3}{100}\right)^n$ oe
(c)	17 000	3	**M2** for $Q+\frac{Q\times 4\times 5}{100} = 20\,400$ oe or **M1** for $\frac{Q\times 4\times 5}{100}$ oe soi by e.g. $0.2Q$ If 0 scored, **SC1** for 16 800 or 16 760 to 16 770

39. 0607_s18_ms_41 Q: 2

Question	Answer	Marks	Partial Marks
(a)	$\frac{8000}{5+7+8}\times 8$ [= 3200]	M2	**M1** for $8000 \div (5+7+8)$ If 0 scored **SC1** for $\frac{3200}{8}\times 20 = 8000$ oe
(b)	15.4 or 15.38…	3	**M2** for $\frac{65-55}{65}$[×100] or $\frac{55}{65}\times 100$ or $1-\frac{55}{65}$ or **M1** for 65 − 55 or $\frac{55}{65}$
(c)	500	2	**M1** for $\frac{2500\times 2.5\times 8}{100}$ oe
(d)	501.42	3	**M2** for 2400×1.024^8 oe (2901 or 2901.4[0] or 2901.42…) or **M1** for 2400×1.024^n oe where $n > 1$
(e)	84	3	**M2** for $79.80 \div \left(1-\frac{5}{100}\right)$ oe or **M1** for recognising 79.80 is 95%

40. 0607_s18_ms_41 Q: 8

Question	Answer	Marks	Partial Marks
(a)	16 000	2	**M1** for $12\,960 \div \left(1-\frac{10}{100}\right)^2$ oe or **B1** for 14400

Question	Answer	Marks	Partial Marks
(b)	7 nfww	3	**B2** for 6.58 or 6.578 to 6.579 or **M2** for $\frac{\log\left(\frac{6480}{12960}\right)}{\log 0.9}$ oe or appropriate sketch or at least two trials with $n > 3$ or **M1** for $12960 \times \left(1-\frac{10}{100}\right)^n = 6480$ oe if 0 scored, **SC1** for answer 9 nfww, coming from 16000

41. 0607_s18_ms_43 Q: 2

Question	Answer	Marks	Partial Marks
(a)	30.51	2	**M1** for $22.6 \times \left(1+\frac{35}{100}\right)$ oe
(b)	40.9 or 40.93 to 40.94	3	**M2** for $\frac{43 - \textit{their}\ 30.51}{\textit{their}\ 30.51}$ [× 100] oe or **M1** for 43 – *their* 30.51 or $\frac{43}{\textit{their}\ 30.51}$
(c)	80	3	**M2** for $92 \div \left(1+\frac{15}{100}\right)$ oe or **M1** for 92 = 115% oe
(d)	7 nfww	3	**M2** for $\frac{\log(\frac{32}{45})}{\log 0.95}$ soi by 6.64 to 6.65 or trials as far as $n = 5$ or **M1** for 45×0.95^n oe soi

42. 0607_w18_ms_41 Q: 5

Question	Answer	Marks	Partial Marks
(a)(i)	28 800	**2**	**M1** for $30000 \times \frac{100-4}{100}$ oe

Question	Answer	Marks	Partial Marks
(a)(ii)	19 147 or 19 100 nfww	**3**	**FT** *their* 0.96, must be <1 and not 0.04 **M2** for $30000\times(their\,0.96)^{11}$ or $28800\times(their\,0.96)^{10}$ or **M1** for $30000\times(their 0.96)^{k}$, $k>1$ oe
(a)(iii)	31 250	**3**	**M2** for $30000\div their(0.96)$ or **M1** for $30000=their 0.96[x]$
(b)	2005 nfww	**4**	**M3** for $n\log(their 0.96)=\log\frac{30000}{50000}$ oe or **M2** for $(their 0.96)^{n}=0.6$ oe or **M1** for $50000\times(0.96)^{n}=30000$ oe OR **M3** for T and I with '12 and13' seen or **M2** for at least 3 correct trials or **M1** for $50000\times(0.96)^{n}=30000$ oe
(c)(i)	140 000	**3**	**M2** for $800\times50\times3.5$ or **M1** for multiplying any two
(c)(ii)	25	**3**	**M2** for $\frac{their(\mathbf{i})-2240\times50}{2240\times50}[\times100]$ oe or $\frac{their(\mathbf{i})}{2240\times50}\times100$ oe or $\frac{800\times3.5-2240}{2240}[\times100]$ oe or $\frac{800\times3.5}{2240}\times100$ or **M1** for $their(\mathbf{i})-2240\times50$ or $\frac{their(\mathbf{i})}{2240\times50}$ or $800\times3.5-2240$ or $\frac{800\times3.5}{2240}$
(d)	960	**4**	**M3** for $\frac{2240\times1.08\times1.25}{3.5\times0.9}$ oe or for $\frac{x\times3.5\times0.9-2240\times1.08}{2240\times1.08}=\frac{their(\mathbf{c})(\mathbf{ii})}{100}$ oe or **B1** for 3.15 or 157.50 and **B1** for 2419.2 or 120 960 or 3024

43. 0607_w18_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	5%	3	**M2** for $\frac{3800-3610}{3800}$ [× 100] oe or $\frac{3610}{3800}\times 100$ or **M1** for $\frac{3610}{3800}$ oe
(b)(i)	7410 or 7407 to 7408	3	**M2** for $6390\times(1+\frac{3}{100})^5$ oe or **M1** for $6390\times(1+\frac{3}{100})^k$ oe, $k>1$
(ii)	12 nfww	4	**M3** for $n\log 1.03=\log\left(\frac{9000}{6390}\right)$ soi by 11.6 or 11.58... oe or correct trials as far as 11 and 12 oe or **M2** for $1.03^n=\frac{9000}{6390}$ or at least 3 correct trials with $n\geqslant 5$ or **M1** for $6390\times 1.03^n=9000$ soi.

44. 0607_w18_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)(i)	$\frac{38}{83}$ cao	2	**M1** for $\frac{190}{225+190}$ implied by correct unsimplified fraction
(a)(ii)	45 : 38 final answer	2	**M1** for 225 : 190 oe If 0 scored **SC1** for 38 : 45 final answer
(b)	18	2	**M1** for 15 ÷ 5 soi by [1 part =] 3
(c)(i)	45.5 or 45.45…	1	
(c)(ii)	3	2	**M1** for $\frac{20}{100}\times 15$ oe
(d)	375 nfww	3	**M2** for $390\div\left(1+\frac{4}{100}\right)$ oe or **M1** for recognising 390 as 104%

45. 0607_w18_ms_43 Q: 7

Question	Answer	Marks	Partial Marks
(a)	23 500	3	**B2** for 23 470 or 23 474. … or **M1** for $26\,010 \times \left(1-\frac{5}{100}\right)^2$ oe If 0 scored, **SC1** for 9300 or 9320 or 9324 or for *their* seen answer rounded to the nearest 100
(b)(i)	25 000 cao nfww	2	**M1** for $26\,010 \div \left(1+\frac{2}{100}\right)^2$
(b)(ii)	14 nfww	4	**M3** for $n\log(1.02) = \log\left(\frac{26010}{20000}\right)$ soi by 13 or 13.3 or 13.26 to 13.27 or for trial and improvement reaching n = 13 and 14 or **M2**for $(1.02)^n = \frac{26010}{20000}$ oe or for trial and improvement at least 3 times or **M1** for $26010 = 20000(1.02)^n$ oe

46. 0607_s17_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	1598 final answer	3	**M2** for $(23\,970 \times 0.8) \div 12$ oe or **M1** for $23\,970 \times 0.2$ or better or for $23\,970 \div 12$
(b)(i)	23 500 nfww	3	**M2** for $23\,970 \div 1.02$ oe or **M1** for 23 970 = 102%
(b)(ii)	2024 nfww	3	**M2** for $\frac{\log\left(\frac{30000}{23970}\right)}{\log 1.03}$ oe soi by 7.59...or sketch leading to 7.59 or 2 trials, one giving 7 and one giving 8 or **M1** for $23\,970 \times \left(1+\frac{3}{100}\right)^n$ [= 30 000] oe seen or reasonable sketch or 3 trials of $23\,970 \times 1.03^n$ or 1 trial giving 8.

47. 0607_s17_ms_43 Q: 4

Question	Answer	Marks	Part Marks
(a)(i)	5 : 4	2	**B1** for any other correct ratio
(a)(ii)	41.68	2	**M1** for $0.16 \times 260.5[0]$ oe
(a)(iii)	12.5[0]	3	**M2** for $11.25 \div 0.9$ oe or **M1** for recognising 11.25 as 90%
(a)(iv)	300 nfww	3	**M2** for $\frac{200 \times 2 \times 25}{100} + 200$ oe or **M1** for $\frac{200 \times 2 \times 25}{100}$ oe (implied by 100 nfww)
(a)(v)	311.72	3	**M2** for 190×1.02^{25} oe or **M1** for 190×1.02^{n} oe where $n > 1$
(b)	17	3	**B2** for 16.5 or 16.52 to 16.53 or **M2** for $\frac{\log\left(\frac{300}{120}\right)}{\log 1.057}$ or appropriate sketch or $120 \times 1.057^{n} = 300$ **and** at least 2 trials which reach from 250 to 350 or **M1** for 120×1.057^{n} [= 300]

48. 0607_w17_ms_41 Q: 2

Question	Answer	Marks	Partial Marks
(a)	3167.94	3	**M2** for $3000 \times 1.025 \times 1.015^{2}$ oe or **M1** for 3000×1.025 [$\times k^{n}$] soi by 3075 or for 3000×0.025 soi by 75
(b)	3144	3	**M2** for $3000 \times 0.016 \times 3 + 3000$ oe or **M1** for $3000 \times 0.016 \times 3$ soi by 144 or for $3000 \times 0.016 \times n + 3000$, $n > 1$
(c)	$\log\left(\frac{3500}{3000 \times 1.025}\right) \div \log 1.015$ oe	M2	or **M1** for $3000 \times 1.025 \times 1.015^{n} = 3500$ implied by at least two correct attempts with $n > 2$, n integer
	$3000 \times 0.016 \times n + 3000 = 3500$ oe or $3000 \times 0.016 \times n = 500$ oe	M1	
	9.7[0] or 9.695... and 10.4 or 10.41 to 10.42 oe	A1	**A1** depends on corresponding years

49. 0607_w17_ms_42 Q: 2

Question	Answer	Marks	Partial Marks
(a)(i)	55.25	2	**M1** for 65×0.85 oe
(a)(ii)	$\frac{99}{320}$ cao	2	**B1** for 80 or **M1** for 24.75 + *their* 55.25
(b)	95[.00]	3	**M2** for $80.75 \div 0.85$ oe or **M1** for recognising 80.75 as 85%.
(c)	23.5	2	**M1** for 0.85×0.90 oe or $\frac{0.9 \times their(a)(i)}{65}$ oe 0.765 implies M1

50. 0607_w17_ms_42 Q: 5

Question	Answer	Marks	Partial Marks
(a)	22 100	4	**B3** for 22 140 or 22 143. … seen and incorrectly or not rounded or **M2** for $17\,500 \times 1.04^6$ oe or **M1** for $17\,500 \times 1.04^k$ $k > 1$ oe
(b)	1.5[0] or 1.499 to 1.5[00]	3	**M2** for $\sqrt[12]{\frac{239.12}{200}}$ or **M1** for $200 \times x^{12} = 239.12$ or better

51. 0607_w17_ms_43 Q: 2

Question	Answer	Marks	Partial Marks
(a)	88, 181.5, 110	5	**B4** for any two correct or all three correct values seen OR **M1** for converting times to same units e.g. 160 : 330 : 200 **M2** for correct method to find any part e.g. $\frac{their\,160\,or\,330\,or\,200}{their\,690}\times 379.5$ oe or **M1** for correct use of total e.g. $\frac{379.5}{their\,690}$ soi 0.55 **A1** for any one value correct, correctly placed
(b)(i)	66.69	2	**M1** for 70.2×0.95 oe
(b)(ii)	65[.00] cao	3	**M2** for $\frac{70.2}{1.08}$ oe or **M1** for 70.2 = 108% soi
(c)(i)	$450\times\frac{3.5}{100}[\times 5]$ or $5\times\frac{3.5}{100}[\times 450]$ or better	M1	
	$450+450\times 5\times\frac{3.5}{100}$ leading to 450 + 78.75 or better.	A1	i.e. full and correct conclusion to 450 + 78.75 [= 528.75]
(c)(ii)	3.35 or 3.350…	3	**M2** for $\sqrt[5]{\frac{530.6}{450}}$ or **M1** for $450\times[\ ]^5 = 530.6$ oe

52. 0607_s16_ms_41 Q: 1

Question	Answer	Mark	Part Marks
(a) (i)	16000	3	**M2** for 13600 ÷ 0.85 oe or **M1** for 13600 = 85%
(ii)	9590 or 9587 to 9588	3	**M2** for 13600×0.89^3 oe or **M1** for 13600×0.89^k, $k>1$ oe
(b)	9 years nfww	3	**M2** for $\frac{\log\left(\frac{11500}{23000}\right)}{\log 0.92}$ or $23\,000\times 0.92^n = 11\,500$ **and** appropriate sketch or at least 2 valid trials or **M1** for $23\,000\times 0.92^n$ [= 11500] If 0 scored **SC2** for 8 nfww or 8.3(1295..) nfww

53. 0607_s16_ms_42 Q: 2

Question	Answer	Mark	Part Marks
(a)	$\frac{630}{9}\times 5$ and $\frac{630}{9}\times 4$ oe	M2	**M1** for $630 \div 9$ [=70] or $\frac{5\times 630 \text{ or } 3150}{9}$ or $\frac{4\times 630 \text{ or } 2520}{9}$
(b) (i)	120	3	**M2** for $98.4[0] \div [0].82$ oe or **M1** for recognising 98.4[0] is 82%
(ii)	69.5 or 69.51…	3	**M2** for $\frac{98.4[0]-30}{98.4[0]}\times 100$ oe or **M1** for $\frac{98.4[0]-30}{98.4[0]}$ oe or $\frac{30}{98.4[0]}\times 100$ If 0 scored, **SC1** for answer 75%
(iii)	211.6[0] cao final answer	1	

Question	Answer	Mark	Part Marks
(iv)	183	4	**B3** for answers 182.8 or 182.84 to 182.85 or **M2** for $150(1.02)^{10}$ seen oe or **M1** for $150(1.02)^n$ seen oe where $n > 1$
(c)	September or October 2035 nfww	5	**B4** for 2035 or 19 years and 9 or 10 or 9.96 or 9.961 to 9.962 months nfww or **B3** for 19.8 or 19.83… seen or **M2** for $\frac{\log\left(\frac{500}{350}\right)}{\log(1.0015)}$ oe or $350\times 1.0015^n = 500$ **and** at least two valid trials or sketch of appropriate graph or **M1** for 350×1.0015^n [= 500] or $350\times\left(1+\frac{0.15}{100}\right)^n$ [= 500] If 0 scored **SC2** for 24[.0] or 23.95 to 23.98 or 2.55 or 2.552 to 2.554… seen

54. 0607_s16_ms_43 Q: 7

Question	Answer	Mark	Part Marks
(a)	90 000	4	**M3** for $1.05\times1.1\times a = 103950$ or better **M2** for $\frac{103950}{1.05 \text{ or } 1.1}$ oe or **M2** for 1.05×1.1 **M1** for 103 950 = 105%
(b)	2028	3	**M2** for $1.05^n = \frac{200000}{103950}$ where $n > 1$ or **M1** for 103950×1.05^n where $n > 1$ If 0 scored **SC2** for 13.4 or 13.41… seen

55. 0607_w16_ms_41 Q: 12

Qu.	Answer	Mark	Part Marks
(a) (i)	12	3	**M2** for $\frac{1540-1375}{1375}\times100$ oe or **M1** for $\frac{1540}{1375}\times100$ or for $\frac{1540-1375}{1375}$
(ii)	89.3 or 89.28 to 89.29	1	
(iii)	1250	3	**M2** for 1375 ÷ 1.1 oe or **M1** for associating 1375 with 110%

Qu.	Answer	Mark	Part Marks
(b) (i)	$500 + \frac{500\times3\times5}{100}$ oe 500×1.025^5	**M2 and M1**	or **M1** for $\frac{500\times3\times5}{100}$ oe (575, 565.704…)
		or	
	$500 \times 1.025^5 - 500$ $\frac{500\times3\times5}{100}$	**M2 and M1**	or **M1** for 500×1.025^5 (65.704…, 75)
	amount – amount or interest – interest	**M1**	
	9.3[0] or 9.295 to 9.296	**A1**	
(ii)	16	4	**B3** for final answer of 15 or 15.28 to 15.29 seen or 15 reached by trial and improvement or **M2** for sketch leading to answer or trial and improvement with at least two steps beyond 5 years or **M1** for $500 + \frac{500\times3\times x}{100} = 500 \times 1.025^x$ oe , implied by one trial

56. 0607_w16_ms_43 Q: 2

Question	Answer	Mark	Part Marks
(a) (i)	276480 × 0.25 oe 0.75× 276480 × 0.055 × 10 oe adding with no errors	M1 M1 M1	 **Dependent** on **M1 M1**
(ii)	19 nfww	4	**B3** for 18.2 or 18.18… or 18 (with correct working) or **M2** for $0.055 \times 276480 \times n = 0.25 \times 276480 + 0.055 \times 0.75 \times 276480 \times n$ oe or **M1** for $0.055 \times 276480 \times n$ or $0.25 \times 276480 + 0.055 \times 0.75 \times 276480 \times n$
(b)	256 000	3	**M2** for 276 480 ÷ 1.08 oe or **M1** for 108% = 276 480

57. 0607_s15_ms_41 Q: 11

Qu.	Answer	Mark	Part Marks
(a) (i)	3374.59	2	**M1** for 3000×1.04^3 oe
(ii)	8	3	**M2** for $\frac{\log\left(\frac{4000}{3000}\right)}{\log 1.04}$ oe or at least 2 trials, one of which goes beyond 4000, soi by 7.3 to 7.4 or **M1** for $3000 \times 1.04^n = 4000$ or at least 2 trials or if 0 scored, **SC1** for answer 7
(b) (i)	3450	1	
(ii)	7	1	
(c)	12	3	**B2** for 11.91... or 11 or **M1** for sketch of both functions with intersection or for $3000 \times 1.04^n = 3000(1 + 0.05n)$ oe or T & I beyond $n = 8$

58. 0607_s15_ms_42 Q: 1

Qu.	Answer	Mark	Part Marks
(a) (i)	40 000	3	**M2** for 76 000 ÷ 1.9 oe or **M1** for 76 000 = 190% oe soi
(ii)	521 284 cao	3	**M2** for $76\,000 \times 1.9^3$ or $40\,000 \times 1.9^4$ oe or **M1** for 76 000 (or *their* 40 000) $\times 1.9^k$, $k \neq 1$ oe seen
(b)	2035	2	**M1** for 76 000 (or *their* **(a)(i)** or *their* **(a)(ii)**) $\times 1.9^k$ = (or > or ⩾) 10 000 000 seen $k \neq 1$ or evidence of at least 2 correct trials

59. 0607_s15_ms_43 Q: 3

Qu.	Answer	Mark	Part Marks
(a) (i)	74.4[0]	2	**M1** for 80 × 0.93 oe or **SC1** for 18.4[0]
(ii)	21.7 or 21.73 to 21.74	4	**M1** for 80 × 0.88 oe **A1** for reduction = \$4 M1A1 implied by 70.4[0] or 14.4[0] **M1** for $\frac{\textit{their}\ \text{reduction}}{18.4} \times 100$
(b) (i)	132.5[0]	2	**M1** for 143.1 ÷ 1.08
(ii)	2.33 or 2.332	2FT	**M1** for 22 × (1.431 – *their*1.325) oe

60. 0607_w15_ms_41 Q: 1

Question	Answer	Mark	Part Marks
(a)	16 : 15	1	
(b) (i)	30	1	
(ii)	24.3[0] or 24.29 to 24.30	4	**M3** for $50 \times 1.02^{20} - 50$ or **M2** for 50×1.02^{20} or **M1** for 50×1.02^{n}, $n \geqslant 2$oe
(c) (i)	48	2	**M1** for $75 \times (0.8)^2$ oe
(ii)	13	3	**B2** for answer 12.13 to 12.14 or **M1** for $75 \times 0.8^{n} = 5$ oe

61. 0607_w15_ms_42 Q: 9

Question	Answer	Mark	Part Marks
(a)	99	2	**M1** for use of 1.1 × 0.9 oe
(b)	960	2	**M1** for use of 1.2 × 0.8 oe
(c)	$10000 - x^2$ oe	3	**M2** for use of $\left(1+\frac{x}{100}\right)\left(1-\frac{x}{100}\right)$ oe or **B1** for $\left(1\pm\frac{x}{100}\right)$ oe soi

62. 0607_w15_ms_43 Q: 2

Question	Answer	Mark	Part Marks
(a)	27.3 or 27.27…	**3**	**M2** for $\frac{220-160}{220}\times 100$ oe or **M1** for $\frac{220-160}{220}$ oe or $\frac{160}{220}\times 100$ oe
(b)	240	**3**	**M2** for $216 \div 0.9$ oe or **M1** for $216 = 90\%$
(c) (i)	1190 or 1186 or 1185. …	**3**	**M2** for 2180×0.97^{20} oe or **M1** for 2180×0.97^{k} k integer > 1 oe
(ii)	26	**2**	**M1** for $2180 \times 0.97^{n} = 1000$ oe If 0 scored, **SC1** for answer 25

63. 0607_s18_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	0.744 or 0.7437 to 0.7438	**1**	
(b)(i)	130.5 final answer	**1**	
(b)(ii)	100 [.00] final answer	**1**	
(c)	17.66	**2**	**M1** for 0.23×76.8 oe
(d)	1000	**3**	**M2** for $\frac{8-3}{3+4+6+8}\times 4200$ oe or **M1** for $\frac{4200}{3+4+6+8}$ [×3 or 8] oe
(e)	Any irrational number less than 10	**1**	e.g. π , $\sqrt{12}$, e ; and not with decimal or fractional equivalent
(f)	$2.29[1]\times 10^{-1}$ final answer	**2**	**B1** for figs 229[1]

64. 0607_w16_ms_43 Q: 1

Question	Answer	Mark	Part Marks
(a) (i)	43	**1**	
(ii)	14.5 or14.54 to 14.55	**1**	
(b) (i)	3.16×10^{11} or $3.158... \times 10^{11}$	**2**	**B1** for figs 316 or 3158... or $k \times 10^{11}$ where $1 \leq k < 10$
(ii)	8.23×10^{7} or $8.228... \times 10^{7}$	**2**	**B1** for figs 823 or 8228... or $k \times 10^{7}$ where $1 \leq k < 10$

65. 0607_m21_ms_42 Q: 2

Question	Answer	Marks	Partial Marks
(a)	261 000	**1**	
(b)	5.76×10^{-7}	**1**	
(c)	26.7	**2**	**B1** for 26.68 to 26.69 or answer 26.6
(d)(i)	303.4[0] cao final answer	**2**	**M1** for $\frac{37\times820}{100}$ oe soi by 303
(d)(ii)	24	**1**	
(e)(i)	2085	**3**	**M1** for $\frac{695}{5}$ soi **M1** for (*their* 139) × (3 + 5 + 7)
(e)(ii)	295.09	**3**	**M2** for $0.4 \times 695 \times 1.012^5$ oe or **M1** for 0.4 × 695 soi by 278 or $A \times 1.012^5$
(f)	2[.00] or 1.998 to 2.001...	**3**	**M2** for $\sqrt[12]{\frac{2663.31}{2100}}$ oe or **M1** for $2100 \times r^{12} = 2663.31$ seen

66. 0607_s16_ms_43 Q: 1

Question	Answer	Mark	Part Marks
(a) (i)	13205.2	**1**	
(ii)	13200	**1**	
(iii)	13210	**1**	
(iv)	13205.173	**1**	
(b)	120	**1**	

67. 0607_w15_ms_42 Q: 1

Question	Answer	Mark	Part Marks
(a)	10	**2**	**B1** for 3 correct terms of $\frac{\sqrt[3]{1000}}{5}+\frac{20+2^2}{\sqrt{9}}$ or **B1** for either of 2 or 8 soi
(b)	Numerator over-estimates, oe and denominator under-estimates oe	**2**	**B1** for each
(c)	8.55 or 8.546…	**1**	

68. 0607_s20_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)	–5, –9	1	
	$19-4n$ oe	2	**B1** for $k-4n$ or $19-kn$ oe
(b)	32, 64	1	
	2^{n-1} oe	2	**B1** for $2^{(an+b)}$ oe $a \neq 0$
(c)	54, 70	1	
	n^2+3n oe	2	**B1** for an^2+bn+c $a \neq 0$

69. 0607_w20_ms_41 Q: 6

Question	Answer	Marks	Partial Marks
(a)	0	B1	
	$(6-n)^3$ oe $216-108n+18n^2-n^3$	B2	**M1** for $f(n^3)$
(b)	56	B1	
	n^2+3n+2 oe	B3	**M2** for n^2+an+b , a, b numeric $\neq 0$ oe or **M1** for $f(n^2)$ or for common difference of 2

70. 0607_w21_ms_43 Q: 3

Question	Answer	Marks	Partial Marks
(a)(i)	900	1	
(a)(ii)	10 45	2	**M1** for correctly adding 8h 30 min or 5h 30 min
(b)(i)	26 910	1	
(b)(ii)	44.6[0]	1	

71. 0607_w20_ms_42 Q: 5

Question	Answer	Marks	Partial Marks
(a)	866 or 865.5 to 865.6	**2**	**M1** for 14498 ÷ 16.75
(b)	1400 or 2 pm	**3**	**B1** for 29h 60min or 30 h **B1** for 06 00 OR **B1** for 21 15 oe **B1** for 38h or 37h 60min OR **M1** for 13 15 + 8 + 16 45 or 13 15 + 16 45 + 8 **M1** for a correct conversion to 24 hour clock
(c)	1505 cao	**2**	**M1** for 827.75 ÷ 0.55

72. 0607_s18_ms_41 Q: 10

Question	Answer	Marks	Partial Marks
(b)(i)	$\frac{10x+60y}{10+z}$ or $\frac{10(x+6y)}{10+z}$	**3**	**M2** for $\left(\frac{x\times\frac{10}{60}+y}{\frac{10}{60}+\frac{z}{60}}\right)$ oe or **M1** for total distance = $x\times\frac{10}{60}+y$ or total time = $\frac{10}{[60]}+\frac{z}{[60]}$
(b)(ii)	5	**2**	**M1** for correct substitution of $x = 3$, $z = 20$ and average speed = 11 in *their* formula which must contain x, y and z. or **B1** for 5.5 oe or 330 seen

Question	Answer	Marks	Partial Marks
(c)(i)	$\frac{3t}{60}+\frac{7(t+10)}{60}$ oe	**M1**	
	$\frac{t}{[60]}+\frac{t+10}{[60]}$	**M1**	The two **M1**s may be seen together in a correct fraction
	Correct simplification to $\frac{5t+35}{t+5}$ seen	**A1**	dep on M1M1 At least one line of working and no errors
(c) (ii)	15	**2**	**M1** for $(5t + 35) = \left(5\frac{1}{2}\right)(t + 5)$ oe or better

73. 0607_w18_ms_42 Q: 7

Question	Answer	Marks	Partial Marks
(a)	18 03	**4**	**M1** for 1318 ÷ 252 **A1** for 5.23 or 5.230... **M1** for converting *their* time in hours to hours and minutes
(b)(i)	70	**2**	**M1** for $252 \times \frac{1000}{60\times60}$ oe

Question	Answer	Marks	Partial Marks
(b)(ii)	102 s or 102.4 to 102.5	**2**	**FT** 7173 ÷ *their* 70 **M1** for (6772 + 401) ÷ *their* 70

74. 0607_s17_ms_42 Q: 5

Question	Answer	Marks	Partial Marks
(a)	2500	**2**	**M1** for 119 050 ÷ 47.62
(b)(i)	[0]6 10 or 6 10 am oe	**2**	**B1** for [0]0 25 or [0]3 40 or 28 h 130 min oe seen
(b)(ii)	722 or 721.7 ...	**3**	**M1** for 4150 ÷ *their* 5h 45 min **B1** for 5.75 oe
(b)(iii)	5 h 32 (or 31.8 to 32[.0]) min	**3**	**M1** for 4150 ÷ 750 soi by 5.53 or 5.53 ... **B1FT** for correct conversion to hours and minutes

75. 0607_w17_ms_41 Q: 7

Question	Answer	Marks	Partial Marks
(a)	192.5	**3**	**B1** for 2.75 oe **M1** for 70 × *their* 2.75

Question	Answer	Marks	Partial Marks
(b)(i)	69.4 or 69.36 to 69.41	**4**	**M1** for 180 ÷ 85 **A1** for 2.12 or 2.117... or $\frac{36}{17}$ oe **M1dep** for *their* total distance ÷ *their* total time (dependent on first M1)
(b)(ii)	04 12[...]	**2**	**M1** for correctly converting *their* total time to hours and minutes. or **B1** for 02 05 seen or total time = 5h 22min or 322 min

76. 0607_s16_ms_41 Q: 9

Question	Answer	Mark	Part Marks
(a)	1 hour 20 minutes cao	**3**	**M1** for 65 ÷ 48.75 **M1** for correctly converting *their* time in hours to hours and mins
(b)	140 or 140.4 to 140.5	**5**	**M1** for 632 + 65 [km] soi by 697 **M1** for *their* 697 ÷ 119.5 soi by 5.83... **M1** for subtracting *their* 1.33...(from (a)) **M1** for 632 ÷ (*their* 4.4993)
(c)	27.9	**3**	**M2** for $\frac{800+130}{120\times\frac{1000}{60\times60}}$ oe or **M1** for distance ÷ speed

77. 0607_w16_ms_41 Q: 1

Qu.	Answer	Mark	Part Marks
(a)	201	**2**	**M1** for 2500 ÷ 12.43 (implied by 201.1…)
(b) (i)	783 or 782.5 to 783.3….	**3**	**B1** for 10h 40min oe 10.66..., 10.67, $10\frac{2}{3}$, 640 **M1** for 8350 ÷ *their* journey time
(ii)	[0]8 05 oe	**1**	
(iii)	7	**3**	**M2** for (36.8 – 20) ÷ 2.4 oe or **M1** for 20 + 2.4 × distance = 36.8 oe

78. 0607_s15_ms_42 Q: 3

Qu.	Answer	Mark	Part Marks
(a)	82.8 or 82.83…	3	**B1** for 9 h 25 m oe or 9.417 oe or 565 [min] **M1** for 780 ÷ 9.416... (or *their* 9 h 25m converted to h)
(b)	58.2 or 58.23 to 58.24 … cao	3	**M1** for 520 ÷ 105 **M1** for *their* 9.41666 – *their* (520 ÷ 105) or for *their* 565 – *their* 520 ÷ 105 × 60
(c)	99.96 cao	4	**M2** for $\frac{520}{100}\times 6+\frac{their\,260}{100}\times 8$ soi by 52 or 31.2 + 20.8 or **M1** for either, soi by 31.2 or 20.8 **M1** for *their* 52 × 1.63 soi by 84.76

79. 0607_s15_ms_43 Q: 1

Qu.	Answer	Mark	Part Marks
(a)	13 h 35 mins or 13 h 34.8 to 35 mins	3	**M1** for 11585 ÷ 852.9 **A1** for 13.58…
(b)	[0]7 50 oe	2	**B1** for 13 50 or 17 20 or 25 50
(c)	825 or 825.0 to 825.1...	3	**B1** for 28.08… hours or $28\frac{5}{60}$ oe **M1** for 23170 ÷ *their* 28.08

80. 0607_w15_ms_42 Q: 8

Question	Answer	Mark	Part Marks
(a)	80	3	**B1** for 3h 45 min oe or better **M1** for $\frac{300}{\text{their time in hours}}$ oe
(b)	2119 to 2120	3	**M2** for $\frac{300}{1.05}\times their(\mathbf{a})$ oe or **M1** for 1.05 × *their*(a) oe or for $\frac{300}{\text{their new speed}}$ if > *their*(a)
(c)	107 or 107.4...	2	**M1** for $\frac{600}{8.1}\times 1.45$ or **SC1 for** $\frac{300}{8.1}\times 1.45 = 53.7$ *or* 53.70…

81. 0607_w15_ms_43 Q: 7

Question	Answer	Mark	Part Marks
(a)	3.56 or 3.555 to 3.556	3	**M2** for $\frac{10+6}{\frac{10}{4}+\frac{6}{3}}$ or **M1** for $\frac{10}{4}$ or $\frac{6}{3}$
(b)	$\frac{5x-4}{5}$ or $x-0.8$ or $x-\frac{4}{5}$ or $0.2(5x-4)$ final answer nfww	4	**M3** for $\frac{x\times\frac{45}{60}+(x-2)\times\frac{30}{60}\text{ oe}}{\frac{45}{60}+\frac{30}{60}\text{ oe}}$ or **M2** for $x\times\frac{45}{[60]}+(x-2)\times\frac{30}{[60]}$ oe or **M1** for one of these products or evidence of total distance ÷ total time