

Edexcel GCSE

Mathematics

Foundation/Higher Tier

Number: Ratio

Information for students

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2). There are 49 questions in this selection.

Advice for students

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

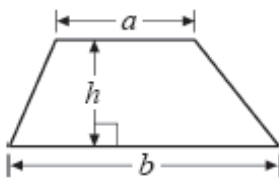
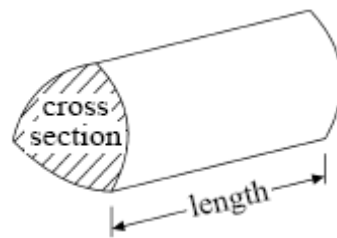
Information for teachers

The questions in this document are taken from the 2009 GCSE Exam Wizard and include questions from examinations set between January 2003 and June 2009 from specifications 1387, 1388, 2540, 2544, 1380 and 2381.

Questions are those tagged as assessing “Ratio” though they might assess other areas of the specification as well. Questions are those tagged as “Foundation/Higher” so could have (though not necessarily) appeared on either a Foundation, Intermediate or Higher tier paper.

GCSE Mathematics

Formulae: Foundation Tier

You must not write on this formulae page.**Anything you write on this formulae page will gain NO credit.****Area of trapezium** = $(a + b)h$ **Volume of prism** = area of cross section \times length

1. In 2002, Shorebridge Chess Club's total income came from a council grant and members' fees.

Council grant £50
 Members' fees 240 at £5 each.

- (a) (i) Work out the total income of the club for the year 2002.

£

- (ii) Find the council grant as a fraction of the club's total income for the year 2002.
 Give your answer in its simplest form.

..... (3)

In 2001, the club's total income was £1000.
 The club spent 60% of its total income on a hall.
 It spent a further £250 on prizes.

- (b) Work out the ratio

The amount spent on the hall : the amount spent on prizes.

Give your answer in its simplest form.

..... (3)
 (Total 6 marks)

2. This is a list of ingredients for making a pear & almond crumble for 4 people.

Ingredients for 4 people. 80 g plain flour 60 g ground almonds 90 g soft brown sugar 60 g butter 4 ripe pears

Work out the amount of each ingredient needed to make a pear & almond crumble for **10** people.

..... g plain flour

..... g ground almonds

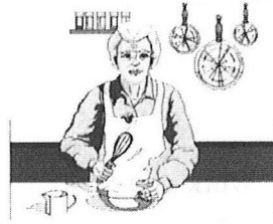
..... g soft brown sugar

..... g butter

..... ripe pears

(Total 3 marks)

3. Rosa prepares the ingredients for pizzas.



She uses cheese, topping and dough in the ratio 2 : 3 : 5
Rose uses 70 grams of dough.

Work out the number of grams of cheese and the number of grams of topping Rosa uses.

Cheese g

Topping g

(Total 3 marks)

4. Rosa prepares the ingredients for pizzas.



She uses cheese, topping and dough in the ratio 2 : 3 : 5
Rose uses 70 grams of dough.

Work out the number of grams of cheese and the number of grams of topping Rosa uses.

Cheese g

Topping g
(Total 3 marks)

5. Here are the ingredients needed to make 500 ml of custard.

<p>Custard makes 500 ml 400 ml of milk 3 large egg yolks 50 g sugar 2 teaspoons of cornflour</p>
--

- (a) Work out the amount of sugar needed to make 2000 ml of custard.

.....g (2)

- (b) Work out the amount of milk needed to make 750 ml of custard.

.....ml (2)
(Total 4 marks)

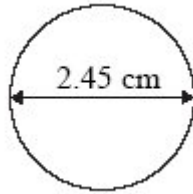
6. A 10 pence coin is made from copper and nickel.
The ratio of the weight of copper to the weight of nickel is 18:6

- (a) Write the ratio 18:6 in its simplest form

..... (1)

The diameter of the 10 pence coin is 2.45 cm.

- (b) Work out the circumference of the coin.
Give your answer correct to 1 decimal place.



.....cm

(2)

(Total 3 marks)

7. Three woman earned a total of £36
They shared the £36 in the ratio 7:3:2
Donna received the largest amount.

- (a) Work out the amount Donna received.

£.....

(3)

A year ago, Donna weighed 51.5 kg.

Donna now weighs $8\frac{1}{2}\%$ less.

- (b) Work out how much Donna now weighs.
Give your answer to an appropriate degree of accuracy.

.....kg
(4)
(Total 7 marks)

8.

**Canal boat for hire
£1785.00
for 14 days**

Jenny and Kath hire the canal boat for 14 days.
They share the hire cost of £1785.00 in the ratio 2:3

Work out the smaller share.

£
(Total 2 marks)

9. Ann, Bill and Colin are travelling in a car from Glasgow to Poole.
Ann, Bill and Colin share the driving so that the distances they drive are in the ratio 3:4:4
Ann drives a distance of 210 km.

(a) Calculate the total distance they travelled from Glasgow to Poole.

..... km

(3)

Ann drives the 210 km in 2 hours 40 minutes.

(b) Work out Ann's average speed.

..... km/h

(3)

Colin's case weighs 7 kg correct to the nearest kg.

- (c) (i) Write down the greatest possible weight of Colin's case.

.....kg

- (ii) Write down the least possible weight of Colin's case.

.....kg

(2)

(Total 8 marks)

10.

Canal boat for hire
£1785.00
for 14 days

Jenny and Kath hire the canal boat for 14 days.
They share the hire cost of £1785.00 in the ratio 2:3

Work out the smaller share.

£

(Total 2 marks)

11. Ann, Bill and Colin are travelling in a car from Glasgow to Poole.
Ann, Bill and Colin share the driving so that the distances they drive are in the ratio 3:4:4
Ann drives a distance of 210 km.

(a) Calculate the total distance they travelled from Glasgow to Poole.

..... km

(3)

Ann drives the 210 km in 2 hours 40 minutes.

(b) Work out Ann's average speed.

..... km/h

(4)

(Total 7 marks)

12. Bob lays 200 bricks in 1 hour.
He always works at the same speed.

Work out how long it will take Bob to lay 960 bricks.
Give your answer in hours and minutes.

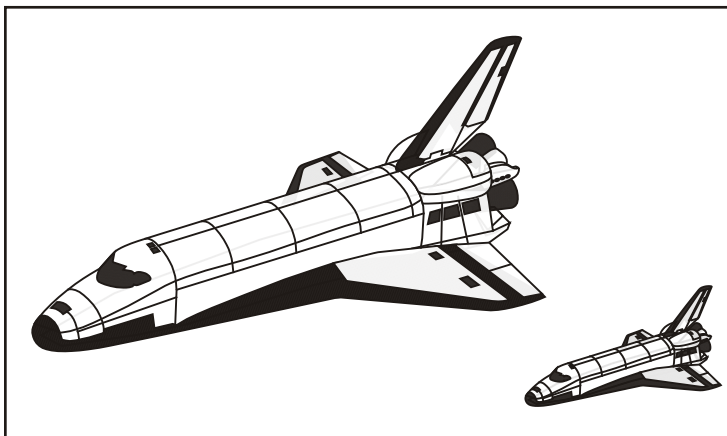


.....hours.....minutes

(Total 3 marks)

13.

Picture **NOT** accurately drawn



A model of a space shuttle is made to a scale of 2 centimetres to 1 metre.

The length of the space shuttle is 24 metres.

- (a) Work out the length of the model.
Give your answer in centimetres.

.....cm

(2)

The height of the model is 10 centimetres.

- (b) Work out the height of the space shuttle.
Give your answer in metres.

.....m

(2)

(Total 4 marks)

14. Amy, Beth and Colin share 36 sweets in the ratio 2 : 3 : 4
 Work out the number of sweets that each of them receives.

Amy.....sweets

Beth.....sweets

Colin.....sweets

(Total 3 marks)

15. Mr Brown buys a garden spade.
 The spade costs £20 plus 17½% VAT.



Garden spade
£20 + 17½ % VAT

- (a) Calculate the total cost of the spade.

£

(3)

Mr Brown makes some compost.
He mixes soil, manure and leaf mould in the ratio 3:1:1

Mr Brown makes 75 litres of compost.

(b) How many litres of soil does he use?

..... litres (3)

Mr Brown sows 200 flower seeds.

For each flower seed the probability that it will produce a flower is 0.8

(c) Work out an estimate for the number of these flower seeds that will produce a flower.

..... (2)
(Total 8 marks)

16. An alloy is made from tin and copper.
The ratio of the weight of tin to the weight of copper is 1 : 4

Sally made 35 grams of the alloy.

(a) Work out the weight of tin she used.

.....g (2)

Sven used 18 grams of tin to make some of the alloy.

- (b) Work out the weight of alloy he made.

.....g
 (2)
 (Total 4 marks)

17. Mr Brown makes some compost.
 He mixes soil, manure and leaf mould in the ratio 3:1:1

Mr Brown makes 75 litres of compost.

- (a) How many litres of soil does he use?

..... litres
 (3)

Mr Brown sows 200 flower seeds.

For each flower seed the probability that it will produce a flower is 0.8

- (b) Work out an estimate for the number of these flower seeds that will produce a flower.

.....
 (2)
 (Total 5 marks)

18. A shop sells CDs and DVDs.
 In one week the number of CDs sold and the number of DVDs sold were in the ratio 3:5
 The total number of CDs and DVDs sold in the week was 728

Work out the number of CDs sold.

.....
 (Total 2 marks)

19. Lillian, Max and Nazia share a sum of money in the ratio 2 : 3 : 5

(a) What fraction of the money does Max receive?

..... (2)

Nazia receives £60

(b) Work out how much money Lillian receives.

£ (3)
 (Total 5 marks)

20. Lillian, Max and Nazia share a sum of money in the ratio 2 : 3 : 5

Nazia receives £60

Work out how much money Lillian receives.

£

(Total 3 marks)

21. A coin is made from copper and nickel.

84% of its weight is copper.

16% of its weight is nickel.

Find the ratio of the weight of copper to the weight of nickel.

Give your ratio in its simplest form.

.....

(Total 2 marks)

22. A garage sells British cars and foreign cars.
The ratio of the number of British cars sold to the number of foreign cars sold is 2 : 7

The garage sells 45 cars in one week.

- (a) Work out the number of British cars the garage sold that week.

.....

(2)

A car tyre costs £80 plus VAT at $17\frac{1}{2}\%$.

- (b) Work out the total cost of the tyre.

£

(3)

(Total 5 marks)

23. A garage sells British cars and foreign cars.
The ratio of the number of British cars sold to the number of foreign cars sold is 2 : 7

The garage sells 45 cars in one week.

- (a) Work out the number of British cars the garage sold that week.

..... (2)

A car tyre costs £80 plus VAT at $17\frac{1}{2}\%$.

- (b) Work out the total cost of the tyre.

£ (3)

The value of a new car is £12 000
 The value of the car depreciates by 20% per year.

- (c) Work out the value of the car after 2 years.

£


(3)

(Total 8 marks)

24. A tin of cat food costs 40p.
 A shop has a special offer on the cat food.

Special offer

Pay for 2 tins and get 1 tin free



Julie wants 12 tins of cat food.

- (a) Work out how much she pays.

£

(3)

9 of the 12 tins are tuna.

(b) Write 9 out of 12 as a percentage.

..... %

(2)

The normal price of a cat basket is £20

In a sale, the price of the cat basket is reduced by 15%.

(c) Work out the sale price of the cat basket.

£

(3)

(Total 8 marks)

25. Sidra and Gemma share £48 in the ratio 5 : 3

Work out how much more money Sidra gets than Gemma gets.

£

(Total 3 marks)

26. Here are the ingredients for making cheese pie for 6 people.

Cheese pie for 6 people

180 g flour

240 g cheese

80 g butter

4 eggs

160 ml milk

Bill makes a cheese pie for 3 people.

- (a) Work out how much flour he needs.

..... g

(2)

Jenny makes a cheese pie for 15 people.

- (b) Work out how much milk she needs.

..... ml

(2)

(Total 4 marks)

27. A tin of cat food costs 40p.
A shop has a special offer on the cat food.

Special offer

Pay for 2 tins and get 1 tin free



Julie wants 12 tins of cat food.

- (a) Work out how much she pays.

£ (3)

The normal price of a cat basket is £20
In a sale, the price of the cat basket is reduced by 15%.

- (b) Work out the sale price of the cat basket.

£ (3)
(Total 6 marks)

28. There are some sweets in a bag.

18 of the sweets are toffees.

12 of the sweets are mints.

- (a) Write down the ratio of the number of toffees to the number of mints.
Give your ratio in its simplest form.

..... :

(2)

There are some oranges and apples in a box.

The total number of oranges and apples is 54

The ratio of the number of oranges to the number of apples is 1 : 5

- (b) Work out the number of apples in the box.

.....

(2)

(Total 4 marks)

29. A recipe for cake requires

450 grams of flour
and 175 grams of butter.

Write down the ratio of grams of flour to grams of butter.
Give your answer in its simplest form.

.....

(Total 2 marks)

30. Here is a recipe for making 10 chocolate chip cookies.

Chocolate Chip Cookies

Makes 10 cookies.

100 g of flour

60 g of sugar

50 g of margarine

40 g of chocolate chips

2 eggs

Work out the amounts needed to make 15 chocolate chip cookies.

..... g of flour

..... g of sugar

..... g of margarine

..... g of chocolate chips

..... eggs

(Total 3 marks)

31. 3 metres of ribbon cost £1.26.

Work out the cost of 5 metres of the same ribbon.

£

(Total 2 marks)

32. Derek, Erica and Fred share £108 in the ratio 3:4:2

Calculate the amount of money Erica gets.

£.....

(Total 3 marks)

33. A model is made of an aeroplane.

The length of the model is 18 centimetres.

The length of the real aeroplane is 45 metres.

Work out the ratio of the length of the model to the length of the real aeroplane.

Write your answer in the form $1 : n$.

.....
(Total 3 marks)

34. Verity and Jean share £126 in the ratio 5 : 3
Work out how much money Verity receives.

£

(Total 2 marks)

35. Ken and Susan share £20 in the ratio 1 : 3
 Work out how much money each person gets.

Ken £

Susan £

(Total 2 marks)

36. Ann and Bob shared £240 in the ratio 3 : 5

Ann gave a **half** of her share to Colin.

Bob gave a **tenth** of his share to Colin.

What fraction of the £240 did Colin receive?

.....

(Total 4 marks)

37. The ratio of girls to boys in a school is 2 : 3

(a) What fraction of these students are boys?

.....

(2)

In Year 8 the ratio of girls to boys is 1 : 3
There are 300 students in Year 8.

(b) Work out the number of girls in Year 8.

.....

(2)

(Total 4 marks)

38. Mrs. Jones shared £375 between her two children in the ratio 1 : 6
She gave the bigger share to Matthew.

Work out how much money she gave to Matthew.

£

(Total 2 marks)

39. Alex and Ben were given a total of £240
They shared the money in the ratio 5 : 7

Work out how much money Ben received.

£

(Total 2 marks)

40. There are 40 chocolates in a box.
12 chocolates are plain chocolates.
The remaining chocolates are milk chocolates.

- (a) Work out the ratio of the number of plain chocolates to the number of milk chocolates in the box.
Give your ratio in its simplest form.

.....

(2)

Some plain chocolates are added to the box so that the ratio of the number of plain chocolates to the number of milk chocolates is 1 : 2

(b) Work out how many plain chocolates are added to the box.

.....
 (2)
 (Total 4 marks)

41. This is a recipe for making Spaghetti Carbonara for 4 people.

<p>Spaghetti Carbonara</p> <p>Ingredients for 4 people</p> <p>400 g of spaghetti</p> <p>120 g of bacon</p> <p>2 tablespoons of oil</p> <p>4 eggs</p> <p>50 g of cheese</p>

Bill is making Spaghetti Carbonara for 6 people.
 Work out the amount he needs.

- g of spaghetti
- g of bacon
- tablespoons of oil
- eggs
- g of cheese

(Total 3 marks)

42. A piece of wood is of length 45 cm.
The length is divided in the ratio 7 : 2

Work out the length of each part.

..... cm, cm
(Total 2 marks)

43. Ruth makes poached peaches.

Here is a list of ingredients for making poached peaches for 6 people.

Poached Peaches	
Ingredients for 6 people	
12	yellow cling peaches
1400 ml	water
130 g	granulated sugar

Ruth makes poached peaches for 9 people.

Work out the amount of each ingredient needed to make poached peaches for 9 people.

..... yellow cling peaches

.....ml water

.....g granulated sugar

(Total 2 marks)

44. On a school trip, the ratio of the number of teachers to the number of students was 1:7
The **total** number of teachers and students was 160.

Work out the number of teachers on this school trip.

.....
(Total 2 marks)

45. There are 20 sweets in a packet.
12 of the sweets are mints.
The rest of the sweets are toffees.

Write down the ratio of the number of mints to the number of toffees.
Give your ratio in its simplest form.

.....
(Total 2 marks)

46. There are 21 questions in a science test.
Each question is on biology or on chemistry or on physics.

The numbers of questions on biology, chemistry and physics are in the ratios 4 : 2 : 1

- (i) What fraction of the questions are on chemistry?

.....

(ii) Work out the number of questions that are on biology.

.....
(Total 5 marks)

47. Kamini and David share £84 in the ratio 1 : 3

Calculate the amount of money Kamini gets.

£.....
(Total 2 marks)

48. Express 108 as a product of its prime factors.

.....
(Total 3 marks)

49. Amy, Beth and Colin share 36 sweets in the ratio 2 : 3 : 4

Work out the number of sweets that each of them receives.

Amysweets

Bethsweets

Colinsweets

(Total 3 marks)

01. (a) (i) 1250 3

$$240 \times 5 = 1200$$

B1 cao 1250

(ii) $\frac{1}{25}$

$$\frac{50}{1250}$$

M1 cao $\frac{50}{1250}$

A1 for $\frac{1}{25}$ in its simplest form

(b) 12:5 3

$$\frac{60}{100} \times 1000 = 600$$

M1 for $\frac{60}{100} \times 1000$ oe

A1 for 600

A1 cao

[6]

02. 200
150
225
150
10 3

B3 cao

(B2 for three correct, or B1 for one correct)

[3]

03. Cheese 28
Topping 42 3
 $70/5 = 14$

M1 for $70/5$ or 5 parts = 70 or 14 seen in a correct context

M1 for "14" $\times 2$ or "14" $\times 3$ (implied by 28 or 42)

A1 for 28 and 42 cao

(SC B1 for 14, 21 on answer line without working)

[3]

04. Cheese 28
Topping 42 3
 $70/5 = 14$
M1 for 70/5 or 5 parts = 70 or 14 seen in a correct context
M1 for "14" \times 2 or "14" \times 3 (implied by 28 or 42)
A1 for 28 and 42 cao
(SC B1 for 14, 21 on answer line without working) [3]
05. (a) 200 2
eg $50 \times \frac{2000}{500}$
M1 for $\frac{2000}{500}$ or 4 seen
A1 cao
- (b) 600 2
eg $400 \times \frac{750}{500}$
M1 for $\frac{750}{500}$ or 1.5 seen or 400 + 200
A1 cao [4]
06. (a) 3 : 1 1
B1 cao
- (b) 7.7 2
 $\pi \times 2.45$
M1 for $\pi \times 2.45$ (accept π as 3.1 or better)
A1 for 7.59 to 7.70 [3]

07. (a) 21 3

$$36 \div (7 + 3 + 2)$$

$$"3" \times 7$$

M1 for $36 \div (7 + 3 + 2)$

M1 (dep) for "3" \times 7 or 3 or 2

A1 cao

(b) 47 or 47.1 or 47.12 4

$$51.5 \times \frac{8.5}{100} = 4.3775$$

$$51.5 - 4.3775 = 47.1225$$

M1 for $51.5 \times \frac{8.5}{100}$ or 4.37(75) seen

M1 (dep) for $51.5 - "4.37(75)"$

A1 for 47 or better

B1 (indep) for rounding their answer correctly to the nearest whole number or 1 or 2 d.p

OR

$$M1 \text{ for } 51.5 \times \frac{100 - 8.5}{100}$$

M1 for $51.5 \times "0.915"$ or $0.515 \times "91.5"$

A1 for 47 or better

B1 (indep) for rounding their answer correct to the nearest whole number or 1 or 2 d.p

[7]

08. $1785 \times 2 \div 5 = \text{£}714$ 2

M1 1785×2 or $1785 \div 5$ or $1785 \div "(2 + 3)"$

A1 cao Accept $\text{£}714$ and $\text{£}1071$ given.

[2]

09. (a) 1 share = $210 \div 3$ (=70)
Total = "70" \times (3+4+4) =
770 3

M1 for association of 210 with 3

M1 for $(210 \div 3) \times (3+4+4)$

A1 cao

(b) Average speed = $210 \div (2\text{hrs } 40\text{ mins})$
 $= \frac{210}{2\frac{2}{3}} \text{ km/h}$
 $= 78.75$ 3

M1 uses speed = distance/time
M1 (dep) for evidence of converting time to a single unit
A1 for 77 to 81
SC: B2 for answer of 87.5

(c) (i) 7.5 2
B1 cao

(ii) 6.5 2
B1 cao

[8]

10. $1785 \times 2 \div 5 = \text{£}714$ 2
M1 1785 \times 2 or 1785 \div 5 or 1785 \div "(2 + 3)"
A1 cao Accept £714 and £1071 given.

[2]

11. (a) 1 share = $210 \div 3 (=70)$
 Total = '70' \times (3+4+4)
 $= 770$ 3
M1 for association of 210 with 3
M1 for $(210 \div 3) \times (3 + 4 + 4)$ oe
A1 cao

(b) Average speed = $210 \div (2\text{hrs } 40\text{ mins})$
 $= \frac{210}{2\frac{2}{3}} \text{ km/h}$
 $= 78.75$ 4

M1 uses speed = distance/time
M1 (dep) evidence of converting time to a single unit
A1 for 77 to 81
SC: B2 for answer of 87.5
B1 for km/h (or other valid unit if consistent with their value)

[7]

12. 960 bricks in $\frac{960}{200}$
 = 4.8 hours
 4h 48min 3
- M1 for $\frac{960}{200}$ or any valid partitioning method leading to 900*
A1 for 4.8 seen
A1 for 4 hours 48 mins cao
(SC B2 for 4 hours 8 minutes or 4 hours 80 mins
or B1 for 4 hours < answer < 5 hours) [3]
13. (a) $\frac{24 \times 2}{48}$ 2
- M1 for 24×2 or $24 \times 2 \times 100$ or 24×200*
A1 cao
SC: 480, 4800 gets B1
- (b) $\frac{10 \div 2}{5}$ 2
- M1 for $10 \div 2$, or multiplication of a scale factor like 1 : "50"*
A1 cao [4]
14. $36 \div 9$
 1 part = 4
 8 : 12 : 16
- A 8
 B 12
 C 16 3
- M1 for $36 \div (2 + 3 + 4)$*
M1 (dep) $2 \times '4'$ or $3 \times '4'$ or $4 \times '4'$
A1 cao [3]
15. (a) eg $10\% + 5\% + 2.5\% = \text{£}2 + \text{£}1 + \text{£}0.50$ 3
 $\text{£}20 + \text{£}3.50 = 23.50$
- M1 for $\text{£}2$, $\text{£}1$ and $\text{£}0.50$ or $\text{£}3.50$ seen or $\frac{17.5}{100} \times 20$ oe*
M1 (dep) for " $\text{£}3.50$ " + $\text{£}20$
A1 for 23.5(0)

(b) $75 \div (3 + 1 + 1) = 15$ 3
 $15 \times 3 = 45$

MI for $75 \div (3 + 1 + 1)$

MI (dep) for “15” \times 3

AI cao

(c) $0.8 \times 200 = 160$ 2

MI for 0.8×200

AI for 160, accept 160 out of 200

SC: BI for $\frac{160}{200}$ or 160 in 200

[8]

16. (a) $\frac{35}{1+4}$ 2
 $= 7$

MI for $\frac{35}{1+4}$

AI for 7 cao

(b) 4×18 or 72 or $5 \times 18 = 90$ 2

MI for 4×18 or 72 or 5×18

AI for 90 cao

[4]

17. (a) $75 \div (3 + 1 + 1) = 15$ 3
 15×3
 $= 45$

MI for $75 \div (3 + 1 + 1)$

MI (dep) for “15” \times 3

AI cao

(b) 0.8×200 2
 $= 160$

MI for 0.8×200

AI for 160, accept 160 out of 200

SC: BI for $\frac{160}{200}$ or 160 in 200

[5]

18. 273

2

*MI for $728 \div 8$ or $728 \div "3+5"$ or 91**AI cao**SC B1 for 455, or for 273:455***[2]**

19. (a) $\frac{3}{2+3+5}$

2

$= \frac{3}{10}$

MI for $3/(2 + 3 + 5)$ *AI for $\frac{3}{10}$ oe*

(b) $60 \div 5 = 12$
 $12 \times 2 = 24$

3

MI for $60 \div 5$ *MI for " 12 " $\times 2$* *AI for 24 cao*

Alternative:

Total sum = $60 \times 2 = 120$

Lillian = $\frac{2}{10}$ of 120

$= 120 \times 2 \div 10$

*Alternative:**MI for $60 \times 2 = 120$ seen**MI for $120 \times 2 \div 10$* *AI cao**SC: B2 for 24, 36 and 60**SC: B1 for 36 on answer line***[5]**

20. $60 \div 5 = 12$
 $12 \times 2 = 24$ 3
- M1 for $60 \div 5$*
M1 (dep) for '12' $\times 2$
A1 for 24 cao [3]
21. 84:16 or 42:8
 21:4 2
- M1 84:16 or 42:8 or 4:21 or 5.25:1 or 1:0.19..., or any multiple of 84:16 (eg 8.4:1.6, 21:4, 10.5:2), or for answers given the wrong way around.*
For M1 ignore % signs.
A1 cao [2]
22. (a) $45 \times 2 \div 9$
 10 2
- M1 for 45×2 or $45 \div "2 + 7"$ or 5 seen, or 90 seen, or 10 seen as part of a ratio (eg 10:35)*
A1 cao
- (b) $(80 \times 17.5/100) + 80 = 14 + 80 =$
 £94 3
- M2 for or $80 \times \frac{17.5}{100}$ or 80×1.175 oe*
A1 cao
or
M1 for 80×0.175 or $80 \times \frac{17.5}{100}$ oe or 14 seen or $8 + 4 + 2$ seen
M1(dep) '14' + 80 or $80 + (80 \times 0.175)$ oe
A1 cao [5]
23. (a) $45 \times 2 \div 9$
 10 2
- M1 for $45 \div "2 + 7"$ or 45×2 or 5 seen, or 90 seen or 10 seen as part of a ratio e.g 10:35*
A1 cao

(b) $(80 \times 17.5/100) + 80 = 14 + 80 = \text{£}94$ 3

M2 for $80 \times \frac{117.5}{100}$ *or* 80×1.175 *oe*

A1 cao
or

M1 for 80×0.175 *or* $80 \times \frac{17.5}{100}$ *oe or 14 seen or 8 + 4 + 2*

seen

M1(dep) '14' + 80 *or* $80 + 80 \times \frac{17.5}{100}$ *oe*

A1 cao

(c) 12000×0.8^2

M2 for 12000×0.8^2 *or* 12000×0.8^3

A1 cao

OR

1st yr: $12000 \times 0.2 = 2400$; $12000 - 2400 = 9600$

2nd yr: $9600 \times 0.2 = 1920$; $9600 - 1920 = 7680$

[3rd year is £6144; 4th yr is £4915.20]

£7680 3

M1 12000×0.8 *oe or 9600 or 2400 or 4800 or 7200 seen*

M1(dep) '9600' $\times 0.8$ *oe*

A1 cao

(if correct answer seen, ignore extra years)

[8]

24. (a) $12 \div 3 \times 2 (=8)$

8×40

Alternative:

3 tins = $40 \times 2 = 80$

12 tins = 80×4

3.20 3

M2 for $40 \times 12 \div 3 \times 2$ *or better (inc. adding 8 lots of 40p)*

(M1 for using 2 of the 3 operations or 8 seen)

A1 cao

OR

M1 for $3 \text{ tins} = 40 \times 2 (=80)$

M1 for "80" $\times 4$

A1 cao

[SC: if M0 scored: B2 for digits 32, or B1 for 480 or 4.80]

(b) $\frac{9}{12} \times 100$
75

2

M1 for $\frac{9}{12}$ oe
A1 cao

(c) $\frac{15}{100} \times 20 = 3$

OR $10\% = 20 \div 10 = 2$

$5\% = 2 \div 2 = 1$

$15\% = 2 + 1 = 3$

$20 - 3$

Alternative:

20×0.85

17

3

M1 for $\frac{15}{100} \times 20$ oe or a correct method to work out 10% and

5% of 20, or 2 and 1 seen

A1 for 3 cao

A1 ft for 20 – “3” dependent on M1 scored

Alternative:

B1 cao for 85 or 0.85 seen

M1 for $\frac{100-15}{100} \times 20$ or “1 – 0.15” $\times 20$

A1 ft for a correct solution of $\frac{100-15}{100} \times 20$ or “1 – 0.15” \times

20 or 17 dependent on M1 scored

SC (for both alternatives) B2 for £3

[8]

25. $48 \div 8 = 6$

$6 \times 5 - 6 \times 3 = 12$

12

3

M1 for $48 \div “5 + 3”$

M1 (dep) for “6” $\times 5$ or 30 seen or “6” $\times 3$ or 18 seen or “6”

$\times 2$

A1 cao

[3]

26. (a) $180 \div 2$
90 2
M1 for $180 \div 2$ OR $180 \div 6 \times 3$
A1 cao
- (b) 160×2.5
400 2
M1 for 160×2.5 OR $160 \div 6 \times 15$ OR $160 \div 2 \times 5$ oe
A1 cao
SC: B1 for an answer of 399 to 405

[4]

27. (a) $12 \div 3 \times 2 (= 8)$
 8×40

Alternative
 $3 \text{ tins} = 40 \times 2 = 80$
 $12 \text{ tins} = 80 \times 4$
3.20 3
M2 for $40 \times 12 \div 3 \times 2$ or better (inc. adding 8 lots of 40p)
(M1 for using 2 of the 3 operations or 8 seen)
A1 cao
OR
M1 for 3 tins = 40×2
M1 (dep) for “80” $\times 4$
A1 cao
[SC: B2 for sight of digits 320 if M0 scored]
[SC: B1 for 480 or 4.80 if M0 scored]

(b) $\frac{15}{100} \times 20 = 3$

OR $10\% = 20 \div 10 = 2$

$5\% = 2 \div 2 = 1$

$15\% = 2 + 1 = 3$

$20 - 3$

Alternative

20×0.85

17

3

M1 for $\frac{15}{100} \times 20$ oe or a correct method to work out 10% and

5% of 20 or 2 and 1 seen

A1 for 3 cao

A1 ft for 20 – “3” dependant upon M1 scored

[SC: B2 for 3 on answer line with no working]

Alternative

B1 cao for 85 or 0.85 seen

M1 for $\frac{100-15}{100}$ or “1 – 0.15” $\times 20$

A1 ft for a correct solution of $\frac{100-15}{100}$ or “1 – 0.15” $\times 20$

OR 17 (dep on M1 scored)

[6]

28. (a) $18 \div 6 : 12 \div 6$
 $3 : 2$

2

M1 for 18 : 12 or 12 : 18 or 1.5:1 or 1:0.67 oe or correct ratio reversed eg 2:3

A1 for 3 : 2 or 1 : 0.6 ... [recurring]

(b) $5 + 1 = 6$
 $54 \div 6 = 9$
 5×9
45

2

M1 for $\frac{5}{5+1} \times 54$ or $\frac{1}{5+1} \times 54$ or $54 \div '5 + 1'$ or 54×5 or

270 or 9 : 45

or 9 seen, as long as it is not associated with incorrect working.

A1 for 45 cao

[4]

29. 18 : 7
OR
 7 : 18 2
 450 : 175 = 90 : 35
M1 for 450 : 175 OR 90 : 35 OR 65 : 25 (oe)
A1 cao
[SC: 7 and 18 seen = B1] [2]
30. 150, 90, 75, 60, 3 3
 $\frac{15}{10} = 1.5$
M1 for sight of $\frac{15}{10}$ oe (can be implied by one correct)
A2 for all 5 correct (A1 for 3 correct) [3]
31. £2.10 2
 $\frac{5}{3} \times 1.26$
M1 for $\frac{5}{3} \times 1.26$
A1 cao [2]
32. £48 3
 $\frac{108}{(3+4+2)}$
 "12" \times 4
M1 for $\frac{108}{(3+4+2)}$
*M1 for "12" \times 4 **OR** "12" \times 3 **OR** "12" \times 2*
A1 cao [3]

33. 1 : 250 3
 18 cm : 45 m = 18 cm : 4500 cm
 Divide by 18
M1 for making both the same unit
M1 for dividing both by 18 OR 0.18, given as a ratio
A1 cao [3]
34. 78.75 2
 $126 \div (5 + 3)$
M1 for $126 \div (5 + 3)$
A1 cao [2]
35. Ken 5 2
 Susan 15
B2
(B1 for one correct or $\frac{20}{4}$ seen or answers transposed) [2]
36. $\frac{1}{4}$ oe 4
 $\frac{240}{3+5} = 30$
 Ann = 90, Bob = 150
 $\text{Colin} = \frac{90}{2} + \frac{150}{10} = 60$
M1 for 240 divided by 5 + 3
A1 for A = 90 and B = 150
M1 ft for $\frac{90}{2}$ and $\frac{150}{10}$
A1 for $\frac{60}{240}$ cao [4]

37. (a) $\frac{3}{5}$ oe 2
 $2 + 3 (= 5)$
 $\frac{3}{2+3}$
MI for denominator of "2 + 3"
AI
- (b) 75 2
 $300 \div (1 + 3)$
MI for $300 \div "(1 + 3)"$
AI cao
- [4]
38. 306 2
 $357 \div 7 = 51$
 51×6
MI for $357 \div 7$ or 51 seen
AI cao
- [2]
39. £140 2
 $5 + 7 = 12$
 $240 \div "12" (= 20)$
 $7 \times "20"$
MI for $240 \div 12$
AI cao
- [2]
40. (a) 3 : 7 2
 $12 : (40 - 12) = 12 : 28$
B1 for 12 : 28 (accept 28 : 12)
B1 ft for correct simplification of a ratio of 12 : n (or n:12 where $n \leq 40$)
- (b) 2 2
 $(40 - 12) / 2 = 14$
MI for "28"/2 (or sight of 14 linked to 28)
AI ft
- [4]

41. 600, 180, 3, 6, 75 3
B3 for all 5 correct
(B2 for 3 or 4 correct)
(B1 for 1 or 2 correct)
[3]
42. $\frac{45}{(7+2)}=5$
 $7 \times 5 \quad 2 \times 5$
 35, 10 2
M1 for $\frac{45}{(7+2)}$
A1 for both correct parts
[2]
43. 18
 2100
 195 2
B2 for all 3 correct answers
(B1 for 1 correct answer)
[2]
44. $160 \div 8$
 20 2
M1 for $160 \div 8$ or 20 seen
A1 cao
[2]
45. 12 : 8
 3 : 2 2
B2 for 3 : 2
(B1 for 12 : 8 or 6 : 4)
[SC B1 for 3 : 5 or 2 : 3 or 5:3]
[2]

46. (i) $\frac{2}{(4+2+1)}$
 $\frac{2}{7}$ oe

5

MI for $\frac{n}{(4+2+1)}$ where $n = 1, 2$ or 4

AI for $\frac{2}{7}$ oe

(ii) $\frac{21}{\text{"4+2+1"}}$
 $4 \times \text{"3"}$
 12

MI for $\frac{21}{\text{"7"}}$

MI for "3" \times 4 or "3" \times 2 or "3" \times 1 (if stated)

AI cao

[5]

47. $84 \div 4$
 21

2

MI for $84 \div 4$

AI cao

(SC M1A0 for 63)

[2]

48. $2 \times 54 = 2 \times 2 \times 27$
 $2 \times 2 \times 3 \times 3 \times 3$

3

MI for attempt at continual prime factorisation (at least 2 correct steps); could be shown as a factor tree.

AI all 5 correct prime factors and no others

AI $2 \times 2 \times 3 \times 3 \times 3$ or $2^2 \times 3^3$ oe

[3]

49. $36 \div 9$
 1 part = 4
 $8 : 12 : 16$
 A 8
 B 12
 C 16

3

MI for $36 \div (2 + 3 + 4)$

MI (dep) $2 \times "4"$ or $3 \times "4"$ or $4 \times "4"$

AI cao

[3]

01. Paper 2

About 90% of candidates worked out the income of the club in (a) (i) correctly. However, few went on to write down the correct fraction for (a) (ii).

In part (b) a significant proportion of answers or working shown indicated the successful calculation of 60% of £1000 for which 2 marks were awarded, yet only a small minority (less than 5%) were able to give the correctly and fully simplified ratio '12:5'.

Paper 4

The total income was found correctly by most candidates in part (i) of (a), but part (ii) was very poorly attempted. Many wrote $\frac{50}{1200}$ or $\frac{1250}{50}$, leading to an incorrect answer. Finding the amount spent on the hall in (b) proved straightforward for most candidates but many were then unable to give the ratio in its simplest form. A ratio of 6:2.5 was seen often and some gave an answer in unitary form.

02. Mathematics A

Paper 2

Many candidates gained full marks. The most common errors were either to multiply the given amounts by 10 or to multiply them by 6, the number of extra people. If one amount was wrong, it was usually soft brown sugar and, if one amount was correct, it was usually ripe pears.

Paper 4

This was a well-answered question. Most candidates gained full marks.

Mathematics B Paper 17

A very well answered question with all but a few candidates scoring at least 2 marks. Merely multiplying all the ingredients by 10 was seen on occasions.

- 03.** About 30% of candidates were successful in this question. Those who realised that 70g represented 5 parts and divided 70 by 5 usually went on to gain full marks. The most common error was for candidates to treat this as a ‘sharing in a given ratio’ question and divide 70 by 10.
- 04.** A well understood concept with 66% of candidates obtaining the fully correct answer. About 25% of candidates mistook the ratios and assumed incorrectly that 70 grains should be divided between the total of 10 of all the components of the ratio. They were awarded partial recognition for this error.

05. Specification A

Foundation Tier

Only a minority scored full marks and, if one part were answered correctly, it was usually the first part. A popular wrong answer to part (a) was 150 g, the extra amount of sugar needed in addition to the original 50 g.. Lack of working made it difficult to see what approaches candidates were using but there was evidence of confusion between which amounts were custard and which were sugar. They might have found it helpful to use tables with clear headings to organise their working.

In part (b), the most common wrong answer was 650. Sometimes this was obtained from $750 - 500 = 250$ and then $250 + 400 = 650$. This answer was also obtained by candidates who realised that 250 ml of custard required 200 ml of milk but then added 400 and 250, instead of adding 400 and 200, now confusing custard and milk. A range of answers was seen including 450 ($750 - 500 = 250$; $250 + 200 = 450$), 350 ($750 - 400$) and 550. The most common method used

by those candidates who obtained the correct answer was $400 + \frac{1}{2} \times 400$, while others used

$\frac{3}{2} \times 400$ successfully.

Intermediate Tier

This question was answered better than expected, with many candidates demonstrating a good understanding of ratio and proportion, albeit intuitive in many cases. The only significant error was in part (b), where some weaker candidates did $750 - 500 = 250$, then $400 + 250 = 650$. An approach of “half again” appeared to more successful than a more formal approach of using a scale factor of 1.5

Specification B

Part (a) was very well answered, 200g usually being found using the scale factor of 4. Use of the ratio between the 50g and 500ml was often used, giving a scale factor of 10. This was sometimes incorrectly used in the subsequent calculation, with 20 or 20000 being answers offered.

In part (b) 650 ($400 + 750 - 500$) was a common error.

06. Specification A**Foundation Tier**

Usually attempted, but this question drew a very small number of correct answers (8%). Few candidates seemed to be able to give the correct formula for the circumference of a circle. There were some bizarre attempts to the question. A majority of candidates mistakenly either multiplied the diameter by two and gave the answer 4.90, attempted to work out the area of the coin or even multiplied 2.45 by 10, the value of the coin to give the answer 24.5.

Intermediate Tier

It was disappointing that only about 60% of candidates managed to write the ratio 18:6 in its simplest form in part (a). 9:3 and 6:2 were the most common incorrect answers. In part (b) those candidates who knew the formula for the circumference of a circle were usually successful and almost half achieved the correct answer. The most common error was for candidates to work out the area of the circle. Some used $2 \times \pi \times d$ or $\pi \times r$ and others had no idea what to do and did not use π at all.

Specification B

Simplifying the ratio 18:6 looked an easy mark by applying a division by 6 to both numbers but many processed it to only 9:3 rather than 3:1. Unexplainable results of 3:6, 2:2 and 1:1 were evident along with 18.6kg and the mysterious 19 which appeared in quite a few cases. Finding the circumference of a 10 pence coin of diameter 2.45 cm lead to various combinations of the 10 and 2.45. with over 90% of the candidates making no use of π to achieve a solution. Other misuses included finding only the radius of the coin and then multiplying this by 10 in the hope that it gave the circumference.

07. Specification A**Higher Tier**

Part (a) rarely posed a challenge at this level. Most candidates were also successful on part (b) either by working out 8.5% and subtracting the kg or by working out 91.5% of the initial weight. Generally candidates were able to round off answers to a sensible degree of accuracy. Of those that got it wrong the main faulty approach was to split the 8.5% into parts (5%, 2.5% etc). In this case accuracy was often lost and/or numbers entered in the wrong columns.

Intermediate Tier

Part (a) was answered very well and candidates who understood the concept of ratio generally gained full marks. Part marks were rarely awarded. The most common error was for candidates to work out $36 \div 7$, $36 \div 3$ and $36 \div 2$ and then give an answer of £18, the largest amount. Responses to part (b) were mixed. Whilst many candidates (just over 40%) gained full marks there were many poor attempts as well. Build-up methods to find $8\frac{1}{2}\%$ were common and these often resulted in an incorrect answer. Many candidates did use a calculator to correctly work out $8\frac{1}{2}\%$ of 51.5 as 4.3775 but some then truncated this to 4.37 or 4.3 before subtracting and others who obtained an answer of 47.1225 did not round it to an appropriate degree of accuracy at the end. Marks were often lost through a lack of understanding of 'percentage'. Quite a few candidates divided 51.5 by 8.5 and subtracted the answer from 51.5 and some merely subtracted 8.5 from 51.5.

Specification B

Dividing £36 in the given ratio was usually accurately done in part (a), often showing more work than required in answering the question, by giving the correct answers for all three shares. The most common error here was to divide £36 by 7, 3 and 2 and then select the highest value. In part (b) methods for finding 8.5% of 51.5 kg were varied. Success was usually achieved where candidates multiplied 51.5 by $\frac{8.5}{100}$. Build up methods were very common but usually failed due to arithmetic error, and through no explicit explanation of the method being given. For example; $10\% = 5.15$ followed by $5\% = 0.515$ must be explained (ie $5\% = 5.15 \div 2 = 0.515$) if method marks are to be awarded when arithmetic errors are made. Answers given to an appropriate degree of accuracy were common with whole number, one and two decimal places being acceptable. It was not uncommon to see $51.5 \div 8.5$ in an attempt to find the percentage. Many weaker candidates simply subtracted 8.5 from 51.5 to give 43; this gained no marks.

08. This was also a good discriminator. Attempts were disappointing. Many candidates merely attempted $1785 \div 2$ or $1785 \div 3$, or both. Those who knew that a division by 5 was needed usually went on to gain 1 mark, but there were many who failed to divide by 5 correctly.
09. Part (a) was answered quite well with more than half of the candidates gaining full marks. Those who made the link between 210 and 3 were often successful but some of those who realised that 210 represented 3 parts went on to work out $70 + 280 + 280$ instead of $210 + 280 + 280$. A significant number of candidates, however, misunderstood the question and divided 210 by 11. In part (b) many candidates attempted to divide the distance by the time but relatively few could express 2 hours 40 minutes in a suitable form for the calculation. Division by 2.40 was very common. Most of those who chose to divide by 160 minutes failed to multiply the result by 60. Less than 15% of candidates gave both the greatest and the least possible weight in part (c). When just one of these was correct it tended to be the least possible weight.

10. This was a standard straightforward ratio question. A surprising number of candidates could not divide 1785 by 5, but most knew that the process was $\div 5$ followed by multiplying by 2. Very few displayed the equivalence of dividing by 5 as being equivalent to doubling and then deleting the trailing zero.
11. Part (a) was done well by the vast majority of candidates. In part (b), virtually all knew, and were able to use $\text{speed} = \frac{\text{distance}}{\text{time}}$, and there was nearly always an attempt to give the units. Many knew that they had to convert the time to a single unit, but this was done with varying success. Those converting 2 hours 40 minutes to minutes generally achieved the greatest accuracy, whilst those converting to hours generally had the least accuracy $2\frac{2}{3}$ was often inappropriately rounded to 2.6 or 2.7. Candidates should be instructed to work in fractions or give thirds to two decimal places or more. Many of the weaker candidates thought the time was 2.4 hours and/or the units were mph.

12. Specification A

Foundation Tier

Candidates understood what they had to do in this question but only 3% were able to give the correct answer. 43% of candidates scored one mark, usually for a valid partitioning method or for obtaining an answer between 4 and 5 hours and 8% managed to get 4.8 hours.

Intermediate Tier

Most candidates gained at least one mark in this question but only one third managed to gain all three marks. The most common approach was to use a partitioning method and this met with varying degrees of success. Many got as far as 4 hours for 800 bricks or even 4 hours 30 minutes for 900 bricks but were then unable to work out the correct time for the remaining bricks. Too few candidates did the basic calculation $960 \div 200$ and many of those that did could not convert 4.8 hours into hours and minutes, giving answers such as 4 hours 8 minutes, 4 hours 80 minutes or 5 hours 20 minutes. Some calculated the number of bricks laid per minute as 3.3 instead of $3\frac{1}{3}$ and lost accuracy marks.

Specification b**Foundation Tier**

This was essentially a calculation of $960 \div 200$ and an interpretation of the outcome into hours and minutes. It was pleasing to note that the majority realised the arithmetical process involved in obtaining the result. What was less successful was the ability to perform the calculation, which again highlighted the lack of access to a calculator. The non-calculator approach involved looking at multiples of 200 but the remaining 160 or 60 proved to be more of a challenge. Answers between 4 hours and five hours were rewarded and this demonstrated a reasonableness in the time taken to lay 960 bricks. There were, however, two extremes in Bob's level of performance suggesting that he could create a new record by completing the job in 15 minutes whilst at the other extreme one might want to avoid employing Bob who took the equivalent of 57 days! Only 10% of the candidates scored 2 or 3 marks, with over 40% not scoring any marks at all.

13. This was a well answered question, with most candidates getting full marks in both parts. Those that were wrong usually gave the answer 12 in part (a) and 20 in part (b), clearly inverting the multiplication and division by 2. Some candidates failed to read part (b) correctly and were tripped up by the requirement to give the answer in metres.

14. Intermediate Tier

This question was answered very well with almost three quarters of candidates gaining full marks. Part marks were rarely awarded. The most common error was for candidates to work out $36 \div 2$, $36 \div 3$ and $36 \div 4$.

Higher Tier

This was a standard ratio question answered very well by the vast majority of candidates at this tier.

15. About half of the candidates calculated the total cost correctly in part (a). Those who were successful in finding 17½% of £20 had usually calculated 10%, 5% and 2½%. Those who tried to use 1% and ½% often made errors. Some failed to add on the VAT. A similar proportion of candidates answered part (b) correctly. A common error was to divide 75 by 3. Some who did divide by 5 then forgot to multiply by 3 and gave 15 as the final answer. In part (c), 50% of candidates appreciated the need to multiply 0.8 by 200 but many could not complete the calculation correctly.

16. Most candidates gained full marks in part (a). A common error was $35 \div 4 = 8.75$, or leaving the answer as the ratio 7:28. In part (b) many worked out the separate parts of the ratio but did not then add them to answer the question correctly. Some worked out the amount of copper required.
17. This question was done very well. In part (a), most candidates were able to obtain the correct answer. If an error was made it was usually from dividing 75 by 3 (the compost component of the ratio) instead of 5. A small number of candidates worked out $3 + 1 + 1$ as 4 or 6. In part (b), some candidates were unable to cope with the multiplication 0.8×200 , ending up with an incorrect number of zeros in their answer, typically 1600 or 16.0. A few candidates give their final answer as $\frac{160}{200}$, thus scoring only one of the two marks available.

18. **Higher Tier**

This was extremely well done. A few candidates lost marks because they had not identified the number of CDs in their answer when they wrote 273:455.

Intermediate Tier

This was a well-answered question, in which many candidates gave the correct answer. Some candidates gave the number of both CDs and DVDs in their answer, perhaps as a result of a failure to read the question fully. The most common error by candidates who did not understand division by ratio was to divide 728 by 3 and 5 separately.

19. More than 60% of candidates were successful in part (a). A common incorrect answer was $\frac{1}{3}$ and some candidates used information from the next part of the question. Part (b) was not answered as well. The most common error was for candidates to take £60 as the total amount of money and divide it in the ratio 2 : 3 : 5, leading to an answer of £12. Some of those who showed a correct method made mistakes with the arithmetic.
20. This question was answered well by the majority of candidates. Most were able to divide 60 by 5 and multiply this by 2 to get £24. By far the most common misunderstanding in this question was to divide 60 in the ratio 2:3:5 and thus get £12 as the final answer.
21. The majority of candidates gave their answer as ratios, but the weaker candidates used fractions. Those candidates who gave their answer as a ratio often left their answer as 84:16 or made errors when cancelling. A significant number of candidates reversed the order of the ratios.

22. It was usual to award some method marks in some part of this question, but few answers both parts correctly. Lots of candidates wrote their answer as 10:35, misreading the question. Trial and improvement methods were also seen. It is a real concern that so many candidates had little idea with regard to calculating percentages. Many non-calculator methods were seen, which rarely attracted any marks due to the many numerical errors that accompanied them. Some candidates went as far as calculating the VAT, but then failed to add it on to find the total.
23. Part (a) was very well done. A few candidates wrote down both 10 and 35 without identifying which value answered the question. They got one of the two marks.
- Part (b) was also very well done with a majority of answers involving multiplying by $\frac{117.5}{100}$ to get the answer directly. Of course, there were a considerable number who worked out $80 \times \frac{17.5}{100}$ and added the answer to 80.
- A few took the $8 + 4 + 2$ route to get to the £94.
- The main errors were a failure to add the £14 to £80 and a miscalculation on the $£8 + £4 + £2$, usually at the $2\frac{1}{2}\%$ stage.
- Part (c) was a standard depreciation question. It was pleasing to see so many students using the efficient 12000×0.8^2 although many who used a careful step by step approach also gained full marks. A common misread was 1200 for 12000, which resulted in the loss of 1 mark. A few candidates added on the 20%.
- Of course, there were many candidates who worked out 20% of £12000 and then subtracted 2×2400 to get the wrong answer £7200
24. This question differentiated well between candidates. Part (a) was quite well done, many candidates using a diagrammatic representation or writing down lists to help them understand the situation. These methods commonly lead to the award of at least 2 of the 3 marks available. Poor arithmetic affected some candidate's responses whilst others just worked out the cost of 12 tins (£4.80) or of 6 tins. This latter group seemed to be under the illusion that the offer was equivalent to "buy one, get one free". Many attempts to part (b) of the question gave $\frac{9}{12}$ as the relevant fraction, but commonly candidates were unable to convert this to a percentage. 44% of candidates scored full marks in part (b). Part (c) was quite well done. Some candidates worked out the price reduction but did not subtract it from the normal price to find the sale price. Weaker candidates merely subtracted 15(%) from (£)20 and gave the answer £5.

25. Foundation

Not all candidates attempted this question. About half of the responses seen deserved 1 mark or more for attempting to work out at least one of the two shares. A good number of candidates stopped at this point, and so were unable to gain all 3 marks. Some candidates showed little understanding of the problem and merely tried to divide 48 by .5 and/or 3.

Higher

The more able candidates had no trouble at all in answering this question correctly; errors tending to reflect poor reading of the question by failing to give the difference of the two girls' share. Weaker candidates often tried to divide 48 by 5 and then by 3, thus making little progress. Some, who had calculated 6 correctly then did 6×5 and 3×5 (instead of 6).

26. Foundation

Most candidates were able to halve 180 correctly without any working, scoring both available marks in part (a). However, some candidates failed to read the question carefully and thought that you just divided 180 by 3 reaching an answer of 60. A few multiplied 180 by 3 thinking the initial ingredients were sufficient for one person.

Around 60% of the candidates managed to find that 400 ml of milk was needed in (b). Many clearly understood what to do but lost an accuracy mark when they prematurely rounded their answer to $160 \div 6$, reaching a final answer somewhere between 399 and 405. A surprising number of candidates recognised the need to find the amount of milk needed for 3 people but then proceeded to divided 160 by 3.

Higher

The correct answer to part (a) was obtained by the vast majority of candidates. Those few candidates that did not obtain the correct answer generally divided by 3 rather than 2. Part (b) was less well done. Approximately 5% of candidates gained only 1 out of 2 marks; this was generally due to a loss of accuracy due to premature rounding although the incorrect answers to $160 \div 2$ or 160×2 were also frequently seen.

27. In part (a), most candidates realised the need to pay for 8 tins of cat food in order to get 12; however a significant number of candidates made arithmetic errors in their calculation of 40×8 . Some candidates just worked out the cost of 12 tins, while many assumed the offer was "buy one get one free" and just calculated the cost of 6 tins.

Part (b) was generally answered well with most candidates able, with whatever method, to correctly work out 15% of £20. However a common error was to say $10\% = £2$, then $5\% = £4$ rather than £1. A significant number of candidates did not then subtract the reduction from £20 and thus failed to score the final mark.

28. Specification A**Foundation**

In part (a) the vast majority of candidates scored a mark for a ratio of 18:12 or equivalent, despite some failing to correctly cancel the ratio, or gave the ratio the wrong way around. There were many correct answers. In part (b) some candidates successfully calculated the ratio of oranges to apples as 9:45 but chose 9 as their final answer. The weaker candidates divided 54 by 5 and rounded the answer to 11.

Higher

In part (a) those who did not score full marks either did not simplify fully or had the ratio around the wrong way. The colon on the answer line seemed to be a very good prompt for candidates. In part (b) the majority of candidates scored 2 marks for “45”; this was generally accompanied by workings which showed division by 6 and multiplication by 5 in that order. Some candidates built up the ratio from “1:5” to “2:10” to “3:15” etc summing the parts until the correct one of “9:45” was obtained. One mark was commonly obtained for “9”, sometimes for the ratio “9:45” and rarely for “270”.

Zero marks were awarded a number of times for the incorrect response of “10.8”, obtained from “54/5”.

Specification B**Foundation**

There was a good understanding of the word ‘ratio’ and two thirds of the candidates were able to gain at least the method mark in the first part of the question. The two most common errors were to state the ratio in the wrong order or to make a mistake in simplifying it.

There were fewer marks awarded in part (b) as the method required seemed to elude them. with only 40% scoring any marks at all. For those with determination, working through a list seemed to be the only option as they began with the given ratio of 1:5 and worked up by multiplication to 9:45; although they did not always understand what they had achieved when they arrived at that ratio.

Higher

Both parts of this question were very well answered. A few candidates wrote the ratio as 9:6 for their final answer in (a) or wrote the final answer as 2:3.

- 29.** By far the most common answer was $450 - 175 = 275$ with some answering $450 + 275 = 675$. The vast majority of candidates had no concept of ratio with the ratio symbol seldom seen.

30. Quite a few candidates scored full marks on this question. Most were able to gain one mark, generally by arriving at 150 g of flour or 3 eggs but then gave the middle 3 values as 70, 60, 50 or other incorrect applications. In some cases the individual quantities suggested would have produced 15 extremely large chocolate chip cookies!
31. This question was well done with many correct answers. Errors were often of an arithmetic nature; many candidates scoring 1 mark for dividing by 3 and then multiplying by 5. Surprisingly, a significant number worked out 15 metres worth (£6.30).
32. There were many correct answers to this question, with the correct method stated clearly. A significant number of candidates, however, failed to divide £108 by 9, choosing rather to divide by 4 giving £27 as their answer. These candidates usually divided £108 by 3 and 2 also to give the other shares.
33. The responses to this question were extremely poor. There were hardly any correct answers and very few attempted to convert both numbers to the same metric unit. 18 : 45 was the most common incorrect response.
34. This was answered well with many candidates gaining full marks. The most common mistake was to divide 126 by 5 or sometimes 3.
35. The majority of answers were fairly evenly split between 10, 10 and 5, 15 (or 15, 5). It was rare to see any working.

36. Paper 17

The majority of candidates successfully gained 3 and often 4 marks in this question. Dividing an amount in a given ratio was very well done indeed by all but the very weak candidates. A half and a tenth of £90 and £150 respectively almost always led to an answer of £60 for Colin's share, however this was often left as the final answer, candidates failing to read the question properly. A number of candidates, having correctly calculated Ann's and Bob's shares, then attempted a fraction calculation of $1 - (\frac{1}{2} + \frac{1}{10})$. Only half marks were gained in these cases.

A small number of candidates disregarded the £240 and worked out $\frac{1}{2}$ of 3 and $\frac{1}{10}$ of 5, summing this to give 2 shares out of the 8 for Colin. This was a perfectly acceptable method.

Paper 19

Virtually all candidates were able to gain marks on this question. There was, however, a clear need for candidates to read the question carefully as the final answer was often given as £60 rather than a fraction as required.

- 37.** Both parts had a high success rate. In part (a) the usual mistakes were either $\frac{2}{5}$, giving the proportion of girls or more usually $\frac{2}{3}$. In part (b) a common error was to divide 300 by 3 giving an answer of 100.
- 38.** 70% of candidates gained full marks in this question, showing a good general understanding of ratio and proportion. The usual error was to divide £357 by 6 instead of 7, giving an incorrect answer of £297.50.
- 39.** The vast majority of candidates were able to score full marks on this question. A common error seen was to give Alex's amount rather than Ben's amount. Some careless arithmetic meant that a small number of candidates attempted to divide 240 by 11 or 13 instead of 12.
- 40.** A substantial number of candidates in part (a) found the ratio of plain chocolates to chocolates (12 : 40); one mark could be gained if this was simplified correctly. In part (b) many candidates used their simplified, or part simplified ratios, to adjust to a ratio of 1 : 2 failing to relate the question back to the numbers of chocolates in the box. 1 (the result of rounding $40/3 - 12$) and 8 ($40/2 - 12$) were popular answers.

41. On the whole most candidates had some idea of how to tackle this last question on section A with over 85% of the candidates scoring at least one mark by providing one of the correct amounts needed to make the recipe for 6 people. Over two thirds of the candidates were able to write 3 or 4 of the correct amounts with 27% scoring all 3 available marks. The vast majority of the candidates wrote their answers without showing any working.
42. The correct answers were given by 90% of candidates. There was, once again, evidence of poor arithmetic with the answer to $7 + 2$ clearly stated as 8 or 10 on occasions.
43. Working with proportions had been handled well in previous years but this was not so with this particular question. The first entry of '18' from 'one and a half times 12' or ' 1.5×12 ' or just simply 'thinking it through' was the most successful. The other quantities however, were rarely both correct. Having worked with '12' to achieve '18' it did not extend to dealing with '1400' or '130'. Perhaps the use of the 'unitary' method might have hindered progress especially as '1400 divided by 6' or '130 divided by 6' did not give integer results as '18 divided by 6' had done.
44. Many candidates gained full marks but division of 160 by 7 either explicitly stated or by repeatedly building the ratio 1:7 up to $n:160$, giving an answer of 22 or 23 was common. A significant number of candidates lost a valuable mark by giving an answer of 20:140 without explicitly stating the number of teachers. There were also some very large answers which were clearly inaccurate; candidates should be encouraged to look at the feasibility of their answers.
45. The idea of obtaining a ratio was lost on many and only 10% were able to obtain full marks. Combinations of '20', '12' and '8' appeared but either as fractions or in some unconnected form. Understanding what the question was asking needed to be overcome prior to manipulating the numbers. Finding '20 - 12' to begin with would have produced '8' toffees and then using this with '12' should have led to the ratio 12:8. In this form it would have been awarded one mark but only a further 15% of candidates achieved this. The further mark came from simplifying the ratio to 3:2.

46. This question was very well done indeed with many candidates gaining at least three out of the five marks available. In part (i) many misread the question and found 6, the number of chemistry questions. If they then went on to write the fraction $\frac{6}{21}$ full marks were awarded; many did not, losing both marks. A few gave answers of $\frac{1}{7}$ or $\frac{4}{7}$ and gained one mark for recognition that a fraction of 7 was required. In part (ii) correct division by the ratio was common; sometimes final answers were then rewritten as a fraction. Weaker candidates often divided 21 by 3 in an attempt to 'share' the questions equally.
47. Most candidates (over 80%) had little idea how to approach this question, with many answers of £42 or £28 where the £84 was divided by 2 or by 3. Where candidates realised that they should share the amount in 4 parts, most then went on to obtain the correct answer.
48. The factor tree method was probably the most common approach to this question, often leading to correct answers. Many incomplete factor trees were seen scoring one mark only. Often prime numbers 2 and/or 3 were split into products 1×2 or 1×3 , with the implication of 1 as a prime number. This lost marks. It should be noted that answers of $2 \times 2 \times 3 \times 3 \times 3$ as well as $2^2 \times 3^3$ gained full marks. Some candidates split 108 into 100 and 8 before continuing with the factor tree. Other common ways of losing marks were to list the factors only (i.e. 2,2, 3,3,3) and fail to notice that a product was required or add the correct factors on the final line.

49. Intermediate Tier

Most candidates were able to score well here, very many gaining full marks. Weaker candidates often divided 36 by 2, 3 and then 4 to give incorrect answers of 18, 12 and 9. Even though this did result in the correct answer (12) for Beth, no marks were awarded for this incorrect method. Other responses included 11, 12, 13 ($9 + 2$, $9 + 3$ and $9 + 4$)

Higher Tier

This question was answered correctly by the vast majority of candidates. Of the very small minority who failed to gain full marks the most common incorrect method was to divide 36 in turn by each number in the ratio.