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Level 1/Level 2

GCSE (9-1) in Mathematics (1MA1)

SUMMER 2018 EXEMPLAR STUDENT ANSWERS WITH EXAMINER COMMENTS – FOUNDATION

First certification 2017

ALWAYS LEARNING

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Contents

About this booklet

This booklet has been produced to support mathematics teachers delivering the new GCSE (9 – 1) Mathematics specification.

The booklet looks at a selection of questions from the Summer 2018 GCSE (9 – 1) Mathematics Foundation tier examination. It shows real student responses to selected questions and how the examining team follow the mark schemes to demonstrate how the students would be awarded marks on these questions.

How to use this booklet

Our examining team have selected student responses to foundation tier questions from the Summer 2018 examination. Following each question you will find the mark scheme for that question and then a range of student responses with accompanying examiner comments on how the mark scheme has been applied and the marks awarded, and on common errors for this sort of question.

Student response A

Student response

There are 12 counters in a bag.

3 of the counters are red.
1 of the counters is blue.
2 of the counters are yellow.
The rest of the counters are green.

Caitlin takes at random a counter from the bag.

(c) Show that the probability that this counter is yellow or green is $\frac{2}{3}$

red = 3 + 1 = blue = 4 $\frac{4}{12} \simeq \frac{1}{3}$

$\frac{3}{3} - \frac{1}{3} = \frac{2}{3}$ (Probability it's yellow or green)

the rest are yellow or green so $\frac{2}{3}$ must be the probability of yellow or green.

(3)

(Total for Question 7 is 5 marks)

3/3

Examiner Comments

This shows the most efficient approach where the calculation for the number of green counters is not required. The $\frac{4}{12}$ gets M1, $\frac{3}{3} - \frac{1}{3}$ gets the 2nd M1 and showing that this is $\frac{2}{3}$ gets the final communication mark.

Examiner commentary on the student response

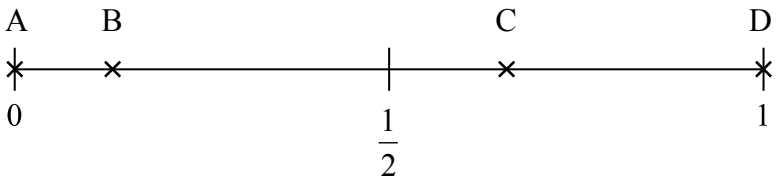
Marks awarded for the question or question parts

Paper 1F (non – calculator)

Exemplar Question 1

Foundation tier Paper 1

7 Here is a probability scale.
It shows the probability of each of the events A, B, C and D.



(a) Write down the letter of the event that is certain.

.....

(1)

(b) Write down the letter of the event that is unlikely.

.....

(1)

There are 12 counters in a bag.

3 of the counters are red.
1 of the counters is blue.
2 of the counters are yellow.
The rest of the counters are green.

Caitlin takes at random a counter from the bag.

(c) Show that the probability that this counter is yellow or green is $\frac{2}{3}$

(3)

(Total for Question 7 is 5 marks)

Examiner Comments

The question is assessing understanding that probabilities of an exhaustive set of outcomes sum to one. It is also assessing equivalent fractions. At this level a formal sequential proof is not expected.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
7(c)		M1	for number of green counters, e.g. $12 - (3+1+2) = 6$ **OR** for $\frac{3}{12}$ oe **or** $\frac{1}{12}$ oe **or** $\frac{2}{12}$ oe linked to the appropriate colour	This is awarded for a correct first step
		M1	for $1 - \left("\frac{3}{12}"+"\frac{1}{12}"\right) (= \frac{8}{12})$ **OR** $\left("\frac{2}{12}"+"\frac{6}{12}"\right) (= \frac{8}{12})$ **OR** for method to find $\frac{2}{3}$ of 12, e.g. $12 \div 3 \times 2 (= 8)$	This is awarded for a fully correct method from which the correct answer of $\frac{2}{3}$ can be found Sight of $\frac{8}{12}$ gets M2
		C1	for correct conclusion supported by accurate figures, e.g. $\frac{8}{12} = \frac{2}{3}$ **OR** $\frac{2}{3}$ of 12 = 8 **and** number of yellow + green = 2 + 6 = 8	

Examiner Comments

There are a number of ways to answer this question as the mark scheme illustrates. The first mark is for either finding the number of green counters or for a correct probability quoted for one of the colours. The second mark is for a fully complete method leading to a probability of $\frac{8}{12}$. The final mark is for a statement, e.g. $\frac{8}{12} = \frac{2}{3}$

Student Response A

7

There are 12 counters in a bag.

3 of the counters are red.
1 of the counters is blue.
2 of the counters are yellow.
The rest of the counters are green.

Caitlin takes at random a counter from the bag.

(c) Show that the probability that this counter is yellow or green is $\frac{2}{3}$

red = 3 + 1 = blue = 4 $\frac{4}{12} \simeq \frac{1}{3}$

$\frac{3}{3} - \frac{1}{3} = \frac{2}{3}$ (Probability it's yellow or green)

the rest are yellow or green so $\frac{2}{3}$ must be the probability of yellow or green.

(3)

(Total for Question 7 is 5 marks)

3/3

Examiner Comments

This shows the most efficient approach where the calculation for the number of green counters is not required. The $\frac{4}{12}$ gets M1, $\frac{3}{3} - \frac{1}{3}$ gets the 2nd M1 and showing that this is $\frac{2}{3}$ gets the final communication mark.

Student Response B

7

There are 12 counters in a bag.

3 of the counters are red.
1 of the counters is blue.
2 of the counters are yellow.
The rest of the counters are green.

Caitlin takes at random a counter from the bag.

(c) Show that the probability that this counter is yellow or green is $\frac{2}{3}$

12 counters
3 = red
1 = blue
2 = yellow
6 = green

~~6/12~~

yellow = 2
green = 6
= 7 altogether

7/12 ~~with~~ which is equivalent to 2/3

(3)

(Total for Question 7 is 5 marks)

2/3

Examiner Comments

A simple error in addition, 2 + 6, prevents $\frac{8}{12}$ being the resulting probability which could then be shown to be equivalent to $\frac{2}{3}$. M1 for 6 green counters. M1 is for the correct method (since an arithmetic error is not penalised when awarding method marks). C0 for an incorrect final statement.

Student Response C

7

There are 12 counters in a bag.

3 of the counters are red.
1 of the counters is blue.
2 of the counters are yellow.
The rest of the counters are green.

Caitlin takes at random a counter from the bag.

(c) Show that the probability that this counter is yellow or green is $\frac{2}{3}$

$3+1+2=6$ $R=3$ $B=1$ $y=2$ $6=6$.

yellow $\frac{2}{12} \div 2 = \frac{1}{6} = \frac{1}{3}$.

Green $\frac{6}{12} \div 2$ $\frac{3}{6} \div \frac{1}{3} \cdot \frac{2}{3}$

(3)

(Total for Question 7 is 5 marks)

1/3

Examiner Comments

A good start is made and M1 is awarded for either 6 green counters or $\frac{2}{12}$ or $\frac{6}{12}$, correct probabilities. There is then no attempt to combine the probabilities of yellow and green.

Exemplar Question 2

Foundation tier Paper 1

10 Tim and three friends go on holiday together for a week.

The 4 friends will share the costs of the holiday equally.

Here are the costs of the holiday.

£1280 for 4 return plane tickets
£640 for the villa
£220 for hire of a car for the week

Work out how much Tim has to pay for his share of the costs.

£ .....

(**Total for Question 10 is 3 marks**)

Examiner Comments

The Special Case in this question awards a mark for those students who think that the cost of each plane ticket is £1280 and works out (1280 × 4 + 640 + 22) ÷ 4 = 1495. Note: the calculations must be correct resulting in the answer of 1495 for the award of P1

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
10	535	P1	for a start to the process e.g. 1280+640+220 (=2140) **or** 1280 ÷ 4 (=320) **or** 640÷4 (=160) **or** 220 ÷ 4 (=55)	
		P1	for a full process to find cost per adult e.g. "2140" ÷ 4 **or** "320" + "160" + "55"	Can have arithmetic error as long as the complete processes, in the correct order, are present.
		A1	cao SC: B1 for answer of 1495 if P0 scored	

Examiner Comments

This question is assessing the ability to perform simple monetary calculations. Without access to a calculator very many Foundation students are found wanting and make basic arithmetic mistakes. Some know what to do but simply are unable to do it; particularly division by, in this case, 4.

Student Response A

10 Tim and three friends go on holiday together for a week.

The 4 friends will share the costs of the holiday equally.

Here are the costs of the holiday.

£1280 for 4 return plane tickets
£640 for the villa
£220 for hire of a car for the week

Work out how much Tim has to pay for his share of the costs.

£1280 ÷ 4 = £300

£80 ÷ 4 = £20 £300 + £20 = £320

£640 ÷ 4 = £160

0160
4|640

£220 ÷ 4 = £55

£320
£160
£55
£535

£ 535

(Total for Question 10 is 3 marks)

3/3

Examiner Comments

Fully correct solution with correct answer of 535. Division of 1280 is carried out in parts but this is perfectly acceptable.

Student Response B

10 Tim and three friends go on holiday together for a week.

The 4 friends will share the costs of the holiday equally.

Here are the costs of the holiday.

£1280 for 4 return plane tickets =£320
£640 for the villa = £160
£220 for hire of a car for the week = £55

Work out how much Tim has to pay for his share of the costs.

4
8
12
16
20
24
28
32

640 ÷ 4 = 160

1280 ÷ 4 = 320

220 ÷ 4 = 55

£320
£160
£55
£435

£ 435

(Total for Question 10 is 3 marks)

2/3

Examiner Comments

All calculations are seen. All divisions by 4 are accurate. The error, losing the final mark, is a careless one in the sum of 320, 160 and 55.

Student Response C

10 Tim and three friends go on holiday together for a week.

The 4 friends will share the costs of the holiday equally.

Here are the costs of the holiday.

£1280 for 4 return plane tickets
£640 for the villa
£220 for hire of a car for the week

Work out how much Tim has to pay for his share of the costs.

£ 1280 ÷ 4

640 ÷ 4

220 ÷ 4

1
4 | 2 80
20

640
4 | 1

£ .....

(Total for Question 10 is 3 marks)

1/3

Examiner Comments

The student knows that one correct process is to divide all values by 4; they are just unable to carry out these calculations without the aid of a calculator.

Exemplar Question 3

Foundation tier Paper 1

11 Write down an example to show that each of the following two statements is **not** correct.

(a) The factors of an even number are always even.

.....

(1)

(b) All the digits in odd numbers are odd.

.....

(1)

(Total for Question 11 is 2 marks)

Examiner Comments

Part (a) Understanding of 'factors' of a number. Also the difference between an odd and even number. To gain this mark, students need only to demonstrate, by example, that an even number can have a factor which is an odd number. No full explanation was required at this level.

Part (b) Understanding of terms 'digit' and 'odd' number. A simple example such as 23, 47, etc. is required.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
11(a)	Example	C1	for a correct example, e.g. $3 \times 4 = 12$ **or** $12 \div 3 = 4$ **or** a statement e.g. '3 is a factor of 12' or '1 is a factor of every number'	This may be seen, for example, in a factor tree or in a list of factors, but there must be no incorrect factors on the tree or in the list
(b)	Example	C1	for an example, e.g. 23 **or** a statement e.g. 'the tens digit may be even' **or** 'the last digit only needs to be odd'	

Examiner Comments

In part (a), students must make it clear the even number that they are trying to find factors of. A list say 6, 3, 2, 1 is not sufficient; we need something like 6: 1,2,3,6 The odd number factor '3' need not be explicitly identified. Note: no incorrect factors are allowed in a list or factor tree.

Student Response A

11 Write down an example to show that each of the following two statements is **not** correct.

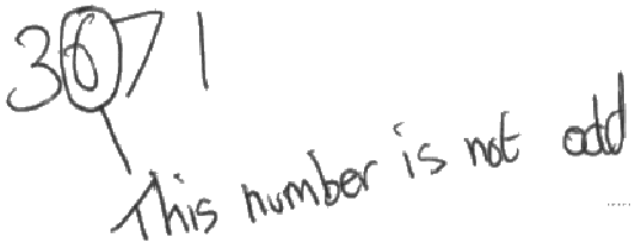
(a) The factors of an even number are always even.

factors of 14 = 7, 2, 14, 1, 7 is odd

(1)

1/1

(b) All the digits in odd numbers are odd.



(1)

(Total for Question 11 is 2 marks)

1/1

Examiner Comments

Part (a) Fully correct list of factors of 14 with 7 identified as the odd number.

Part (b) Clear odd number exemplified with the even digit 6 identified to disprove the statement.

Student Response B

11 Write down an example to show that each of the following two statements is **not** correct.

(a) The factors of an even number are always even.

2x6=12 3x6=18

(1)

0/1

(b) All the digits in odd numbers are odd.

432

(1)

(Total for Question 11 is 2 marks)

0/1

Examiner Comments

Part (a) $3 \times 6 = 18$ alone would have got the mark but the sight of an alternative, $2 \times 6 = 12$ shown on the answer line is contradictory and so no mark is awarded.

Part (b) The student thinks that 432 is an odd number.

Student Response C

11 Write down an example to show that each of the following two statements is **not** correct.

(a) The factors of an even number are always even.

9 x 3 = 27

9 x 3 = 27

(1)

0/1

(b) All the digits in odd numbers are odd.

1, 5, 7, 9,

1, 3, 5, 7, 9

(1)

(Total for Question 11 is 2 marks)

0/1

Examiner Comments

Part (a) An even number is never considered.

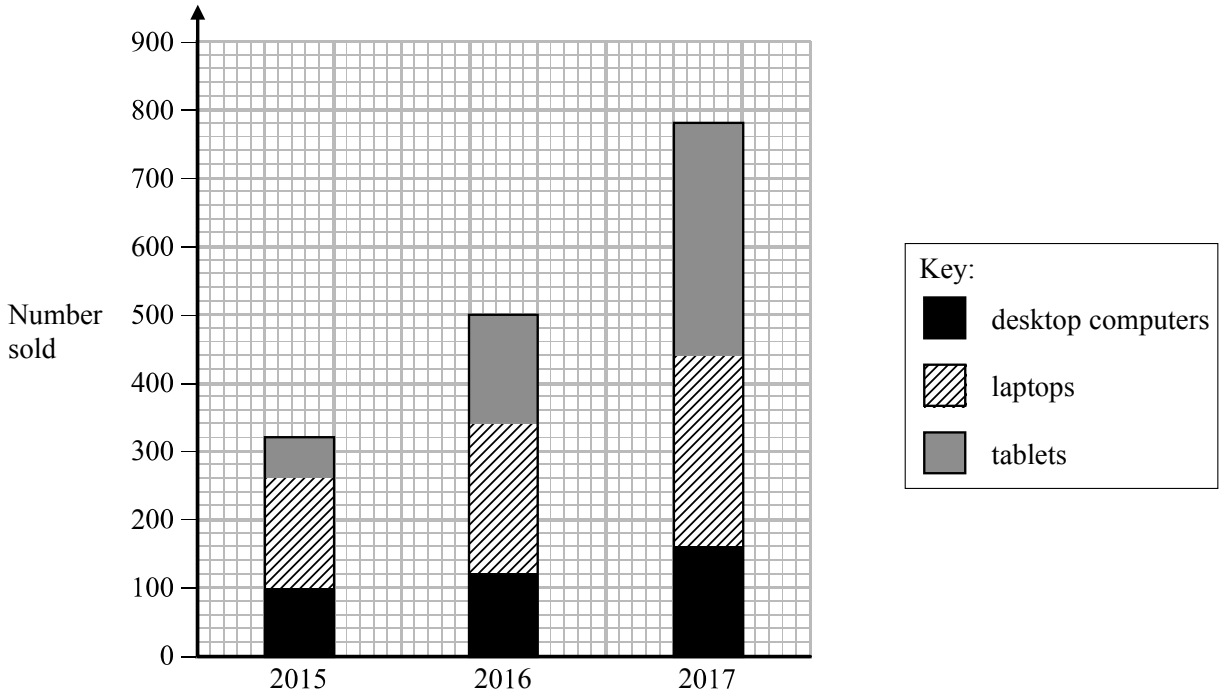
Part (b) Knows what an odd number is but has not gone far enough.

Exemplar Question 4

Foundation tier Paper 1

12 A shop sells desktop computers, laptops and tablets.

The composite bar chart shows information about sales over the last three years.



(*a*) Write down the number of desktop computers sold in 2015

.....

(1)

(*b*) Work out the total number of laptops sold in the 3 years.

.....

(3)

(*c*) State the item that had the greatest increase in sales over the 3 years.
Give a reason for your answer.

.....

.....

.....

(2)

Alex says,

> "In 2017, more tablets were sold than desktop computers. This means the shop makes more profit from the sale of tablets than from the sale of desktop computers."

(*d*) Is Alex correct?
You must justify your answer.

.....

.....

.....

(1)

(Total for Question 12 is 7 marks)

Examiner Comments

Part (a) This is assessing the reading of the scale on the 'number sold' axis.

Part (b) Understanding of this bar chart, reading the scale correctly, and calculating number of laptops sold each year.

Part (c) The intention here was for students to select 'tablets' since they went from the lowest sales in 2015 to the greatest sales in 2017

Part (d) Analysis of the limited information given in the question.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
12(a)	95 – 100	B1	for answer in the range 95 to 100	
(b)		M1	for reading at least 3 of the required figures from the graph e.g. 3 of "100", 260, 120, 340, 160, 440 **OR** for 260 – "100" (= 160) **or** 340 – 120 (= 220) **or** 440 – 160 (= 280) **OR** for"100" + 60 (= 160) **or** 80 + 100 + 40 (= 220) **or** 40 + 100 + 100 + 40 (= 280)	Figures may be seen on graph
		M1	(dep) for adding their 3 differences e.g. "160" + "220" + "280"	
		A1	for 660 or ft their answer to part (a)	
(c)	Tablets	B1	Tablets	
	And statement	C1	Statement e.g. the bars get proportionally longer over time (most in 2017 and least in 2015) **or** they (more than) double each year **or** for an increase of 280 **or** numbers range from 60 to 340	Values quoted for tablets must be correct. Ignore any calculations relating to laptops and/or desktop computers whether correct or not. Award previous mark if "tablets" is not specifically stated but can be implied from statement.
(d)	Statement (supported)		for statement, eg (No because) we do not know costs or prices or profit.	Answer of 'Yes' gets C0 Answer of 'No' without justification gets C0

Examiner Comments

Part (a) Some read this as just below 100 and readings of 95 to 100 were accepted.

Part (b) The 1st M1 is a mark for the correct reading of at least 3 relevant values or a correct method shown to find the value for any year. The 2nd method mark was for a complete process shown. Many students failed to show working and credit was not given for assumed readings.

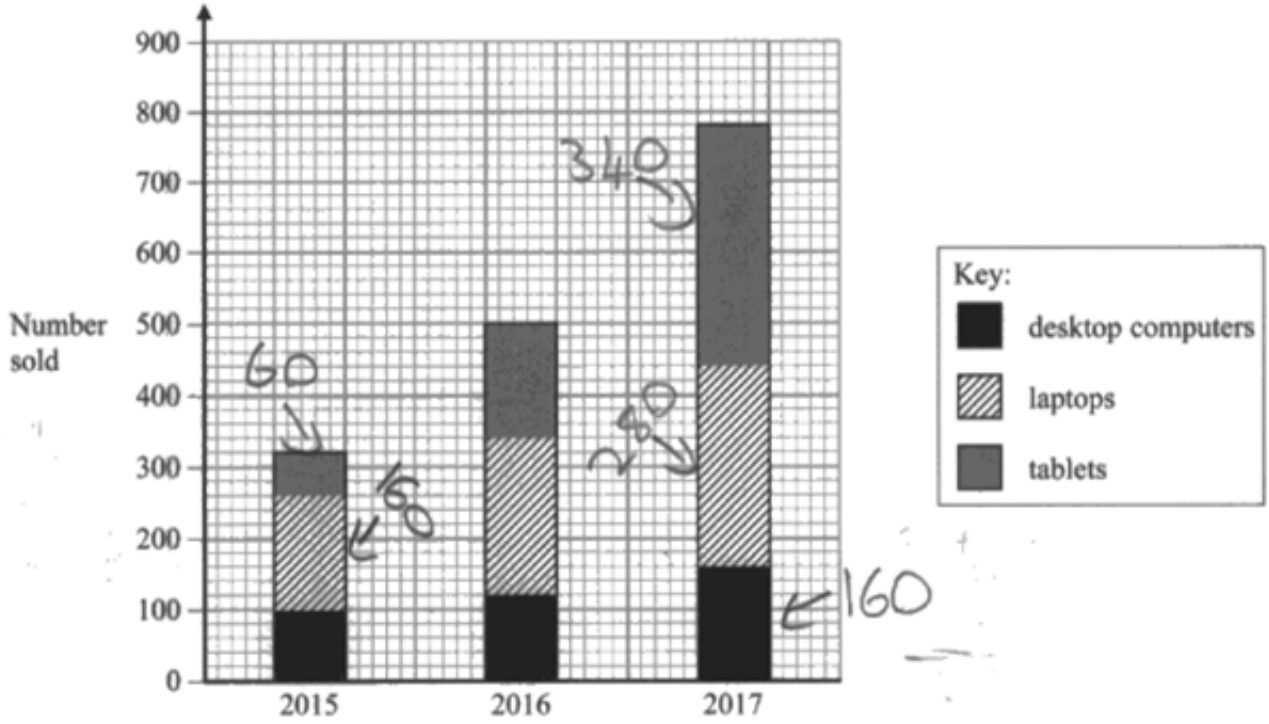
Part (c) Any values quoted for tablets had to be correct. Values for laptops or desktop computers were ignored, right or wrong.

Part (d) Any general comment relating to not having enough information gained the mark.

Student Response A

12 A shop sells desktop computers, laptops and tablets.

The composite bar chart shows information about sales over the last three years.



(a) Write down the number of desktop computers sold in 2015

100

(1)

1/1

(b) Work out the total number of laptops sold in the 3 years.

2015 = 160
2016 = 340 - 120 = 220
2017 = 440 - 160 = 280

160
220
280
660

660

(3)

3/3

(c) State the item that had the greatest increase in sales over the 3 years.
Give a reason for your answer.

tablets because in 2015 ~~30~~ 60 tablets were sold but in 2017 340 were sold 280 more tablets sold, whereas there was only 120 more laptops sold and only 60 more desktops sold.

(2)

2/2

Alex says,

"In 2017, more tablets were sold than desktop computers. This means the shop makes more profit from the sale of tablets than from the sale of desktop computers."

(d) Is Alex correct?
You must justify your answer.

The profit is dependant on the prices of both the tablet and the computer, the computer may be sold for a larger amount and may make more profit.

(1)

(Total for Question 12 is 7 marks)

1/1

Examiner Comments

Part (a) Correct reading of 100

Part (b) Correct answer with all working clearly seen showing the limits of the bars.

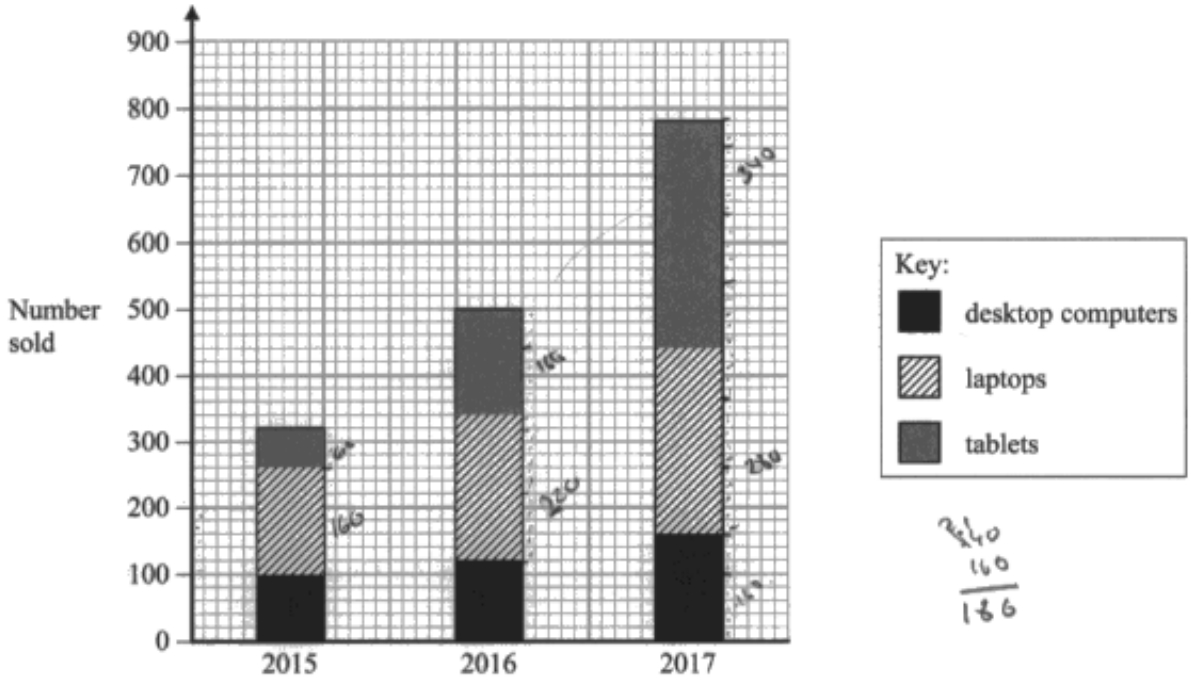
Part (c) Fully correct quoting the correct total increase across the years. Correct values are also shown for laptops and desktop computers.

Part (d) Even though an explicit answer of 'no' is not seen, it is clear that the student realises that the decision cannot be taken with more information.

Student Response B

12 A shop sells desktop computers, laptops and tablets.

The composite bar chart shows information about sales over the last three years.



(a) Write down the number of desktop computers sold in 2015

100

(1)

1/1

(b) Work out the total number of laptops sold in the 3 years.

160
220
280
460

460

(3)

2/3

(c) State the item that had the greatest increase in sales over the 3 years.
Give a reason for your answer.

Tablets, they increased by the highest amounts over the 3 years, ~~in~~ 2015 - 60, 2016 - 160, 2017 - 320.

(2)

1/2

Alex says,

"In 2017, more tablets were sold than desktop computers. This means the shop makes more profit from the sale of tablets than from the sale of desktop computers."

(d) Is Alex correct?
You must justify your answer.

No because desktop computers are way more expensive than tablets, meaning they made more profit selling 160 of them.

(1)

(Total for Question 12 is 7 marks)

0/1

Examiner Comments

Part (a) Correct reading of 100

Part (b) The correct yearly values of 160, 220 and 280 are seen but added up incorrectly.

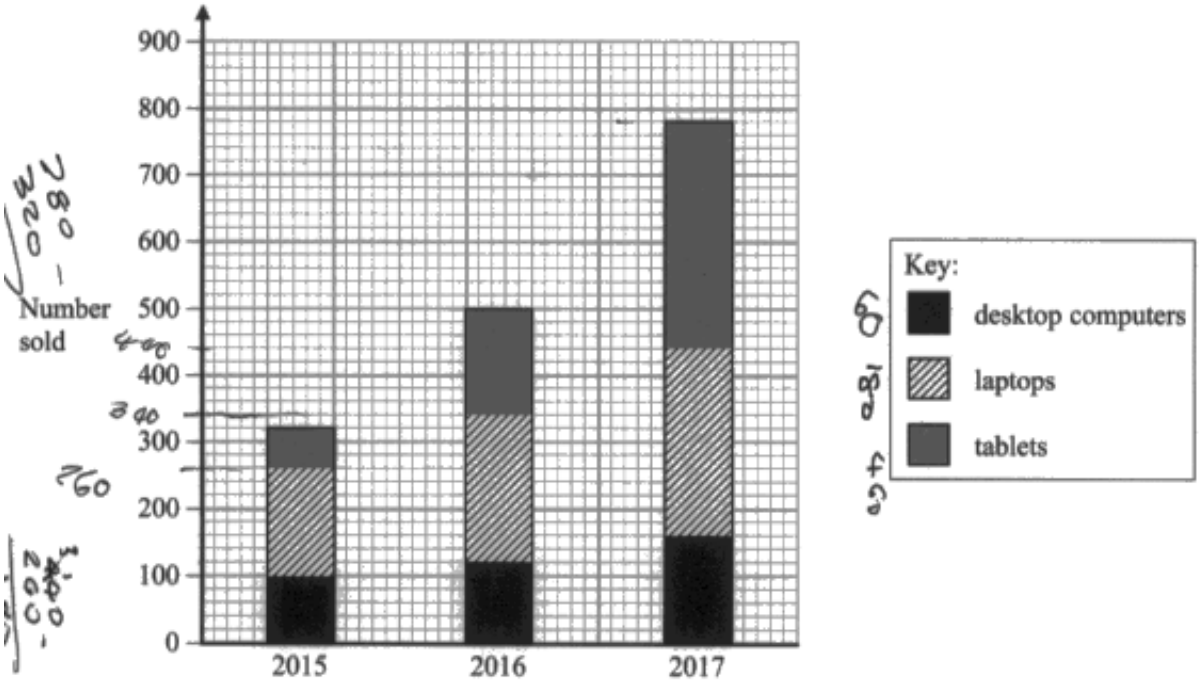
Part (c) Identified 'tablets' correctly but with incorrect value of 320 instead of 340

Part (d) 'No' is the correct answer but the reasoning relates to information not available in the question.

Student Response C

12 A shop sells desktop computers, laptops and tablets.

The composite bar chart shows information about sales over the last three years.



(a) Write down the number of desktop computers sold in 2015

100

(1)

1/1

(b) Work out the total number of laptops sold in the 3 years.

260
340 +
440
1040

1040

(3)

1/3

(c) State the item that had the greatest increase in sales over the 3 years.
Give a reason for your answer.

Tablets because the number sold increased each time

(2)

1/3

Alex says,

"In 2017, more tablets were sold than desktop computers. This means the shop makes more profit from the sale of tablets than from the sale of desktop computers."

(d) Is Alex correct?
You must justify your answer.

yes because more tablets are selling for higher price

(1)

(Total for Question 12 is 7 marks)

0/1

Examiner Comments

Part (a) Correct reading of 100.

Part (b) One mark is awarded for 3 correct relevant readings, although incorrectly used.

Part (c) B1 for 'tablets'; they all increased over time and so their reason is not.

Part (d) The answer of 'yes' is wrong.

Exemplar Question 5

Foundation tier Paper 1

13 A piece of wire is 240 cm long.

Peter cuts two 45 cm lengths off the wire.
He then cuts the rest of the wire into as many 40 cm lengths as possible.

Work out how many 40 cm lengths of wire Peter cuts.

.....

(**Total for Question 13 is 3 marks**)

Examiner Comments

Students are expected here to subtract 2 lots of 45 from 240 and then divide by 40 to find the whole number of 40 cm pieces cut. Many failed to read the question carefully and only subtracted one 45 cm piece, many were unable to divide by 40, even repeated subtraction proved difficult for some.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
13	3	P1	for a start to the process e.g. 240 − (2 × 45) (= 150) oe **or** (2 × 45) + 40 (= 130) oe	
		P1	for complete process e.g. "150" ÷ 40 (= 3.75) – can be implied by 40 + 40 + 40 = 120 **or** "130" + 40 + 40 (= 210)	Considering just one piece of 45 cm is not a misread but (240 – 45) ÷ 40 (= 4.875) oe should be awarded P1 only
		A1	cao	

Examiner Comments

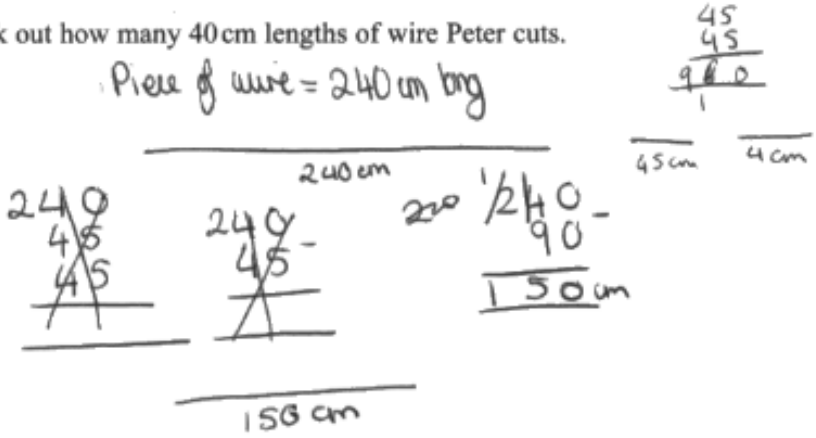
Dividing 150 by 40 can be carried out in different ways, including repeated subtraction. The remaining piece of wire, 30 cm, need not be quoted and was ignored if errors in this remainder were seen. A complete process considering just one 45 cm piece could earn a maximum of one mark.

Student Response A

13 A piece of wire is 240 cm long.

Peter cuts two 45 cm lengths off the wire.
He then cuts the rest of the wire into as many 40 cm lengths as possible.

Work out how many 40 cm lengths of wire Peter cuts.



(Total for Question 13 is 3 marks)

3/3

Examiner Comments

Subtraction of 90 cm is shown and 150 divided by 40 shows the number of 40s required. 40, 80 and 120 are crossed out as the numbers are counted; 160 clearly being too much. Correct answer of 3 shown.

Student Response B

13 A piece of wire is 240 cm long.

Peter cuts two 45 cm lengths off the wire.
He then cuts the rest of the wire into as many 40 cm lengths as possible.

Work out how many 40 cm lengths of wire Peter cuts.

240 − 90 = 150

150

40
40
40
120

$3\frac{3}{4}$

40 × 4 = 160

$3\frac{3}{4}$

(Total for Question 13 is 3 marks)

2/3

Examiner Comments

All working is correct and the division of 150 by 40 is carried out using the addition of 3 lots of 40. The answer of 3.75 is correct for this division but the whole number of 40cm pieces is required and never shown here.

Student Response C

13 A piece of wire is 240 cm long.

Peter cuts two 45 cm lengths off the wire.
He then cuts the rest of the wire into as many 40 cm lengths as possible.

Work out how many 40 cm lengths of wire Peter cuts.

45 + 45 = 90 cm

240 − 90 = 150 cm

$4 \overline{)150^{30}}$ = 37

37

(Total for Question 13 is 3 marks)

1/3

Examiner Comments

A good start is made subtracting 90 from 240 but then the solution ends when the student divides 150 by 4 instead of 40

Exemplar Question 6

Foundation tier Paper 1

14 Gavin, Harry and Isabel each earn the same monthly salary.

Each month,

Gavin **saves** 28% of his salary and spends the rest of his salary

Harry spends $\frac{3}{4}$ of his salary and **saves** the rest of his salary

the amount of salary Isabel saves : the amount of salary she spends = 3 : 7

Work out who saves the most of their salary each month.
You must show how you get your answer.

(**Total for Question 14 is 4 marks**)

Examiner Comments

This question is all about converting 3 proportions into the same format to enable comparison. The most economic process is to convert to percentages, relatively easy for Harry a little more demanding when dealing with the ratio for Isabel.

Some students chose to invent a salary and then work out the proportion that each saved.

A common error was to quote Harry's savings as 75% instead of 25%. In dealing with the ratio, many tried to convert $\frac{3}{7}$ instead of $\frac{3}{10}$ into a percentage (or decimal).

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
14	Isabel (supported)	P1	for process to work with $\frac{3}{4}$ e.g. $1-\frac{3}{4}$ $(=\frac{1}{4})$ oe, e.g. 25% or $\frac{25}{100}$ **or** $\frac{3}{4}$ = 75% or $\frac{75}{100}$ **or** value of salary (say 1000) × 3 ÷ 4 (= 750)	
		P1	for process to work with ratio 3 : 7 e.g. $\frac{3}{3+7}$ oe **or** $\frac{7}{3+7}$ oe **or** value of salary (say 1000) ÷ (3+7) (= 100)	
		A1	for (28(%)), 25(%) and 30(%) **or** 72(%), 75(%), 70(%) **or** 0.28, 0.25, 0.3 **or** for using value of salary (say 1000) giving 280, 250, 300 **or** 720, 750, 700	
		C1	(dep P2) for Isabel or ft their comparative values	"Isabel" alone without supported evidence, gets 0 marks.

Examiner Comments

The final mark is dependent upon processes, dealing with Harry's savings and for dealing with the ratio. If P2 is awarded, the C mark is awarded for a correct comparison of their three values even if these are incorrect.

Student Response A

14 Gavin, Harry and Isabel each earn the same monthly salary.

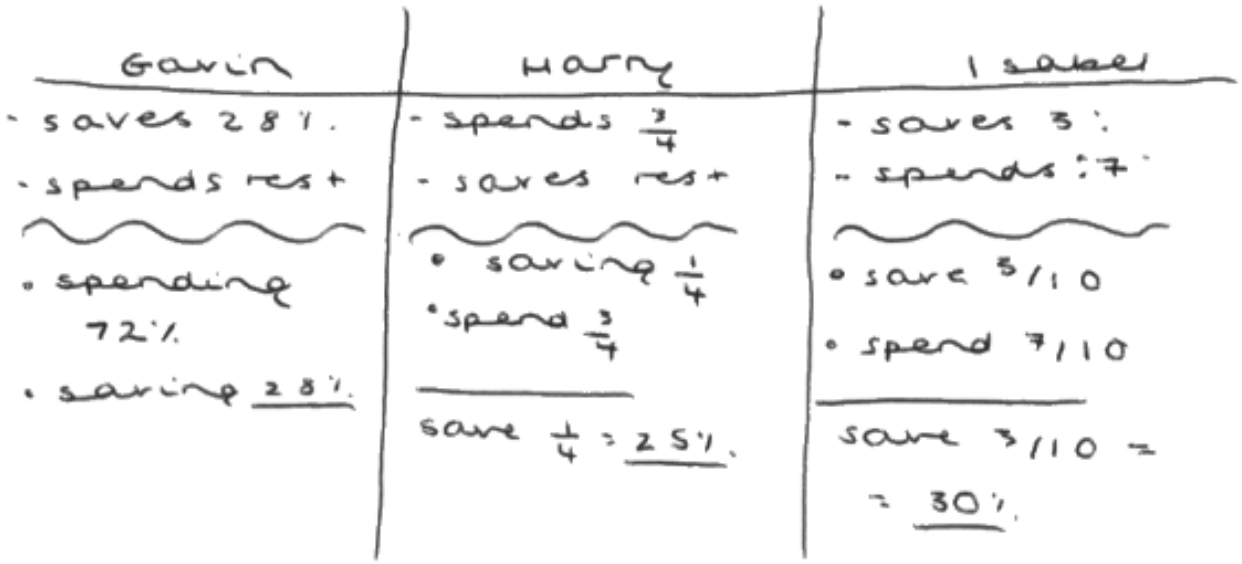
Each month,

Gavin **saves** 28% of his salary and spends the rest of his salary

Harry spends $\frac{3}{4}$ of his salary and **saves** the rest of his salary

the amount of salary Isabel saves : the amount of salary she spends = 3 : 7

Work out who saves the most of their salary each month.
You must show how you get your answer.



(Total for Question 14 is 4 marks)

4/4

Examiner Comments

This student clearly shows the amount saved and spent by each of the three, given as percentages. All working is correct and a correct statement made in conclusion.

Student Response B

14 Gavin, Harry and Isabel each earn the same monthly salary.

Each month,

Gavin **saves** 28% of his salary and spends the rest of his salary

Harry spends $\frac{3}{4}$ of his salary and **saves** the rest of his salary

the amount of salary Isabel saves : the amount of salary she spends = 3 : 7

Work out who saves the most of their salary each month.
You must show how you get your answer.

Gavin saves 28% and spends 72%

Harry spends 75% and saves 25%

Isabel saves 3 : 7 3 + 7 = 10 = 100%

Isabel saves 30% and spends 70%

Harry saves the most salary each month

(Total for Question 14 is 4 marks)

3/4

Examiner Comments

All working is seen and is correct showing three correct comparative values of 28%, 25% and 30%. For some reason, the student then selects Harry instead of Isabel.

Student Response C

14 Gavin, Harry and Isabel each earn the same monthly salary.

Each month,

Gavin **saves** 28% of his salary and spends the rest of his salary

Harry spends $\frac{3}{4}$ of his salary and **saves** the rest of his salary

the amount of salary Isabel saves : the amount of salary she spends = 3 : 7

Work out who saves the most of their salary each month.
You must show how you get your answer.

$\frac{3}{4} = 75\%$

G = 28% saved

H = 75% 100-75 = 25% saved

I = 3:7

(Total for Question 14 is 4 marks)

1/4

Examiner Comments

A good start is made, correctly converting ¾ to 75% and then subtracting from 100 to give 25% saved by Harry. Unfortunately no further progress is made as the student is unable to deal with the ratio of 3:7

Exemplar Question 7

Foundation tier Paper 1

19 (*a*) Work out $2\frac{1}{7} + 1\frac{1}{4}$

.....

(2)

(*b*) Work out $1\frac{1}{5} \div \frac{3}{4}$

Give your answer as a mixed number in its simplest form.

.....

(2)

(Total for Question 19 is 4 marks)

Examiner Comments

This question is assessing addition and division involving mixed numbers.

In part (a), the most economic approach is to deal with the whole number and fractional parts separately. The most common approach is to convert to improper fractions before finding any common denominator. Whilst this is of course an acceptable method it is prone to arithmetic error.

Although, in part (b), converting to $\frac{6}{5} \times \frac{4}{3}$ is the best method, many convert to fractions with a common denominator before attempting any division. In this part, a great number of students did not give their answer in the simplest form and therefore denied themselves full marks.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
19(a)	$\frac{95}{28}$	M1	for a method to add using common denominators with at least one fraction correct (matching numerator with common denominator) e.g. $\frac{60}{28}+\frac{35}{28}$ **or** $(2)\frac{4}{28}+(1)\frac{7}{28}$	Use of decimals gets no credit unless it leads to a correct fraction
		A1	$\frac{95}{28}$ oe e.g. $3\frac{11}{28}$	
	$1\frac{3}{5}$	M1	for $\frac{6}{5}\times\frac{4}{3}$ **or** $\frac{24}{20}\div\frac{15}{20}$ **or** $\frac{8}{5}$ oe e.g. $1\frac{9}{15}$	Use of decimals gets no credit unless it leads to a correct fraction
(b)		A1	cao	

Examiner Comments

Part (a) The method mark was given for converting to a common denominator, usually 28, with at least one correct numerator.

Part (b) Use of decimals was not common, but it had to lead to a correct fractional answer for any credit to be given.

Student Response A

19 (a) Work out $2\frac{1}{7}+1\frac{1}{4}$

$2+1=3$ $\frac{4}{28}+\frac{7}{28}=3\frac{11}{28}$

$3\frac{11}{28}$

(2)

2/2

(b) Work out $1\frac{1}{5}+\frac{3}{4}$

Give your answer as a mixed number in its simplest form.

$\frac{6}{5}\div\frac{3}{4}$ $\frac{6}{5}\times\frac{4}{3}=\frac{24}{15}$ $1\frac{9}{15}=1\frac{3}{5}$

$1\frac{3}{5}$

(2)

(Total for Question 19 is 4 marks)

2/2

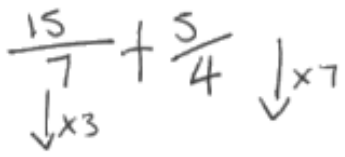
Examiner Comments

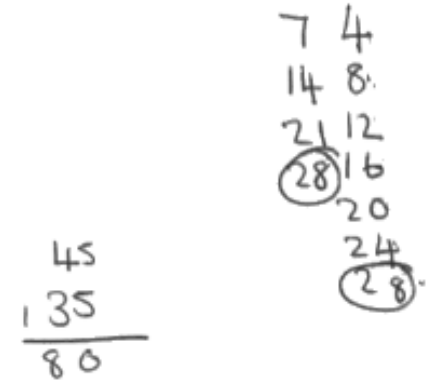
Part (a) A fully correct solution by the most economical route.

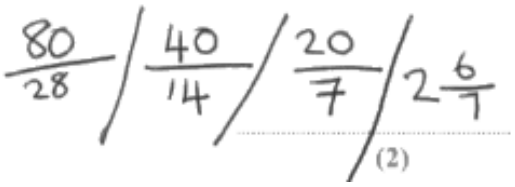
Part (b) Fully correct method with answer given in its most simplified form.

Student Response B

19 (a) Work out $2\frac{1}{7} + 1\frac{1}{4}$





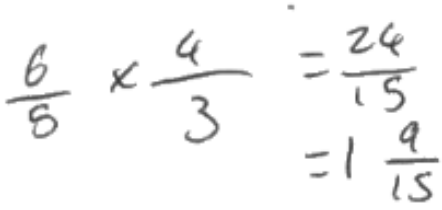


(2)

1/2

(b) Work out $1\frac{1}{5} \div \frac{3}{4}$

Give your answer as a mixed number in its simplest form.



(2)

(Total for Question 19 is 4 marks)

1/2

Examiner Comments

Part (a) A fully correct approach, however the student decides to multiply $\frac{15}{7}$ by $\frac{3}{3}$ thinking that $7 \times 3 = 28$; otherwise the solution would have been fully correct. Another example of poor arithmetic throwing marks away.

Part (b) A fully correct method is given. However, the answer is not given in its most simplified form.

Student Response C

19 (a) Work out $2\frac{1}{7}+1\frac{1}{4}$

$2+1=3$

$\frac{1}{7}+\frac{1}{4}$ $\frac{1}{28}$ $\frac{1}{24}$

$3\frac{1}{28}$

(2)

0/2

(b) Work out $1\frac{1}{5}\div\frac{3}{4}$

Give your answer as a mixed number in its simplest form.

$1\frac{1}{5}=\frac{6}{5}\div\frac{3}{4}=\frac{18}{20}=\frac{9}{10}$

$1\frac{1}{9}$

$1\frac{1}{9}$

(2)

(Total for Question 19 is 4 marks)

0/2

Examiner Comments

Part (a) A good start is made dealing with the whole numbers first and then shows the intention to add the fractions $\frac{1}{7}$ and $\frac{1}{4}$. Unfortunately, no acceptable method is shown to do this.

Part (b) Correctly converts the mixed fraction to an improper fraction, but then proceeds to multiply instead of dividing the fractions.

Exemplar Question 8

Foundation tier Paper 1

20 In a village

the number of houses and the number of flats are in the ratio 7 : 4
the number of flats and the number of bungalows are in the ratio 8 : 5

There are 50 bungalows in the village.

How many houses are there in the village?

.....

(**Total for Question 20 is 3 marks**)

Examiner Comments

This question is assessing students' ability to combine two 2-part ratios into one 3-part ratio by considering equal ratios. The most common error was to write an answer of 70, generally with no explanation.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
20	140	P1	for beginning to solve the problem e.g. 50 ÷ 5 × 8 (= 80) **or** 14 : 8 : 5 oe **or** 14 : 8 and 8 : 5 oe (linked)	80 may be seen in the ratio 80 : 50
		P1	for a full process to solve the problem e.g. "80" ÷ 4 × 7 **or** $\frac{50}{5} \times$ "14" **or** 140 : 80 : 50	
		A1	cao	If 140 clearly identified as houses in working award full marks

Examiner Comments

Students at Foundation level often will try to answer this by listing equivalent ratios for each of the two ratios given. This only gained any credit if there was a genuine attempt to link their lists with a common value in the 'flats' column. Some students found the total of the houses, flats and bungalows, 270. This was ignored if the number of houses, 140, had been clearly identified in the working.

Student Response A

20 In a village

the number of houses and the number of flats are in the ratio 7 : 4
the number of flats and the number of bungalows are in the ratio 8 : 5

There are 50 bungalows in the village.

How many houses are there in the village?

Flats = 80

Houses : Flats
7 : 4
×20 ×20
140 : 80

140

(Total for Question 20 is 3 marks)

3/3

Examiner Comments

Recognises the need to multiply by 10 to find the number of flats, 80 and then uses this to deduce that multiplication of the ratio 7:4 by 20 is required.

Student Response B

20 In a village

the number of houses and the number of flats are in the ratio 7 : 4
the number of flats and the number of bungalows are in the ratio 8 : 5

There are 50 bungalows in the village.

How many houses are there in the village?

h(7) f(4)
f(8) b(5)

4 × 2 = 8
7 × 2 = 14
14 : 8 : 5

5 × 10 = 50
8 × 10 = 80
14 × 10 = 140

140 : 80 : 50

140 + 80 + 50 = 270

270

(Total for Question 20 is 3 marks)

2/3

Examiner Comments

Completes a perfect solution and then adds the three totals to get 270 "dwellings". The 140 has not been identified as the number of houses and so full marks are not awarded.

Student Response C

20 In a village

the number of houses and the number of flats are in the ratio 7 : 4
the number of flats and the number of bungalows are in the ratio 8 : 5

There are 50 bungalows in the village.

How many houses are there in the village?

houses
7 x 10 = 70

Bungalows
5 x 10 = 50

70

(Total for Question 20 is 3 marks)

0/3

Examiner Comments

Realises the need to multiply 5 by 10 to get the number of bungalows. Then ignores making any attempt to find the number of flats before finding the number of houses.

Exemplar Question 9

Foundation tier Paper 1

21 Renee buys 5 kg of sweets to sell.
She pays £10 for the sweets.

Renee puts all the sweets into bags.
She puts 250 g of sweets into each bag.
She sells each bag of sweets for 65p.

Renee sells all the bags of sweets.

Work out her percentage profit.

..... %

(**Total for Question 21 is 4 marks**)

Examiner Comments

Students need to know that 1 kg = 1000 g and how to work out percentage profit. There should be a clear method to find the selling price of a correctly worked out number of bags and an unambiguous method to find percentage profit. Many students were able to find the actual profit of £3 made but were unable to convert this to a percentage profit; 3% was a common incorrect answer.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
21	30	P1	for full process to find the number of bags sold e.g. 5 × 1000 ÷ 250 (= 20) **or** for process to find selling price of 1 kg of sweets e.g. 0.65 × 4 (= 2.60)	This could be by repeated addition Calculations can be in £ or pence
		P1	for [number of bags] × 0.65 **or** "20" × 0.65 (= 13) **or** "2.60" × 5 (= 13) **or** for 10 ÷ "20" oe (= 0.50) **or** for 0.65 × 4 (= 2.60) **and** 10 ÷ 5 (= 2)	[number of bags] can only come from 5 × 10 ÷ 250 (= 0.2) or 5 × 100 ÷ 250 (= 2) or 5 ÷ 250 (= 0.02)
		P1	(dep on previous P1) for a process to find the percentage profit e.g. ("13" – 10) ÷ 10 × 100 **or** (0.65 – "0.50") ÷ "0.50" × 100 **or** ("2.60" – "2") ÷ "2" × 100 **or** "13" ÷ 10 ×100 (= 130) oe	3/10 or 0.3 is not enough but should be awarded 2 marks Award P3 for 130(%)
		A1	cao	

Examiner Comments

A process to find the number of bags by repeated subtraction/addition of 250 must be complete, e.g. up to 5000. The number of bags has to be calculated using an acceptable method, after an attempt to convert 5 kg to grams. The process to find percentage profit is dependent upon the award of the 2nd P mark.

Student Response A

21 Renee buys 5 kg of sweets to sell.
She pays £10 for the sweets.

Renee puts all the sweets into bags.
She puts 250 g of sweets into each bag.
She sells each bag of sweets for 65p.

Renee sells all the bags of sweets.

Work out her percentage profit.

1kg = 1000g

5000g ÷ 250g = 20 bags of sweets

20 x 0.65 = £13

£13 − £10 = £3

10% of 10 = 1 x 3 = £3 profit

30 %

(Total for Question 21 is 4 marks)

4/4

Examiner Comments

A very clear and concise solution gaining full marks

Student Response B

21 Renee buys 5 kg of sweets to sell.
She pays £10 for the sweets.

Renee puts all the sweets into bags.
She puts 250 g of sweets into each bag.
She sells each bag of sweets for 65p.

Renee sells all the bags of sweets.

Work out her percentage profit.

percentage change
original
original
× 100

250 1250 2250 3250 4250
500 1500 2500 3500 4500
750 1750 2750 3750 4750
1000 2000 3000 4000 5000

65 × 20 = 1300

3 Pound profit

$\frac{3}{10} \times 100$

0.03

3 %

(Total for Question 21 is 4 marks)

3/4

Examiner Comments

The number of bags here is found by repeated addition up to 5000. The correct profit of £3 is found and the method to find the percentage profit $\frac{3}{10} \times 100$ should result in the correct answer. This is not the case here.

Student Response C

21 Renee buys 5 kg of sweets to sell.
She pays £10 for the sweets.

Renee puts all the sweets into bags.
She puts 250 g of sweets into each bag.
She sells each bag of sweets for 65p.

Renee sells all the bags of sweets.

Work out her percentage profit.

5k = 5000 g

~~250~~
5000 ÷ 250 = 200 bags of sweets

200 ÷ 65p

65 $\overline{)200}$ = 184

60 x 2 = 120 r 80
180 r 20
20 ÷ 5 = 4
184 ÷ 100 = 18.4

18.4 %

(Total for Question 21 is 4 marks)

1/4

Examiner Comments

5000 ÷ 250 gets the first process mark even though the result of 200 bags is incorrect. The solution then falters in trying to divide 200 by 65

Exemplar Question 10

Foundation tier Paper 1

22 A cycle race across America is 3069.25 miles in length.

Juan knows his average speed for his previous races is 15.12 miles per hour.
For the next race across America he will cycle for 8 hours per day.

(*a*) Estimate how many days Juan will take to complete the race.

.....

(3)

Juan trains for the race.
The average speed he can cycle at increases.
It is now 16.27 miles per hour.

(*b*) How does this affect your answer to part (*a*)?

.....

.....

(1)

(Total for Question 22 is 4 marks)

Examiner Comments

The aim of this question is to assess the ability of students to find the approximate solution of a problem by appropriate estimated values. Students should round accurate figures to 1 significant figure, e.g. 3069.25 to 3000, 15.12 to 15 or 20. The calculation following these estimates is then straightforward, using $\text{Time} = \frac{\text{Distance}}{\text{Speed}}$

Many students here attempted to find and use exact values such as 120.96 (15.12 × 8). Often methods of repeated subtraction/addition followed with many arithmetic errors. This wasted valuable examination time.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
22(a)	Estimated value	P1	for using a rounded value in a correct process e.g. 3000 ÷ 15 **or** 15 × 8 **or** 20 × 8	Their rounded value must be used in a calculation Rounding may appear after a correct process e.g. 15.12 × 8 = 120.96 ≈ 100 followed by e.g. 3069.25 ÷ 100
		P1	for a full process to find the number of days e.g. "3000" ÷ "15" ÷ "10" (= 20) **or** "3000" ÷ "15" ÷ 8 (= 25)	Accept 3069.25 ÷ 15.12 ÷ 8 oe
		A1	for a correct answer following through their rounded values	
(b)	Explanation	C1	e.g. less days required **or** it doesn't affect the answer because I would still round 16.27 down to 15 (or up to 20)	Refers to time taken

Examiner Comments

Part (a) Estimated values MUST be used to gain any credit. For example, 15.12 × 8 = 120.96 rounded to 120 or 121 had then to be used in a correct process. Processes of repeated subtraction/addition had to be complete to gain any credit. The final estimated answer for the number of days, if followed through, must be correct for the student's working.

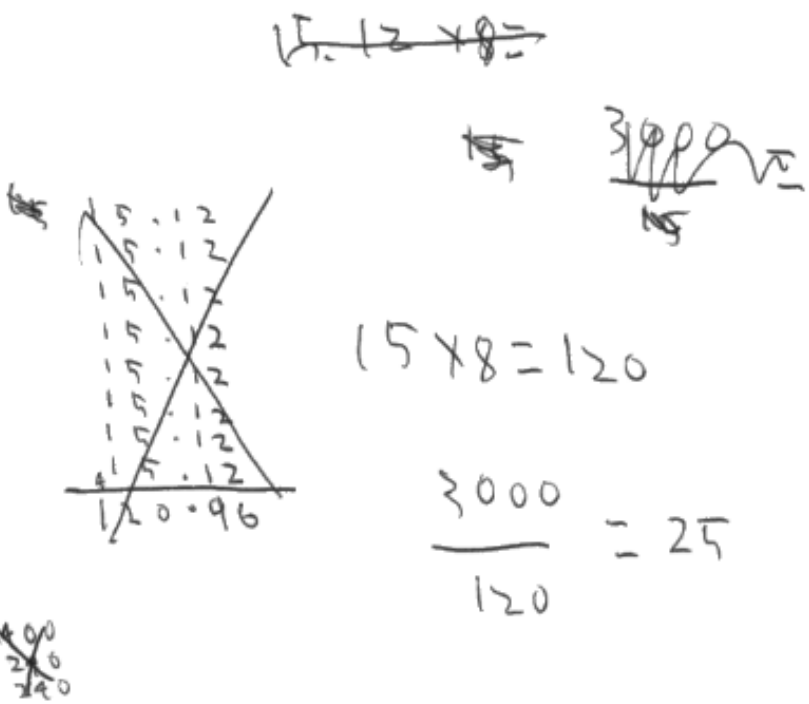
Part (b) To gain any credit, the statement had to answer the question and had to relate to time.

Student Response A

22 A cycle race across America is 3069.25 miles in length.

Juan knows his average speed for his previous races is 15.12 miles per hour.
For the next race across America he will cycle for 8 hours per day.

(a) Estimate how many days Juan will take to complete the race.



(3)

3/3

Juan trains for the race.
The average speed he can cycle at increases.
It is now 16.27 miles per hour.

(b) How does this affect your answer to part (a)?

It makes it less days

(1)

(Total for Question 22 is 4 marks)

1/1

Examiner Comments

Part (a) The handwriting may be questionable but the solution is excellent concise and fully correct. The student quickly realised that they were not expected to carry out any long winded calculations.

Part (b) "It takes less days" is a perfect concise answer to the question.

Student Response B

22 A cycle race across America is 3069.25 miles in length.

Juan knows his average speed for his previous races is 15.12 miles per hour.
For the next race across America he will cycle for 8 hours per day.

(a) Estimate how many days Juan will take to complete the race.

MILES
ESTIMATED = 3000.

MILES
PER HOUR = 15 mph

3000 ÷ 15 = 200.

$$15\overline{)3000} = 200$$

200 ÷ 8 =

$$8\overline{)200} = 4$$

4 DAYS
(3)

2/3

Juan trains for the race.
The average speed he can cycle at increases.
It is now 16.27 miles per hour.

(b) How does this affect your answer to part (a)?

My answer will decrease because the speed is increasing so the less time to make the journey.
(1)

(Total for Question 22 is 4 marks)

1/1

Examiner Comments

Part (a) Estimated values of 3000 and 15 are fit for purpose and are used in a fully correct process which would have produced a correct answer of 25 days had the student actually carried out the division of 200 by 8 correctly.

Part (b) "My answer will decrease" is enough for the award of this mark.

Student Response C

22 A cycle race across America is 3069.25 miles in length.

Juan knows his average speed for his previous races is 15.12 miles per hour.
For the next race across America he will cycle for 8 hours per day.

(a) Estimate how many days Juan will take to complete the race.

15
× 10
150

150

(3)

1/2

Juan trains for the race.
The average speed he can cycle at increases.
It is now 16.27 miles per hour.

(b) How does this affect your answer to part (a)?

yes because it is a faster speed

(1)

(Total for Question 22 is 4 marks)

0/1

Examiner Comments

Part (a) A good start is made with the use of a sensibly rounded value of 15. 8 was then rounded to 10 to produce 15×10 = 150 The solution then stops thinking that this is all that is required.

Part (b) Any comment relating to faster/quicker speed gained no credit and an answer of "yes" does not answer the question posed.

Paper 2F (calculator)

Exemplar Question 1

Foundation tier Paper 2

6 Margaret is thinking of a number.
She says,

"My number is odd. It is a factor of 36 and a multiple of 3"

There are two possible numbers Margaret can be thinking of.

Write down these two numbers.

....

(Total for Question 6 is 3 marks)

Examiner Comments

This question assesses the understanding of number patterns, specifically the knowledge of factors, multiples and odd. The common mistakes seen are to mix up the terminology e.g. even numbers may be listed as the answer to odd numbers or factors given as multiples.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
6	3 and 9	P1	for starting to list factors of 36 **or** multiples of 3 **or** odd numbers	Must be at least 3.
		A2	cao	In either order
		A1	for one correct answer	

Examiner Comments

Please note that the award of A1 implies the award of P1.

Student Response A

6 Margaret is thinking of a number.
She says,

"My number is odd. It is a factor of 36 and a multiple of 3"

There are two possible numbers Margaret can be thinking of.

Write down these two numbers.

9 ~~36~~ 12

3

$\frac{36}{3} = 12$ $\frac{36}{12}$ 3

$\frac{36}{4} = 9$

9 3

3/3

Examiner Comments

A fully correct answer showing 3 and 9, in the reverse order but this is perfectly acceptable. The correct answer alone is sufficient to score full marks although there is some correct working present with factors clearly shown which does support the answer.

Student Response B

6 Margaret is thinking of a number.
She says,

"My number is odd. It is a factor of 36 and a multiple of 3"

There are two possible numbers Margaret can be thinking of.

Write down these two numbers.

9, 18, 27, 36

3, 6, 9, 12, 15, 18
= Odd

9 18

2/3

Examiner Comments

The student has one correct answer and one incorrect answer. This answer is supported by a list of multiples of 3 and an indication of understanding the term odd. The top list is probably the factors of 36 with one error. (27 is incorrect). The final score is 2 marks.

Student Response C

6 Margaret is thinking of a number.
She says,

"My number is odd. It is a factor of 36 and a multiple of 3"

There are two possible numbers Margaret can be thinking of.

Write down these two numbers.

1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21

1/3

Examiner Comments

The student lists the odd numbers, a sensible first step but they go no further. This suggests they do not know how to select the multiples of 3 or factor of 36 from this list.

Exemplar Question 2

Foundation tier Paper 2

7 Mohsin, Yusuf and Luke are going to play a game.
At the end of the game, one of them will be in First place, one of them will be in Second place and one of them will be in Third place.

Use the table below to list all the possible outcomes of the game.

First place	Second place	Third place

(Total for Question 7 is 2 marks)

Examiner Comments

This question assesses the ability to list the possible outcomes. The most common mistake seen was to only write down the three combinations and not a full set of six outcomes.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
7	(MYL) (MLY) (YML) (YLM) (LMY) (LYM)	M1 A1	for at least 3 correct different combinations fully correct list with no extras or repeats	for M1 ignore extras or repeats; accept words or unambiguous abbreviations

Examiner Comments

A list could use letters (e.g. M, Y L) but not numbers unless a key was provided. Any order was acceptable as long as reading across the page, the options were clear.

Student Response A

7 Mohsin, Yusuf and Luke are going to play a game.
At the end of the game, one of them will be in First place, one of them will be in Second place and one of them will be in Third place.

Use the table below to list all the possible outcomes of the game.

First place	Second place	Third place
M	Y	L
L	M	Y
Y	L	M
L	Y	M
Y	M	L
M	L	Y

6

2/2

Examiner Comments

A fully correct answer using initials.

Student Response B

7 Mohsin, Yusuf and Luke are going to play a game.
At the end of the game, one of them will be in First place, one of them will be in Second place and one of them will be in Third place.

Use the table below to list all the possible outcomes of the game.

First place	Second place	Third place
Mohsin	Yusuf	Luke
Luke	Mohsin	Yusuf
Yusuf	Luke	Mohsin

(Total for Question 7 is 2 marks)

1/3

Examiner Comments

This student begins correctly but only shows 3 combinations.

Student Response C

7 Mohsin, Yusuf and Luke are going to play a game.
At the end of the game, one of them will be in First place, one of them will be in Second place and one of them will be in Third place.

Use the table below to list all the possible outcomes of the game.

First place	Second place	Third place
Mohsin	Yusuf	Luke
	Moshin	Moshin

(Total for Question 7 is 2 marks)

0/3

Examiner Comments

Only one correct combination is given. This is insufficient for any marks.

Exemplar Question 3

Foundation tier Paper 2

8 Neil buys 30 pens, 30 pencils, 30 rulers and 30 pencil cases.

Price list	
pens	6 for 82p
pencils	15 for 45p
rulers	10 for £1.25
pencil cases	37p each

What is the total amount of money Neil spends?

£.....

(**Total for Question 8 is 5 marks**)

Examiner Comments

This question was classified as a problem. It assesses calculating with measures, in this case with money. Students often work in mixed units e.g. 90p and £4.10, this is usually correctly added to £5 but sometimes 94.1 will be seen. Centres are advised to encourage students to practice questions with mixed money notation.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
8	19.85	P1	for a start to the process e.g. 30 ÷ 6 (=5) **or** 30 ÷ 15 (=2) **or** 30 ÷ 10 (=3) **or** 30 × 37 (=1110) **or** 82 ÷ 6 (=13.6 to 13.7) **or** 45 ÷ 15 (=3) **or** 1.25 ÷ 10 (=0.125)	
		P1	for process to find cost of 30 pens **or** 30 pencils **or** 30 rulers e.g. "5" × 82 (= 410) **or "**2" × 45 (= 90) **or** "3" × 1.25 (= 3.75) **or "**13.6.." × 30 (=409.8 to 410) **or** "3" × 30 (=90) **or** "0.125" × 30 (=3.75)	Work may be in pence or in pounds
		P1	for a process to find cost of 2 of 30 pens **or** 30 pencils **or** 30 rulers e.g. any 2 of "5" × 82 (= 410) **, "**2" × 45 (= 90)**,** "3" × 1.25 (= 3.75)	Intention to add not necessary e.g. 410, 3.75 is sufficient, or working leading to these figures Any two correct methods will imply P1P1P1
		P1	for adding at least 3 different costs (units may not be consistent) e.g. "410" + "90" + "3.75" **or** "410" + "90" + "11.10"	Correct working for 3 of pens, pencils, rulers and pencil cases with an intention to add, may be in a mixture of money units
		A1	cao	

Examiner Comments

The use of inverted commas (e.g. "5") means that this number in the inverted commas must come from a correct process; this makes the marks dependent on correct processes seen. A step may be implied by seeing a correct figure used, for example, 5 × 82 in the working would be awarded P1P1. Students could work in pounds or pence throughout.

Student Response A

8 Neil buys 30 pens, 30 pencils, 30 rulers and 30 pencil cases.

Price list	
pens	6 for 82p
pencils	15 for 45p
rulers	10 for £1.25
pencil cases	37p each

What is the total amount of money Neil spends?

30 x 0.37 = 11.1 pencil cases £11.10
10 x 3 = 30 3 x 1.25 = 3.75
15 x 2 = 30 0.45 x 2 = 0.90
6 x 5 = 30
5 x 0.82 = 4.10

11.10 + 3.75 + 0.90 + 4.10 = 19.85

pencil cases £11.10
rulers: £3.75
pencils: 0.90
pens: £4.10

£ 19.85

(Total for Question 8 is 5 marks)

5/5

Examiner Comments

A fully correct answer with each step of working clearly shown.

Student Response B

8 Neil buys 30 pens, 30 pencils, 30 rulers and 30 pencil cases.

Price list	
pens	6 for 82p
pencils	15 for 45p
rulers	10 for £1.25
pencil cases	37p each

What is the total amount of money Neil spends?

30 pens = 82 ÷ 6 = 13.6 × 30 = 410

30 pencils = 45 ÷ 15 = 3 × 30 = 90

30 rulers = 1.25 ÷ 10 = 0.125 × 30 = 3.47

30 pencil cases = 0.37 × 10 = 3.7

410 + 90 + 3.47 + 3.7 = £507.17

£ 507.17

(Total for Question 8 is 5 marks)

4/5

Examiner Comments

This shows the process to find the cost of 1 pen, 1 pencil and 1 ruler e.g. unit cost. The student then uses the correct process to find the cost of 30 pens, 30 pencils and 30 rulers BUT only 10 pencil cases. The student has then added their 4 costs; at least 3 of their costs have come from a correct process so the fourth method mark is awarded. The money notation is mixed. The final answer is incorrect so cannot gain the accuracy mark.

Student Response C

8 Neil buys 30 pens, 30 pencils, 30 rulers and 30 pencil cases.

Price list	
pens	6 for 82p
pencils	15 for 45p
rulers	10 for £1.25
pencil cases	37p each

What is the total amount of money Neil spends?

82 ÷ 6 = 13.6
13.6 x 5 = £68.3

45 ÷ 15 = 3
3 x 10 = £30

1.25 x 3 = 3.75

0.37 x 30 = £11.1

68.30
30.00
3.75
11.01
113.06

£ 113.06

(Total for Question 8 is 5 marks)

2/5

Examiner Comments

There is a correct process to find the cost of 1 pen or 30 pencil cases hence the first mark can be awarded. Then we see the correct process to calculate the cost of 30 rulers. This meets the requirement for the second P1. No other full process for 30 of the other required items is seen so no further marks can be awarded.

Exemplar Question 4

Foundation tier Paper 2

9 Emily drives 186 miles in 3 hours.

(*a*) What is her average speed?

..... mph
(2)

Sarah drives at an average speed of 58 mph for 4 hours.

(*b*) How many miles does Sarah drive?

..... miles
(2)

(Total for Question 9 is 4 marks)

Examiner Comments

This question assesses the student's ability to work with a compound measure. In this case speed. This is a straightforward question but some students tried to work in minutes even though everything was given in hours and the answer in part (a) required miles per hour and in (b) miles.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
9(a)	62	M1	for distance ÷ time, e.g. 186 ÷ 3 **or** 186 ÷ (3× 60)(=1.03..)	May use hours or minutes at this point
		A1	cao	
(b)	232	M1	for speed × time, e.g. 58 × 4 **or** 58 × 4 × 60 (=13920)	May use hours or minutes at this point
		A1	cao	

Examiner Comments

The intention to carry out the correct calculation was required here not just the words. For the first mark students were able to work in other units of time as long as this was clearly shown.

Student Response A

9 Emily drives 186 miles in 3 hours.

(a) What is her average speed?

186 ÷ 3 = 62 MPH

62 MPH mph

(2)

2/2

Sarah drives at an average speed of 58 mph for 4 hours.

(b) How many miles does Sarah drive?

232 miles

(2)

2/2

Examiner Comments

Part (a) The correct answer is given. Working is seen and the units are repeated. There is no contradiction in the repeated units so this is acceptable for full marks.

Part (b) The correct answer is given on the answer line so full marks are awarded. Students are advised to show working as any errors in an answer will result in no marks being awarded.

Student Response B

9 Emily drives 186 miles in 3 hours.

(a) What is her average speed?

186 ÷ 180 = 1.033333333

60 - minutes 1 hour
60 + 60 + 60 = 180

1.03 mph

(2)

1/2

Sarah drives at an average speed of 58 mph for 4 hours.

(b) How many miles does Sarah drive?

58 × 4 = 216

216 miles

(2)

1/2

Examiner Comments

Part (a) The student has worked in minutes. 186 ÷ 180 is enough to show an understanding of speed and so the method mark is awarded. The answer of 1.03 (or better) can ONLY get the accuracy mark if the units on the answer line are changed to miles per minute.

Part (b) The correct calculation is shown, 58 × 4, but the answer is incorrect. The method mark is awarded.

Student Response C

9 Emily drives 186 miles in 3 hours.

S = d x t

(a) What is her average speed?

186 x 3 = 558 m/h

558 mph

(2)

0/2

Sarah drives at an average speed of 58 mph for 4 hours.

D

(b) How many miles does Sarah drive?

D = S ÷ T

58 ÷ 4 = 14.5

14.5 miles

(2)

(Total for Question 9 is 4 marks)

0/2

Examiner Comments

Part (a) Although the student realises that they have to use the speed, distance, time relationship they write down and use an incorrect formula. No marks can be awarded.

Part (b) The student realises the need to connect speed, time and distance but uses the incorrect relationship. No marks can be awarded.

Exemplar Question 5

Foundation tier Paper 2

10 (*a*) Write down all the prime numbers between 20 and 30.

.....

(2)

Catherine says,

"2 is the only even prime number."

(*b*) Is Catherine right?
You must give a reason for your answer.

.....

.....

(1)

(Total for Question 10 is 3 marks)

Examiner Comments

This assesses the students understanding of prime numbers and the ability to reason.

Part (a) Numbers are required form within a range. Many students gave 3 numbers often thinking that 21 or 27 were prime. Others gave numbers out of the range suggestion they should read the question carefully.

Part (b) The main confusion was in describing factors using language of the type, going into or will go into in confused statements. Many did not give a reason but jut stated other prime numbers or agreed that 2 is prime.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
10(a)	23, 29	B2	for 23 **and** 29 **and** no extras	
		B1	for one correct **and** no more than one incorrect)	2 correct and 1 incorrect award B1
(b)	Explanation	C1	for decision **and** explanation e.g. yes and because all other even numbers have 2 as a factor	Decision is required may be yes or implied by she is ... oe. Do not accept statements that are ambiguous, or contradictory

Examiner Comments

In part (a) the correct numbers are required. Answers which give numbers must be looked at to consider how many are correct and how many are incorrect. More than 1 incorrect answer will prevent the awarding of any marks.

In part (b) an explanation is required. This must not be a restatement of the question but must be a full and clear explanation with a decision.

Student Response A

10 (a) Write down all the prime numbers between 20 and 30

~~20~~, ~~21~~, ~~22~~, 23, ~~24~~, ~~25~~, ~~26~~, ~~27~~, ~~28~~, 29, 30

~~20 = 10, 2, 1, 20, 5 4X~~

~~21 = 7, 3, 7, 21 X~~

~~22 = 11, 2, 1, 22X~~

~~23~~ = 1, 23 ✓

~~24 = 12, 2, 1, 24X~~

23, 29

(2)

2/2

Catherine says,

"2 is the only even prime number."

(b) Is Catherine right?
You must give a reason for your answer.

Yes, because there are no other prime numbers that are even because they can all be divided by 2.

(1)

(Total for Question 10 is 3 marks)

1/1

Examiner Comments

Part (a) The correct answer is seen on the answer line. There is working which can be followed as a list of numbers and then looking for factors to eliminate these numbers from the list.

Part (b) Explains that other even numbers have a factor of 2 and so is sufficient for the mark.

Student Response B

10 (a) Write down all the prime numbers between 20 and 30

~~24~~ | 2, 3, 5, 7, 11, 13, 17, 19, 23, ~~26~~, 27, 29 |

23, 27, 29

(2)

1/2

Catherine says,

"2 is the only even prime number."

(b) Is Catherine right?
You must give a reason for your answer.

yes because 2 x 2 = 4 which is a even number.

(1)

0/1

Examiner Comments

Part (a) Again listing is used but the student thinks 27 is prime and so 2 correct answers are seen with 1 incorrect. This is awarded B1

Part (b) The student starts to think about 2 being a factor of even numbers but there is insufficient explanation given.

Student Response C

10 (a) Write down all the prime numbers between 20 and 30

Ans ~~DKE~~ 1, ~~3~~, 2, 3, 5, 7, 13, 17, 19, 21, 23, 27, 29

21, 23, 27, 29

(2)

0/2

Catherine says,

"2 is the only even prime number."

(b) Is Catherine right?
You must give a reason for your answer.

No, there are more even numbers than 2

(1)

0/1

Examiner Comments

Part (a) Again listing is used but this is an attempt at listing prime numbers. The list is incorrect leading to 2 incorrect answers on the answer line (as well as 2 correct) no marks can be awarded.

Part (b) This student has thought about even numbers but not prime numbers. No marks can be awarded.

Exemplar Question 6

Foundation tier Paper 2

13 A scout group has a raffle to raise money for charity.
There is 1 prize to be won in the raffle.

Laura buys 12 raffle tickets.
A total of 350 raffle tickets are sold.

Find the probability that Laura does **not** win the prize.

.....

(Total for Question 13 is 2 marks)

Examiner Comments

This assesses the concept that an exhaustive set of mutually exclusive events sum to 1. Classic mistakes involve forgetting to subtract from 1 or giving the probability in an incorrect format. Although these mistakes were not seen that often.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
13	$\frac{338}{350}$	M1	for 350 – 12 (=338) **or** $\frac{y}{350}$ oe where $y < 350$ **and** $y \neq 12$ **or** $1-\frac{12}{350}$ oe	For the method mark probability fractions can be expressed as equivalent expressions, even if not correct probability notation e.g. 338 : 350 scores M1 A0
		A1	oe	Using correct probability notation Allow 0.96 to 0.97 or 96% to 97%

Examiner Comments

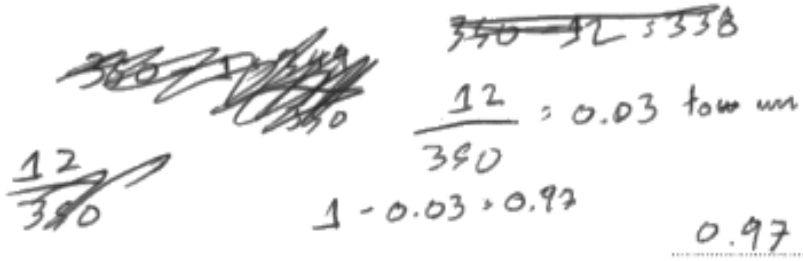
The method mark can be awarded for an appropriate first step. There must be no choice seen in this step for the mark to be awarded.

Student Response A

13 A scout group has a raffle to raise money for charity.
There is 1 prize to be won in the raffle.

Laura buys 12 raffle tickets.
A total of 350 raffle tickets are sold.

Find the probability that Laura does **not** win the prize.



(Total for Question 13 is 2 marks)

2/2

Examiner Comments

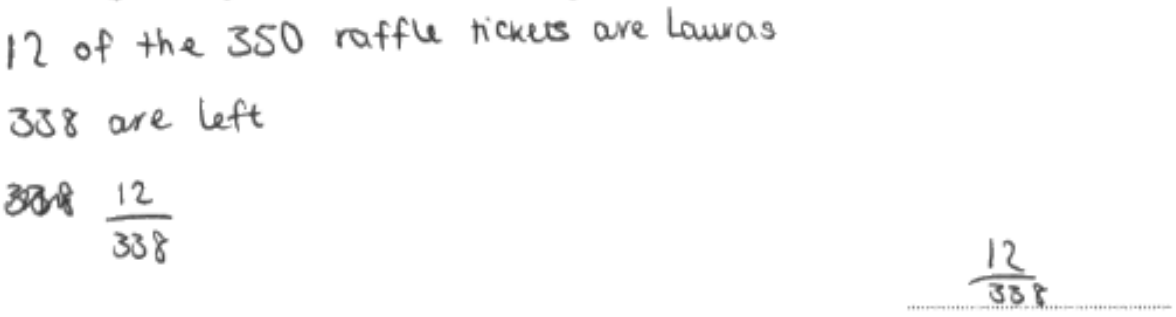
The answer is given as a decimal equivalent which is acceptable as stated in the mark scheme.

Student Response B

13 A scout group has a raffle to raise money for charity.
There is 1 prize to be won in the raffle.

Laura buys 12 raffle tickets.
A total of 350 raffle tickets are sold.

Find the probability that Laura does **not** win the prize.



(Total for Question 13 is 2 marks)

1/2

Examiner Comments

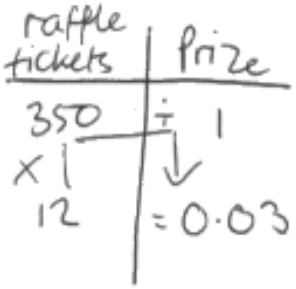
This student clearly indicates that 338 tickets are left which gains the method mark. This number is then used incorrectly in the probability given on the answer line. The answer is incorrect.

Student Response C

13 A scout group has a raffle to raise money for charity.
There is 1 prize to be won in the raffle.

Laura buys 12 raffle tickets.
A total of 350 raffle tickets are sold.

Find the probability that Laura does **not** win the prize.



0·03

(Total for Question 13 is 2 marks)

0/2

Examiner Comments

The student does not subtract from 1 and has not moved away from using 12 divided by 350 and so cannot gain any marks.

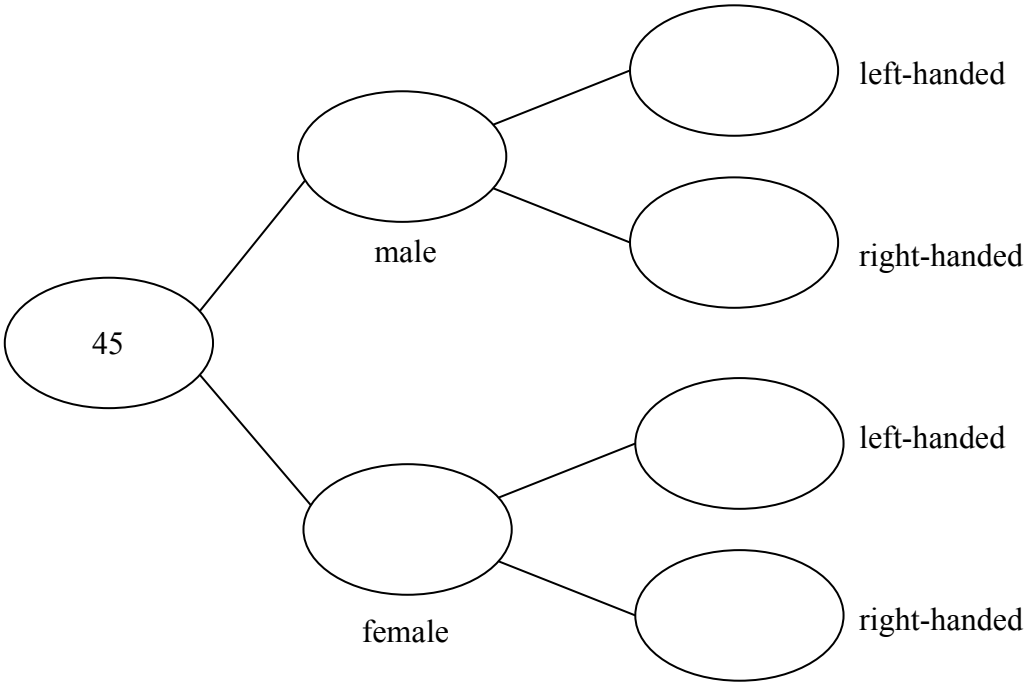
Exemplar Question 7

Foundation tier Paper 2

14 Each worker in a factory is either left-handed or right-handed.

22 of the 45 workers are male.
16 of the 34 right-handed workers are female.

Complete the frequency tree for this information.



(Total for Question 14 is 3 marks)

Examiner Comments

This is a new topic to this specification which asses the use of frequency trees. The challenge for some students proved to be putting the given figures in the correct places.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
14	**4** 22 **18** 45 **7** **23** 16	C1	for correctly placing at least one piece of data (22 or 16) **OR** for finding at least one unknown piece of data (4, 18, 7 or 23)	Unknown figures may be seen in working and need not be on the diagram
		C1	for correctly placing at least one piece of data (22 or 16) **and** for finding at least one unknown piece of data (4, 18, 7 or 23)	Award of this mark implies the first C1
		C1	for a complete correct tree. **SC C2** if all 6 figures are shown as the numerator of fractions in the correct places	

Examiner Comments

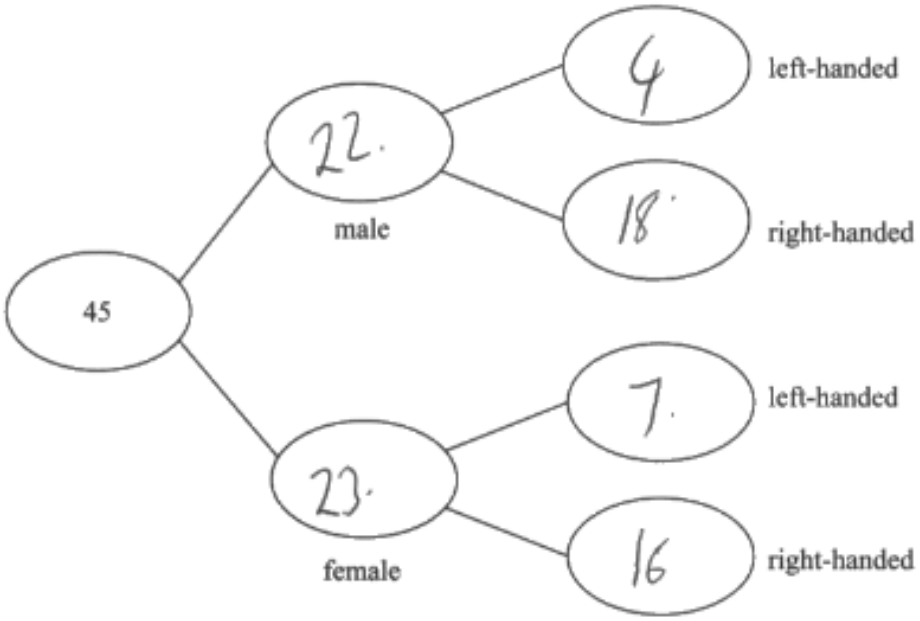
The marks were for placing either of the two given figures correctly on the diagram or for working out a missing figure. The fully correct diagram received full marks. There was a special case to allow for students who gave the answers as fractions using correct numerators (possibly showing some confusion with probability trees).

Student Response A

14 Each worker in a factory is either left-handed or right-handed.

22 of the 45 workers are male.
16 of the 34 right-handed workers are female.

Complete the frequency tree for this information.



(Total for Question 14 is 3 marks)

3/3

Examiner Comments

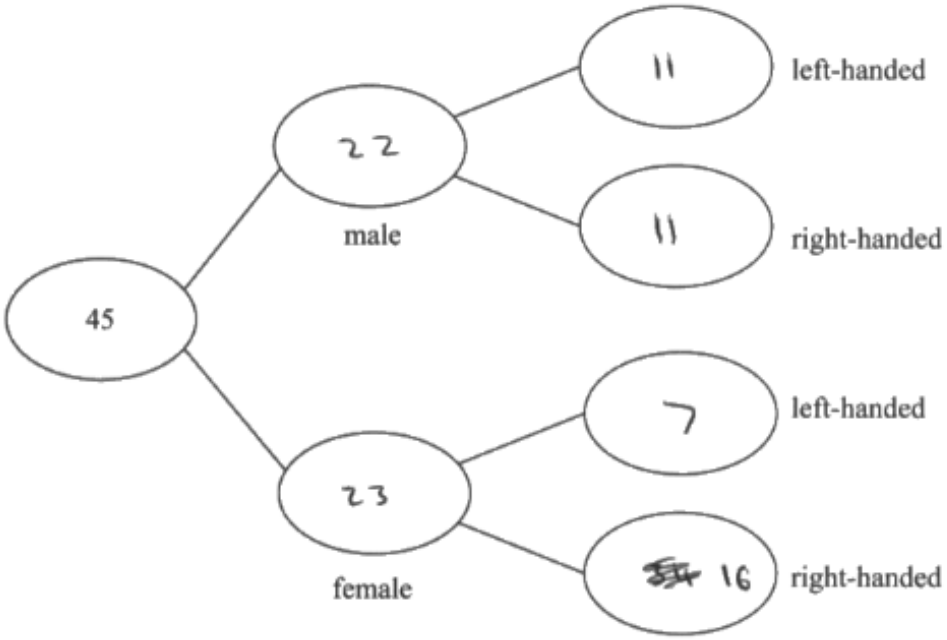
All the figures are placed correctly. Full marks can be awarded.

Student Response B

14 Each worker in a factory is either left-handed or right-handed.

22 of the 45 workers are male.
16 of the 34 right-handed workers are female.

Complete the frequency tree for this information.



(Total for Question 14 is 3 marks)

2/3

Examiner Comments

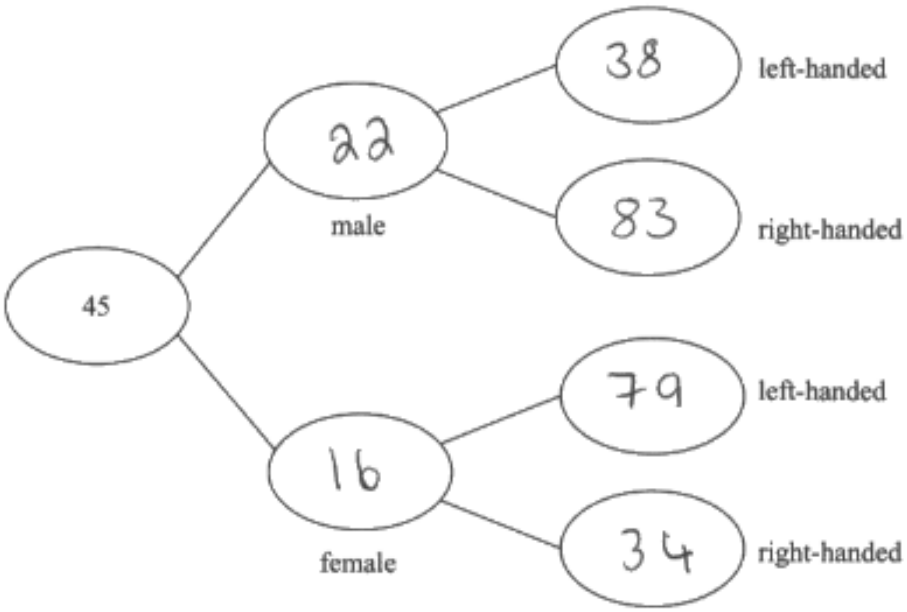
The student places 22 and 16 correctly, either is worthy of C1. We can see 23 and 7 correctly calculated, again either is worthy of another C1. Unfortunately the student then splits the 22 males equally and so cannot have the final mark.

Student Response C

14 Each worker in a factory is either left-handed or right-handed.

22 of the 45 workers are male.
16 of the 34 right-handed workers are female.

Complete the frequency tree for this information.



(Total for Question 14 is 3 marks)

1/3

Examiner Comments

The student only places 22 correctly. 16 is incorrectly placed and all other figures are incorrect. Only C1 can be awarded.

Exemplar Question 8

Foundation tier Paper 2

16 Marla buys some bags of buttons.

There are 19 buttons or 20 buttons or 21 buttons or 22 buttons in each bag.

The table gives some information about the number of buttons in each bag.

Number of buttons	Frequency
19	……..……
20	7
21	3
22	1

The total number of buttons is 320.

Complete the table.

(Total for Question 16 is 3 marks)

Examiner Comments

This is a problem set to assess the understanding and use of a table in a statistical setting. Most students coped well with this question with the main error seen being incomplete processing.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
16	5	P1	for start to process e.g. 7 × 20 (= 140) **and** 3× 21 (= 63) **or** (7 × 20) + (3 × 21) + 22 (= 225)	May be written near table 7 × 20 (= 140) **and** 3 × 21 (= 63) minimum requirement for P1
		P1	for a complete process to find the missing frequency e.g. (320 – "225") ÷ 19 **or** 320 – "225" = (95) **and** "95" ÷ 19	May be seen as two calculations
		A1	cao	Please check the table. Correct answer in the table without working award 3 marks

Examiner Comments

The entry in the table should be considered as the answer line. The second process mark does require a correct first process to have been seen or implied by correct figures. The final answer must come from correct working and not a rounded answer form incorrect or inaccurate working.

Student Response A

16 Marla buys some bags of buttons.

There are 19 buttons or 20 buttons or 21 buttons or 22 buttons in each bag.

The table gives some information about the number of buttons in each bag.

Number of buttons	Frequency	Total
19	5	95
20	7	140
21	3	63
22	1	22

The total number of buttons is 320

Complete the table.

320 − 140 = 180
180 − 63 = 117
117 − 22 = 95
95 / 19 = 5

95
+ 140
+ 63
+ 22
= 320

(Total for Question 16 is 3 marks)

3/3

Examiner Comments

A fully correct answer supported by working. Some working is seen in the body and other working is near the table.

Student Response B

16 Marla buys some bags of buttons.

There are 19 buttons or 20 buttons or 21 buttons or 22 buttons in each bag.

The table gives some information about the number of buttons in each bag.

Number of buttons	Frequency
19	6
20	7
21	3
22	1

The total number of buttons is 320

Complete the table.

1 22 1×22=22

3 21 3×21=63 +

7 20 7×20=140

=198

320 − 198 = 122

122 ÷ 19 = 6

(Total for Question 16 is 3 marks)

2/3

Examiner Comments

The answer is incorrect because of an error in the addition. However, all the processes are clearly seen. Hence 2 marks can be awarded.

Student Response C

16 Marla buys some bags of buttons.

There are 19 buttons or 20 buttons or 21 buttons or 22 buttons in each bag.

The table gives some information about the number of buttons in each bag.

Number of buttons	Frequency
19	.....
20	7
21	3
22	1

The total number of buttons is 320

Complete the table.

20 x 7 = 140
3 x 21 = 63
22 x 1 = 22

140 + 63 + 22 = 225
320 − 225 = 95

(Total for Question 16 is 3 marks)

1/3

Examiner Comments

This student finds all the products and adds them. They then subtract correctly but the lack of division by 19 prevents the award of the second process mark. There is no final answer.

Exemplar Question 9

Foundation tier Paper 2

17 Here is the list of ingredients for making 30 biscuits.

Ingredients for 30 biscuits	
225 g	butter
110 g	caster sugar
275 g	plain flour
75 g	chocolate chips

Lucas has the following ingredients.

900 g	butter
1000 g	caster sugar
1000 g	plain flour
225 g	chocolate chips

What is the greatest number of biscuits Lucas can make?
You must show your working.

.....

(Total for Question 17 is 3 marks)

Examiner Comments

This is a real life problem involving ratios and use of scale factors. The student is told they must show their working so the communication of their method is essential for the award of marks. An answer only does not receive any marks for this question. Several approaches were seen but some students failed to realise that the chocolate chips available could only complete 3 batches; some choose to consider 4 batches and gave 120 as an incorrect final answer.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
17	90	P1	for a process to find the number of batches for at least 2 ingredients, e.g. 900 ÷ 225 (= 4) **or** 1000 ÷ 110 (= 9.09..) **or** 1000 ÷ 275 (= 3.6……) **or** 225 ÷ 75 (= 3) **OR** A full method to find the maximum number of biscuits for 1 ingredient e.g. 900 ÷ 225 × 30 **OR** Amount required for 1 biscuit for at least 2 ingredients e.g. 225 ÷ 30 (= 7.5) **or** 110 ÷ 30 (= 3.6..) **or** 275 ÷ 30 (= 9.1..) **or** 75 ÷ 30 (= 2.5) **OR** Amount required for 3 batches for at least 2 ingredients e.g. 225 × 3 (= 675) **or** 110 × 3 (= 330) **or** 275 × 3 (=825) **or** 75 × 3 (= 225)	
		P1	(dep P1) for a complete process to find the maximum number of biscuits after considering at least 3 different ingredients e.g. "3" × 30	They must use their smallest multiplier after considering at least 3 different ingredients
		A1	(dep P2) cao from fully correct working	90 without working award no marks

Examiner Comments

The mark scheme shows examples of the main calculations seen. The marks are dependent and working is required to score full marks.

Student Response A

17 Here is the list of ingredients for making 30 biscuits.

Ingredients for 30 biscuits
225 g butter
110 g caster sugar
275 g plain flour
75 g chocolate chips

Lucas has the following ingredients.

900 g butter
1000 g caster sugar
1000 g plain flour
225 g chocolate chips

What is the greatest number of biscuits Lucas can make?
You must show your working.

B : S : P : C

225 : 110 : 275 : 75

$\frac{225}{30} = 7.5$ $\frac{900}{7.5} = 120$

$\frac{110}{30} = 3.6$ $\frac{1000}{3.6} = 272.72$

$\frac{275}{30} = 9.16$ $\frac{1000}{9.16} = 109.09$

$\frac{225}{2.5} = 90$

90 biscuits

(Total for Question 17 is 3 marks)

3/3

Examiner Comments

A fully correct solution that looks at the amount required per biscuit and then finds how many biscuits could be made for each ingredient. The student then correctly selects the limiting number and places 90 on the answer line.

Student Response B

17 Here is the list of ingredients for making 30 biscuits.

Ingredients for 30 biscuits
225 g butter
110 g caster sugar
275 g plain flour
75 g chocolate chips

1 biscuit
7.5g – butter
3.6g – caster sugar
9.16 – plain flour
2.5g – chocolate chips.

Lucas has the following ingredients.

900 g butter ✓
1000 g caster sugar
1000 g plain flour
225 g chocolate chips

What is the greatest number of biscuits Lucas can make?
You must show your working.

60 biscuits
450 – g butter
220g – sugar
550g – plain flour
150g – chocolate chips

~~450 + 450 = 900~~

900 ÷ 7.5
= 120

1000 ÷ 36
= 27.77

1000 ÷ 9.16 =
= 109.17

225 ÷ 2.5
= 90

120 + 90
= 210 + 27.77 + 109.17
= 546.94
= 547

547

(Total for Question 17 is 3 marks)

2/3

Examiner Comments

The ingredients per biscuit are calculated correctly (7.5,3.6,9.16,2.5) so the first process mark can be awarded. The number of biscuits that could be made with each individual ingredient is then calculated correctly (120,277,109,90). This is a complete process considering at least 3 ingredients, the award of the second process mark can be made. However, the student then decides to add all these together rather than select the lowest value so the accuracy mark cannot be awarded.

Student Response C

17 Here is the list of ingredients for making 30 biscuits.

Ingredients for 30 biscuits
225 g butter
110 g caster sugar
275 g plain flour
75 g chocolate chips

Lucas has the following ingredients.

900 g butter
1000 g caster sugar
1000 g plain flour
225 g chocolate chips

What is the greatest number of biscuits Lucas can make?
You must show your working.

120 biscuits

30 +30 +30 +30 = 120

225 + 225
4 +225
+225
= 900.

120 biscuits

(Total for Question 17 is 3 marks)

1/3

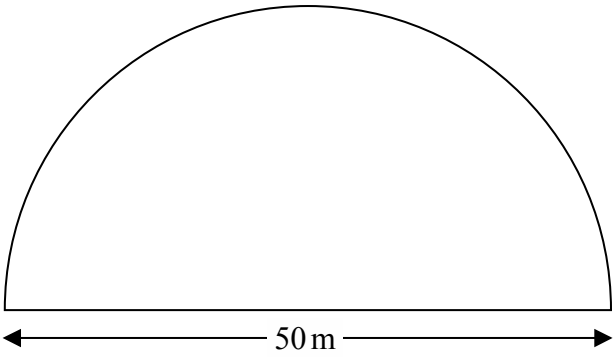
Examiner Comments

A full method for 1 ingredient, butter, is shown. 225 + 225 + 225 + 225 = 900 is equivalent to 900 ÷ 225 = 4 and 30 + 30 + 30 + 30 = 120 is the same as 4 × 30 = 120. No other working is given so only the first process mark can be awarded.

Exemplar Question 10

Foundation tier Paper 2

19 A farmer has a field in the shape of a semicircle of diameter 50 m.



The farmer asks Jim to build a fence around the edge of the field.
Jim tells him how much it will cost.

Total cost = £29.86 per metre of fence plus £180 for each day's work

Jim takes three days to build the fence.

Work out the total cost.

£.....

(**Total for Question 19 is 5 marks**)

Examiner Comments

This question is multi step problem involving both geometry and ratio. The student must work with the semi-circle and consider both the cost per metre and the rate of pay. Misconceptions included using area instead of circumference, forgetting to half the full circumference or only using part of the perimeter of the shape. Some students ignored the arc altogether. Most successfully students considered the labour charge. Although a few added 29.86 and 180, trying to use this as a single rate.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
19	4378.2(0)	P1	for a process to find the circumference of the circle **or** the semi-circle, e.g. $\pi \times 50$ (= 157.0796327) **or** $0.5 \times \pi \times 50$ (= 78.53981634)	Figures may be truncated or rounded
		P1	for a complete process to find the perimeter of the field, e.g. $(0.5 \times \pi \times 50) + 50$ (= 128.5...) **or** for working with one cost e.g. "157.07…" × 29.86 (= 4690.11..) **or** "78.5…" × 29.86 (= 2345.198…) **or** 50 × 29.86 (=1493) **or** 3 × 180 (= 540)	May use circle at this point, figures imply method One cost is 1 length or labour Figures may be truncated or rounded
		P1	For finding the costs of two different aspects e.g. 2 of "78.5…" × 29.86 (= 2345.1..) **or** 50 × 29.86 (= 1493) **or** 3 × 180 (= 540)	Two different aspects means arc and straight edge or arc and labour or straight edge and labour Condone circle and labour or circle and straight edge.
		P1	for a adding at least 2 costs e.g. "2345.1.." + "540" (=2885.1..) **or** "1493" + "540" (=2033) **or** "128.5…" × 29.86 (= 3838.2..)	Finding the cost of the perimeter is two costs added and so implies the previous P1 The circle is not allowed to be counted as one of the two costs for this mark
		A1	for answer in the range 4377 – 4392	

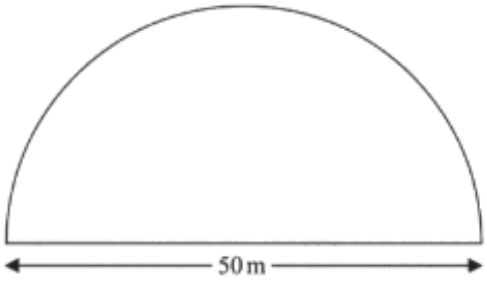
Examiner Comments

The first mark is for calculating the circumference of the circle (or semi-circle). The second mark is for building onto this method or for making a start to find the cost of the straight edge or the cost of the labour. These first two marks can be awarded in any order and are independent of each other. The use of the inverted commas means that any subsequent marks depend on the use of previous correct processes. The range in the final answer allows for the different values of π which students tend to use.

Note: Guidance is given on the front cover of the examination paper as to what value of π should be used.

Student Response A

19 A farmer has a field in the shape of a semicircle of diameter 50 m.



The farmer asks Jim to build a fence around the edge of the field.
Jim tells him how much it will cost.

Total cost = £29.86 per metre of fence plus £180 for each day's work

Jim takes three days to build the fence.

Work out the total cost.

$C = \pi \times 50 = 157.079$ meters

$157.079 \div 2 = 78.53$ meters

$78.53 + 50 = 128.53$ meters

Total cost $= 128.53 \times 29.86 = 3837.90$

$3 \times 180 = 540$

$3837.90 + 540 = 4377.90$

£ 4377.90

(Total for Question 19 is 5 marks)

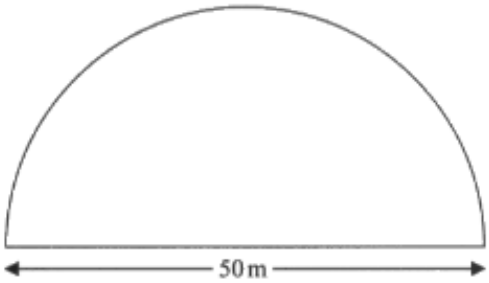
5/5

Examiner Comments

A correct answer that fails within the given range required. The student finds the perimeter and the cost of the perimeter and adds on the labour costs. All stages of working can clearly be seen.

Student Response B

19 A farmer has a field in the shape of a semicircle of diameter 50 m.



The farmer asks Jim to build a fence around the edge of the field.
Jim tells him how much it will cost.

Total cost = £29.86 per metre of fence plus £180 for each day's work

Jim takes three days to build the fence.

Work out the total cost.

$\pi \times 50 = \frac{157.079}{2} = 78.539$

79 meters of fence

$29.86 \times 79 = £2358.94$

$180 \times 3 = 540$

$2358.94 + 540 = 2898.94$

£2898.94

(Total for Question 19 is 5 marks)

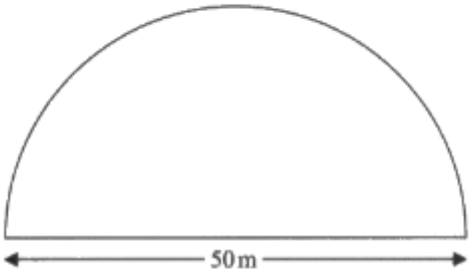
4/5

Examiner Comments

This student does nothing wrong other than forgetting to consider the straight edge of the field. All their processes are clearly seen but the final answer is incorrect due to the missing step.

Student Response C

19 A farmer has a field in the shape of a semicircle of diameter 50 m.

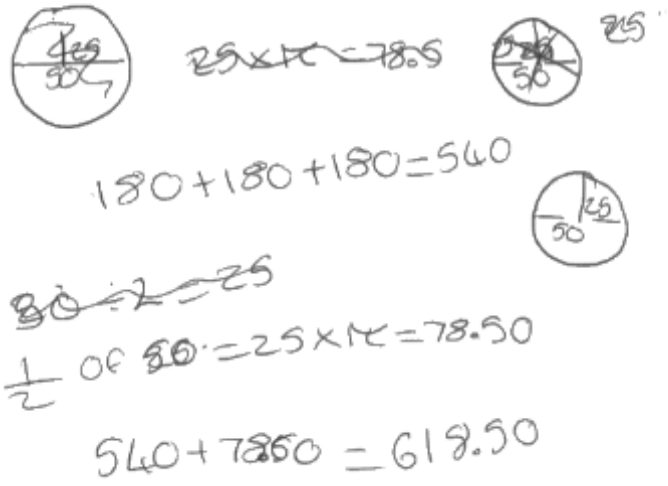


The farmer asks Jim to build a fence around the edge of the field.
Jim tells him how much it will cost.

Total cost = £29.86 per metre of fence plus £180 for each day's work

Jim takes three days to build the fence.

Work out the total cost.



£618.50

(Total for Question 19 is 5 marks)

2/5

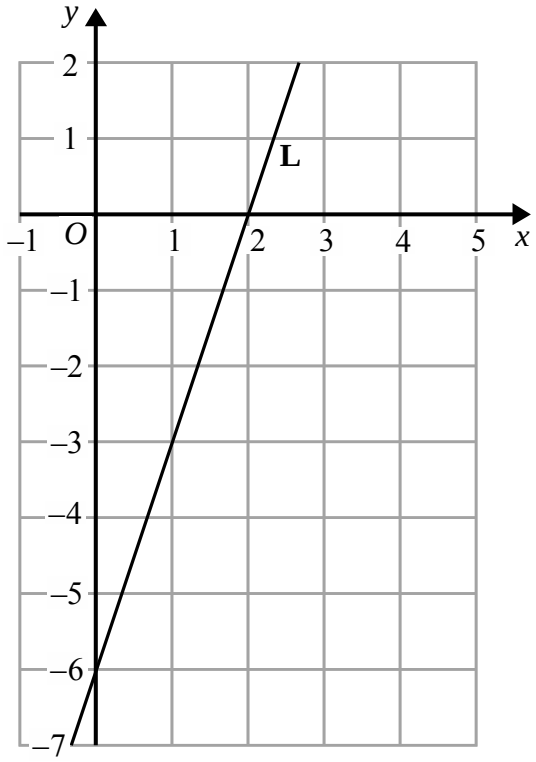
Examiner Comments

The student starts by finding the cost of the labour. This allows the award of the second process mark. They then find the length of the semi-circle allowing the award of the first process mark. Unfortunately, they do not then deal with any costs so no more marks can be awarded.

Exemplar Question 11

Foundation tier Paper 2

22 The line **L** is shown on the grid.



Find an equation for **L**.

.....

(Total for Question 22 is 3 marks)

Examiner Comments

This question assesses finding the equation of a given line. Students need to extract information from the given graph; this was often done correctly but then used incorrectly. Some students used the letter *L* within their equation and so failed to gain full marks.

Mark Scheme

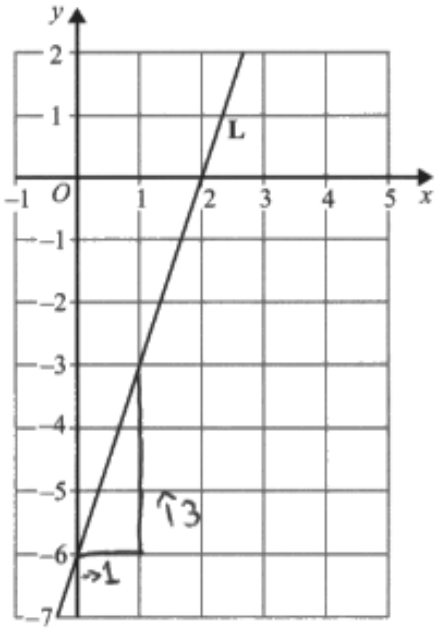
Question	Answer	Mark	Mark scheme	Additional guidance
22	$y = 3x - 6$	M1	for a correct method to find the gradient of the line, or $m = 3$ **or** identifies -6 as the intercept in words or in a partial equation **or** $y - b = m(x - a)$ where $m \neq 3$ and (a, b) is a correct coordinate	Just ringing -6 is insufficient
		M1	for $y = 3x + c$ **or** (L=) $3x - 6$ **or** $y =$ "3"$x - 6$ **or** $y - y_1 = 3(x - x_1)$ **or** $y - b =$ "3"$(x - a)$ where (a, b) is a correct coordinate	Award of this mark implies the first M1 c must be seen either as a letter or a number
		A1	accept $y = 3x + -6$ oe	

Examiner Comments

The first mark is for the correct calculation of the gradient or for showing that -6 is the intercept. The -6 must be clearly and unambiguously shown as the intercept, not just as part of the working for the gradient. The second mark is for beginning to form a correct equation, as can be seen from the additional guidance; if this mark is awarded then the previous method mark can be implied. But note that "3" means the gradient used must come from a correct process if it is not the correct gradient of 3.

Student Response A

22 The line **L** is shown on the grid.



Find an equation for **L**.

y = mx + c
gradient y-intercept

y = 3x - 6

y = 3x - 6

(Total for Question 22 is 3 marks)

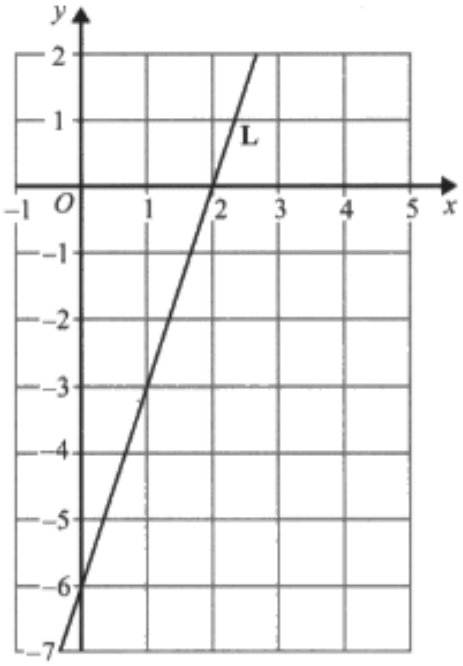
3/3

Examiner Comments

There is some evidence of working to find the gradient on the graph; this is insufficient in itself for the method mark BUT the fully correct answer is given, without any choice, so all marks can be awarded.

Student Response B

22 The line **L** is shown on the grid.



Find an equation for **L**.

$y = mx + c$ ↑ y-intercept

↑ gradient

$y = 3x + 6$

$y=3x+6$

(Total for Question 22 is 3 marks)

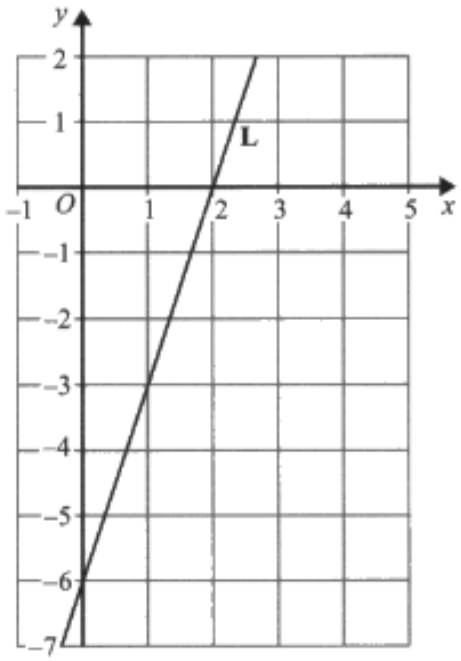
2/3

Examiner Comments

This answer is correct except for the sign in front of the 6. As such it can have the two method marks for the correct gradient and $y = 3x + c$ shown. There is no working BUT the student clearly communicates the value of the gradient and uses $y = mx + c$ appropriately.

Student Response C

22 The line **L** is shown on the grid.



Find an equation for **L**.

$y = 2x - 6$

(Total for Question 22 is 3 marks)

1/3

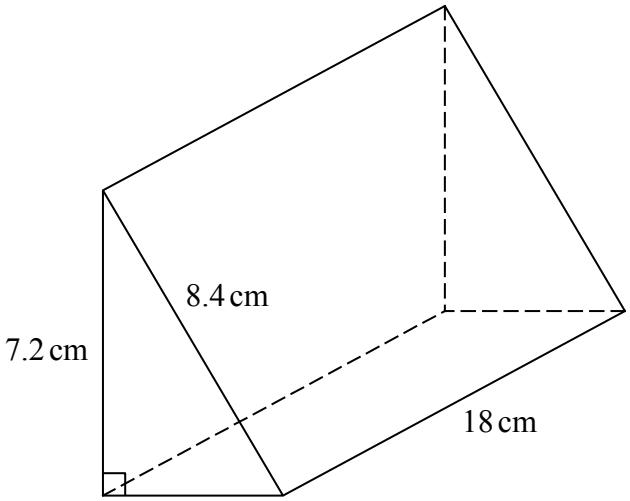
Examiner Comments

This answer is just stated. The − 6 is correctly given in an acceptable format. The value of the gradient is incorrect, no working is seen. This means only M1 can be awarded for the intercept.

Exemplar Question 12

Foundation tier Paper 2

26 Here is a triangular prism.



Work out the volume of the prism.
Give your answer correct to 3 significant figures.

..... cm^3

(Total for Question 26 is 5 marks)

Examiner Comments

This question makes connections between Pythagoras theorem and the volume of a prism within a problem. Students often confused volume with surface area in this question. Some failed to find the missing length for the bottom of the triangle. Another common error was to find the volume of the cuboid without dividing by 2 when attempting to find the volume of the given prism.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
26	280	P1	for starting to use Pythagoras to find the missing side e.g. $8.4^2 - 7.2^2$ (= 18.72)	Award P1 for a correct Pythagorean statement e.g. $x^2+7.2^2=8.4^2$
		P1	for a complete process to find the missing side e.g. $\sqrt{70.56-51.84}$ **or** $\sqrt{18.72}$ (=4.32....)	4.3 truncated or rounded can imply P2
		P1	(dep P1) for a process to find the area of the triangular face e.g. [length of base] × 7.2) ÷ 2 (=15.57..) **OR** the volume of the cuboid e.g. [length of base] × 7.2 ×18 (=560.7..)	Uses a figure they show as the length of the base of the right angled triangle but dep on P1 Allow 15.57.. truncated or rounded if unsupported
		P1	for a complete process to find the volume of the prism e.g. "15.5.." × 18 **or** "560.7.." ÷ 2	
		A1	answer in the range 278 – 281	If an answer is given in the range 278 to 281 but then incorrectly given to 3 sig fig this mark can still be awarded.

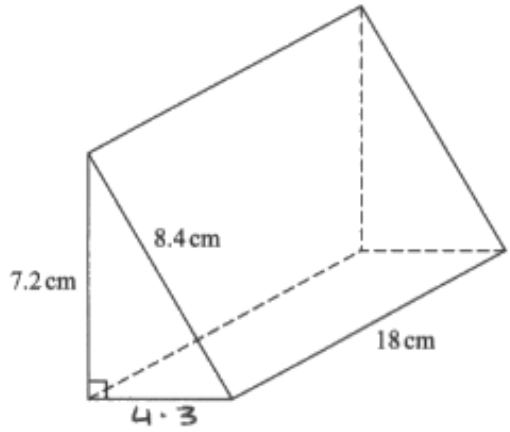
Examiner Comments

The first two marks are for correctly using Pythagoras's theorem to find the missing length. The next two marks are for a correct process to find the volume of the cuboid, these are both dependent upon P1 being scored from the use of Pythagoras's theorem. The use of [length of base] in the mark scheme is explained in the additional guidance at the beginning of the mark scheme and must be the result of at least a first correct step using Pythagoras's theorem. If this has not occurred no marks can be awarded.

Note: the accuracy given in the question is for guidance only. Any answer within the range 278 – 281 gains full marks, providing it has not come from an incorrect method.

Student Response A

26 Here is a triangular prism.



Work out the volume of the prism.
Give your answer correct to 3 significant figures.

volume = area of cross section × length

area of cross section =

$a^2 + b^2 = c^2$

$8.4^2 - 7.2^2 = 18.72$

$\sqrt{18.72} = 4.326661531$

$\frac{1}{2} \times 4.3 \times 7.2 = 15.48$

$15.48 \times 18 = 278.64$

279 cm³

(Total for Question 26 is 5 marks)

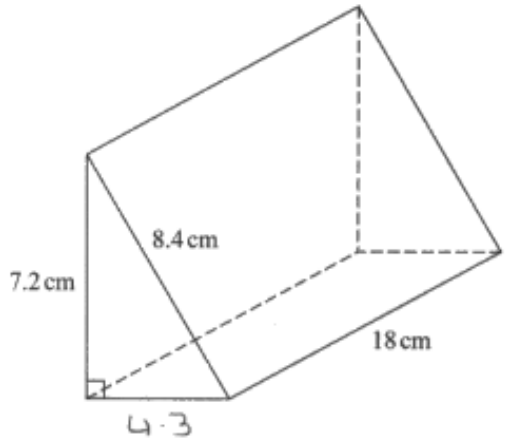
5/5

Examiner Comments

A clearly communicated solution with a final answer in the acceptable range. Full marks can be awarded.

Student Response B

26 Here is a triangular prism.



Work out the volume of the prism.
Give your answer correct to 3 significant figures.

$8.4^2 - 7.2^2 = 18.72$

$\sqrt{18.72} = 4.326$

$18 \times 4.3 \times 7.2 = 557.28$

557 cm³

(Total for Question 26 is 5 marks)

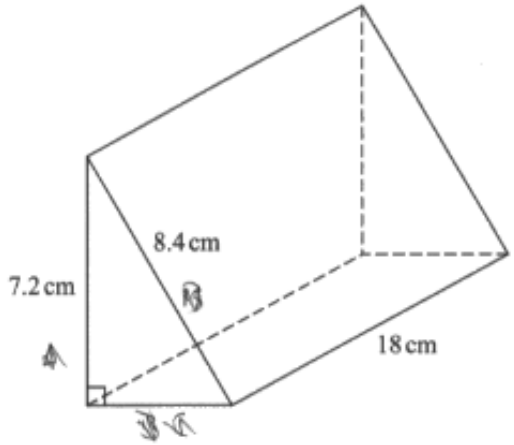
3/5

Examiner Comments

The first two marks can be awarded for the correct use of Pythagoras's theorem. The next process mark can be awarded for the process to find the volume of the cuboid. The last two marks are not awarded and there no full process seen and the final answer is incorrect.

Student Response C

26 Here is a triangular prism.



Work out the volume of the prism.
Give your answer correct to 3 significant figures.

$7.2^2 + 8.4^2 = 122.4$

$8.4^2 - 7.2^2 = 18.72$

$\sqrt{18.72} = 4.3\text{ cm}$

$7.2 + 4.3 = 11.5$

$\frac{11.5}{2} = 5.75 \times 18 = 103.5$

103.5 ..... cm³

(Total for Question 26 is 5 marks)

2/5

Examiner Comments

The first two marks can be awarded for the correct use of Pythagoras theorem. The method shown to find the volume is incorrect and so no more mark can be awarded.

Paper 3F (calculator)

Exemplar Question 1

Foundation tier Paper 3

4 Here are the first 4 terms of a sequence.

2 9 16 23

(*a*) (i) Write down the next term in the sequence.

.....

(1)

(ii) Explain how you got your answer.

.....

(1)

(*b*) Work out the 10th term of the sequence.

.....

(1)

(Total for Question 4 is 3 marks)

Examiner Comments

This type of question is usually a well answered since students are very familiar with sequences. Here the students are expected to work with the given numbers, and will usually do this by either working out what is added on from term to term, or higher ability students may generate the rule for the sequence of numbers.

In part (b) they can build on their work in (a) and find a number well into the sequence. Many will do this by continuing to "add 7"; an easy task using their calculator; but a common error is when students mis-count and perhaps given the answer for the 11^{th} or 12^{th} number. Those who have generated their algebraic rule could substitute 10 to find the answer.

Mark Scheme

Question	Answer	Mark	Mark scheme
4(a)(i)	30	B1	cao
(ii)	Explanation	C1	for explanation, e.g. increase by 7, add 7, states $7n - 5$
(b)	65	B1	cao

Examiner Comments

The mark scheme awarded marks for correct answers only.

In (a)(ii) marks were awarded for common responses such as a statement like "adding 7" in words, symbols or by showing how they did it, or by writing down the algebraic rule. "7" is insufficient but "+7" is enough. This is also the case if these numbers are written between the number sequence given. Note that for part (b) there is no follow-through from an incorrectly stated algebraic formula.

Student Response A

4 Here are the first 4 terms of a sequence.

2 9 16 23

(a) (i) Write down the next term in the sequence.

7n-5

30

(1)

(ii) Explain how you got your answer.

Found that the sequence was +7, then added 7 to 23. (7n-5)

(1)

2/2

(b) Work out the 10th term of the sequence.

5 6 7 8 9 10

30 37 44 51 58 65

65

(1)

(Total for Question 4 is 3 marks)

1/1

Examiner Comments

The correct answers have been given in (a)(i) and (b) – both 1 mark. In part (a)(ii) lots of correct answers: "+7" stated, "added 7 to 23" and "7*n* − 5" given; any one of these three would be given the mark.

Student Response B

4 Here are the first 4 terms of a sequence.

2 9 16 23

(a) (i) Write down the next term in the sequence.

30

(1)

(ii) Explain how you got your answer.

you work out how much it goes up by each time- (1)

1/2

(b) Work out the 10th term of the sequence.

65

(1)

(Total for Question 4 is 3 marks)

1/1

Examiner Comments

The correct answers have been given in (a)(i) and (b) – both 1 mark. In part (a)(ii) there is a description of what you have to do to generate the sequence, but this is insufficient for the mark since there is no indication of how much it goes up. To dispel any queries further examination of this paper showed there were no further words written after "by each time-".

Student Response C

4 Here are the first 4 terms of a sequence.

2 9 16 23

(a) (i) Write down the next term in the sequence.

26

(1)

(ii) Explain how you got your answer.

I got my answer by adding 2.

(1)

0/2

(b) Work out the 10th term of the sequence.

99

(1)

(Total for Question 4 is 3 marks)

0/1

Examiner Comments

There is no explaining how this student arrived at their answers. In part (a) they state that they "added 2" yet 26 is 3 more than 23. In part (b) the answer is also wrong.

Exemplar Question 2

Foundation tier Paper 3

9 This is part of a bus timetable between Bury and Manchester.

Bury	08 25	08 55	09 15	09 30	09 45	10 05
Whitefield	08 34	09 04	09 24	09 39	09 54	10 14
Heaton Park	08 46	09 16	09 36	09 51	10 06	10 27
Cheetham	08 56	09 26	09 46	10 01	10 16	10 37
Manchester	09 05	09 35	09 55	10 10	10 25	10 48

(*a*) How many minutes should the 08 25 bus take to go from Bury to Manchester?

..... minutes
(1)

Daniel goes from Whitefield to Manchester by bus.

Daniel takes 17 minutes to get from his house to the bus stop in Whitefield.
He takes 15 minutes to get from the bus stop in Manchester to work.

Daniel has to get to work by 10 am.
He leaves his house at 8.45 am.

(*b*) Does Daniel get to work by 10 am?
You must show all your working.

(3)

(Total for Question 9 is 4 marks)

Examiner Comments

This question assesses use of time, both periods of time, time duration, and use of timetables and uses standard units of time. Knowledge of timetables is expected, as is how to work out and combine durations of time. In part (a) students have to pick out the two relevant times from the timetable and calculate the duration of time between them.

In part (b) this multi-stage question requires students to work through a real-life scenario, extract relevant figures from the question and use the timetable to select an appropriate bus.

Students find working with time quite difficult. They often confuse units of hours and minutes, especially if they try to use a calculator. Showing working may also be a problem for some. The order in which they process the figures may be a problem, though if they work through the problem in sequence of the times this should not be a problem.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
9(a)	40	B1	cao	
(b)	Yes (supported)	P1	for process shown to add a time to departure time e.g. 8.45+0.17 or 8.45+0.15 **or** 8.45+0.15+0.17 OR for process to work out time at work after arrival at Manchester bus stop e.g. "9.35"+15 OR finds accumulated additional time e.g. 17 + 15 (=32) OR start to work backwards e.g. 10.00−0.15	There must be some attempt to add but not necessarily complete or correct (e.g. 8.62). "9.35" must be a given time ie from 0905, 0935, 0955, 1010, 1025, or 1048. Process must be shown.
		P1	for process to use a bus time from Whitefield to Manchester with other times e.g. 0904 to 0935 with use of 17 or 15	Do not award in cases of ambiguity.
		C1	for conclusion of "Yes" supported by correct figures e.g. states 9.50 or comparable figures e.g. 9.35 and 25 (spare)	There needs to be a conclusion e.g. Yes or equivalent words supported by correct figures; if C mark fully evidenced award 3 marks.
			Alternative scheme	
		P1	for process shown to find a duration of time using given figures e.g. 8.45 to 10.00, 8.34 to 9.05, 10.14 to 10.48	There must be some attempt to find a duration of time but not necessarily complete or correct. Process must be shown.
		P1	for process to find the total travelling time e.g. 17 + 31 + 15 or 17 + 2 + 31 + 15	31 can come from any bus apart from the last bus which is 34
		C1	for conclusion of "Yes" supported by correct figures e.g. comparable figures e.g. 65 < 75 or 75 – 65 (= 10)	There needs to be a conclusion e.g. Yes or equivalent words supported by correct figures; if C mark fully evidenced award 3 marks.

Examiner Comments

In part (a) the answer had to be correct; there were no marks for working.

Part (b) involved several stages in calculation. Two possible schemes are shown in the mark scheme, which covered the majority of the response seen, but these are only examples: there were other possible methods seen which were marked in a similar way by examiners. The first mark was given when the student showed a simple operation involving time; either by working out a time duration, adding an amount to a given time, or even two given times. The second mark was given for showing another stage in the process of working to a final solution, which was frequently combining their chosen bus with one of the other times in the question, or a process of working out the total travelling time. The final mark was only given when a clear conclusion was given, which could be a simple "yes" or could be words to that effect, but this had to be supported by correct figures. "9.50" or "10 minutes early" could suffice, but it was not uncommon to find students missing out the waiting time at the bus stop. Statement of the conclusion only did NOT attract full credit since they were expected to show their working.

Student Response A

9 This is part of a bus timetable between Bury and Manchester.

Bury	0825	0855	0915	0930	0945	1005
Whitefield	0834	0904	0924	0939	0954	1014
Heaton Park	0846	0916	0936	0951	1006	1027
Cheetham	0856	0926	0946	1001	1016	1037
Manchester	0905	0935	0955	1010	1025	1048

(a) How many minutes should the 0825 bus take to go from Bury to Manchester?

40 minutes

(1)

1/1

Daniel goes from Whitefield to Manchester by bus.

Daniel takes 17 minutes to get from his house to the bus stop in Whitefield.
He takes 15 minutes to get from the bus stop in Manchester to work.

Daniel has to get to work by 10 am.
He leaves his house at 8.45 am.

(b) Does Daniel get to work by 10 am?
You must show all your working.

8:45 + 17
9:02

9:35 + 15
9:50

yes he will get to work for 10am with 10minutes to spare.

(3)

(Total for Question 9 is 4 marks)

3/3

Examiner Comments

Fully correct solution. In (b) full working is shown, with a correct conclusion of 9.50 and a statement that he will get to work.

Student Response B

9 This is part of a bus timetable between Bury and Manchester.

Bury	0825	0855	0915	0930	0945	1005
Whitefield	0834	0904	0924	0939	0954	1014
Heaton Park	0846	0916	0936	0951	1006	1027
Cheetham	0856	0926	0946	1001	1016	1037
Manchester	0905	0935	0955	1010	1025	1048

(a) How many minutes should the 0825 bus take to go from Bury to Manchester?

40 minutes

(1)

1/1

Daniel goes from Whitefield to Manchester by bus.

Daniel takes 17 minutes to get from his house to the bus stop in Whitefield.
He takes 15 minutes to get from the bus stop in Manchester to work.

Daniel has to get to work by 10 am.
He leaves his house at 8.45 am.

(b) Does Daniel get to work by 10 am?
You must show all your working.

8:34 → 9:05 = 31 mins

1 hour + 3 mins

8.45 + [illegible] = 9:48

17 mins

15 mins +

31 mins

63 mins

1 hour and 3 mins

yes he will be at work 12 minutes early

(3)

(Total for Question 9 is 4 marks)

2/3

Examiner Comments

Part (a) This is answered correctly.

Part (b) The alternative scheme applies. P1 is first awarded as the process to find the duration of the bus journey is clearly shown: 8:34 to 9:05 (=31 minutes). A further P1 is then awarded for the start of the process to find the total travelling time (17+15+31=): note they do not have to include the 2 minutes waiting time at the bus stop to get this mark. Unfortunately, the final C mark cannot be awarded. The correctly state "yes" but this is not supported by the correct figures (in this case 12 mins early; they have failed to add in the 2 minutes waiting at the bus stop).

Student Response C

9 This is part of a bus timetable between Bury and Manchester.

Bury	0825	0855	0915	0930	0945	1005
Whitefield	0834	0904	0924	0939	0954	1014
Heaton Park	0846	0916	0936	0951	1006	1027
Cheetham	0856	0926	0946	1001	1016	1037
Manchester	0905	0935	0955	1010	1025	1048

(a) How many minutes should the 0825 bus take to go from Bury to Manchester?

30 minutes

(1)

0/1

Daniel goes from Whitefield to Manchester by bus.

Daniel takes 17 minutes to get from his house to the bus stop in Whitefield.
He takes 15 minutes to get from the bus stop in Manchester to work.

Daniel has to get to work by 10 am.
He leaves his house at 8.45 am.

(b) Does Daniel get to work by 10 am?
You must show all your working.

8.45+17 = 9:02 + 15 = 9:17

~~++++~~
~~++++~~
~~++++~~ 9:00
11

Yes he does get to work by 10am because he gets there at 9:17

(3)

(Total for Question 9 is 4 marks)

1/3

Examiner Comments

Part (a) The answer is wrong so 0 marks.

Part (b) The first P1 is awarded for the process of adding time to departure time (8.45 + 17). The second P mark cannot be awarded since no bus is used: this part of the journey is absent in the working. Incorrect figures are used so no C mark either.

Exemplar Question 3

Foundation tier Paper 3

10 Bronwin works in a restaurant.

The table gives her rates of pay.

Day	Rate of pay
Monday to Friday	£8.40 per hour
Weekend	£11.20 per hour

Bronwin worked for a total of 20 hours last week.
She worked 8 of these 20 hours at the weekend.

Show that Bronwin was paid less than £200 last week.

(**Total for Question 10 is 3 marks**)

Examiner Comments

This question poses a short problem in what should be a familiar context. It is important that students extract the correct figures from the question to perform their calculations. They should relate the hours worked with the correct pay rate; weaker student will not match these correctly. Students will need to use standard and compound units and rates.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
10	Shows earnings	M1	for a method to start to work out earnings e.g. 11.2 × 8 (= 89.6) **or** 20 – 8 (=12) **or** 8.4 × 12 (= 100.8)	Accept calculations in pence, or £ written in decimal form.
		M1	for a complete method e.g. 11.2 × 8 + 8.4 × (20 – 8) **or** "89.6" + "100.8" **or** 200 – "89.6" – "100.8" (= 9.6)	
		C1	Shows earnings e.g. 190.4(0) or 9.6(0) with fully correct arithmetic	Conclusion in figures; ignore written conclusion.

Examiner Comments

To award the final mark it is only necessary to see the correct figures, since other figures for comparison are given in the question. Method marks can be awarded for calculations in £ or in pence. This question does not test correct use of money notation so an answer of 190.4 is sufficient.

Student Response A

10 Bronwin works in a restaurant.

The table gives her rates of pay.

Day	Rate of pay
Monday to Friday	£8.40 per hour
Weekend	£11.20 per hour

Bronwin worked for a total of 20 hours last week.
She worked 8 of these 20 hours at the weekend.

Show that Bronwin was paid less than £200 last week.

weekend - $11.20 \times 8 = 89.60$

weekday - $8.40 \times 12 = 100.80$

$100.80 + 89.60 = £190.40$ ✓

✓ how much she got paid

(Total for Question 10 is 3 marks)

3/3

Examiner Comments

A fully correct solution.

Student Response B

10 Bronwin works in a restaurant.

The table gives her rates of pay.

Day	Rate of pay
Monday to Friday	£8.40 per hour
Weekend	£11.20 per hour

Bronwin worked for a total of 20 hours last week.
She worked 8 of these 20 hours at the weekend.

Show that Bronwin was paid less than £200 last week.

4
8.40
8.40
8.40
8.40
8.40
8.40
8.40
8.40
8.40
8.40
8.40
8.40
80.80

£89.60
£80.80
+170.40

She was paid £170.40

(Total for Question 10 is 3 marks)

2/3

Examiner Comments

This student has shown they want to find 12 lots of 8.4 by presenting these in a list. This is correct method and can be awarded the first method mark, even though these are summed incorrectly (80.80). Sight of the correct total, 89.60 could also attract the award of this mark. The complete method is shown by 89.60 + 80.80, where 80.80 is their total from 12 × 8.4 so the second method mark can also be awarded. But the C mark cannot be awarded since the final answer is incorrect.

Student Response C

10 Bronwin works in a restaurant.

The table gives her rates of pay.

Day	Rate of pay
Monday to Friday	£8.40 per hour
Weekend	£11.20 per hour

Bronwin worked for a total of 20 hours last week.
She worked 8 of these 20 hours at the weekend.

Show that Bronwin was paid less than £200 last week.

8 × 11·20 = 89·6

16 × 8:40 = 134·4

(Total for Question 10 is 3 marks)

1/3

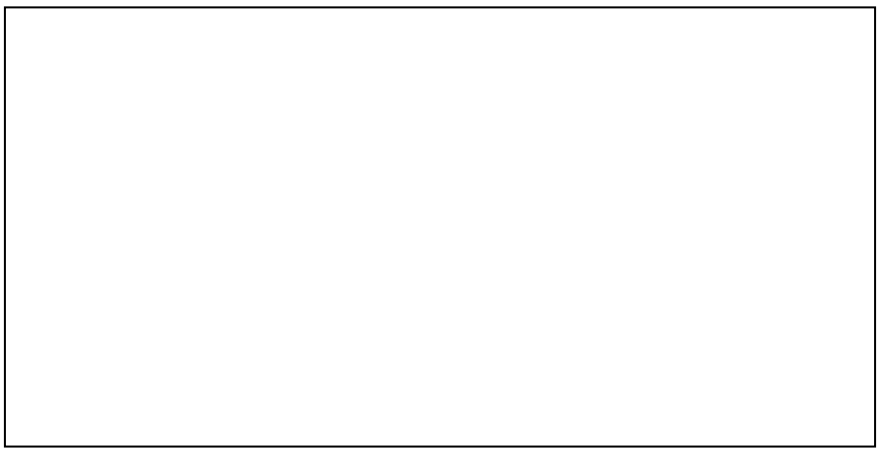
Examiner Comments

8 × 11.20 or 89.6 are sufficient for the award of the first method mark, but the student then goes wrong by showing 16 × 8.40, and therefore no further marks were awarded.

Exemplar Question 4

Foundation tier Paper 3

12 The diagram shows a scale drawing of a tennis court.



The scale of the drawing is 1 : 200

Work out the perimeter of the real tennis court.
Give your answer in metres.

..... metres

(**Total for Question 12 is 5 marks**)

Examiner Comments

The main focus of this question is use of a scale diagram. Students have to take their own measurement, scale these up, and use them to work out a perimeter, putting their final answer into metres. Weaker students thought the dimensions were 200. A significant minority worked out their answer but failed to convert to metres.

Mark Scheme

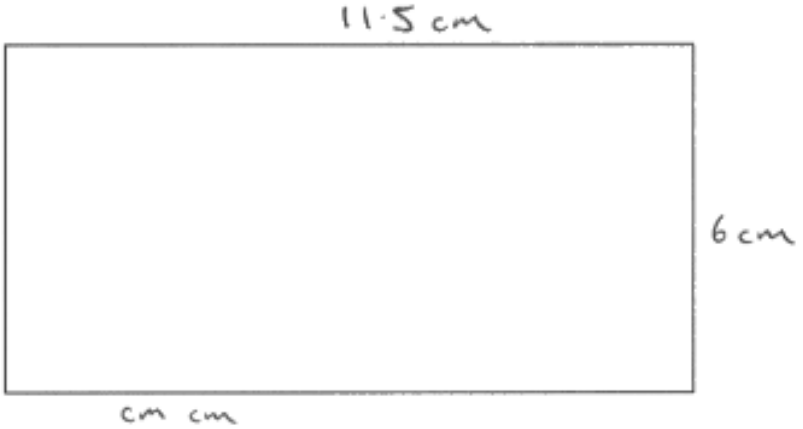
Question	Answer	Mark	Mark scheme	Additional guidance
12	69.2	B1	for a correct measurement of either length or width, e.g. 11.5 (cm) or 5.8 (cm)	Allow measurements 11.3 to 11.7 cm and 5.6 to 6.0 cm NB: could work in mm
		P1	for process to find actual dimensions, e.g. [length] × 200 (= 2300) or [width] × 200 (= 1160)	[length] in the range 11.0 to 12.0 [width] in the range 5.0 to 6.5 NB: could work in mm
		P1	(indep) for process to convert to metres [length in cm] ÷ 100 e.g. "2300" ÷ 100 (= 23) or "1160" ÷ 100 (= 11.6)	This mark can be awarded for the conversion of any amount in cm to m (ie not from an area)
		P1	(indep) for process to find the perimeter, eg"23" × 2 + "11.6" × 2 (= 69.2) or "11.5" × 2 + "5.8" × 2 (=34.6)	calculations could be in cm or in m and could be scaled or unscaled figures
		A1	for an answer in the range 67.6 to 70.8	SC: award 3 marks for an answer in the range 67.6 to 70.8 using measurements outside the above ranges

Examiner Comments

This was a complex question to mark due to the many steps that students had to work through. The first mark was awarded when students carried out a measurement of either the length of the width, given to the tolerances shown in the mark scheme. The second mark was awarded when either their length or their width was scaled up by multiplying by 200 but this was only if the measurements being scaled were within the ranges given in the mark scheme. The third mark is an independent mark and is awarded when the student attempts to convert from cm to metres by dividing by 100; note this mark can be awarded at any stage as long as the conversion is not attempted with figures that result from an area calculation. The fourth mark is also independent and is for an attempt to find the perimeter; again, this can be awarded at any stage for summing four figures that arise from the rectangle. The final mark is for an answer in the given range. There is a special case: 3 marks (rather than the full 5 marks) when the student presents a final answer which is within the given range, but it is clear from working that the student is not using measurements within the given range (of the first mark).

Student Response A

12 The diagram shows a scale drawing of a tennis court.



The scale of the drawing is 1 : 200

Work out the perimeter of the real tennis court.
Give your answer in metres.

1cm = 200cm

11·5 × 200 = 2300

6 × 200 = 1200

2300 + 1200 = 3500

3500 × 2 = 7000

7000 ÷ 100 = 70

70 metres

(Total for Question 12 is 5 marks)

5/5

Examiner Comments

11.5 and 6 are within the ranges given for the measurements. These are then scaled up (×200) and also added to give a perimeter, which is then converted to metres (÷100).The final answer of 70 is within the final range for an accurate answer.

Student Response B

12 The diagram shows a scale drawing of a tennis court.

The scale of the drawing is 1 : 200

Work out the perimeter of the real tennis court.
Give your answer in metres.

1cm : 200 m

×200

5.3 + 5.3 + 11.5 + 11.5 = 34.6 cm

34.6 6920

×200

6920 metres

(Total for Question 12 is 5 marks)

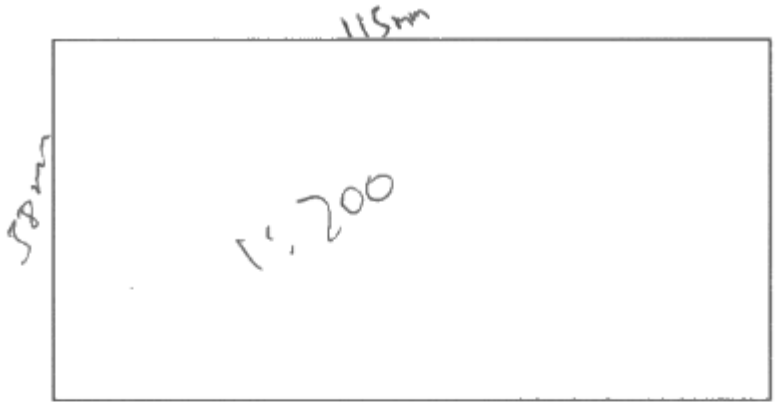
3/3

Examiner Comments

The first mark can be given for 11.5 (even though 5.3 is out of tolerance). These are then used to find the perimeter, which can be awarded the (independent) P mark for finding the perimeter. This is then scaled up (×200) which can be given a further mark for scaling. But there is no attempt to convert to metres and the final answer is incorrect.

Student Response C

12 The diagram shows a scale drawing of a tennis court.



The scale of the drawing is 1 : 200

Work out the perimeter of the real tennis court.
Give your answer in metres.

115 x 2 = 270

58 x 2 = 116

= 346m

3.5 metres

(Total for Question 12 is 5 marks)

2/3

Examiner Comments

The length and width (in mm) are in the acceptable ranges (for the B1 mark) but a correct use of scale or conversion to metres is not evident. The correct process is seen to find the perimeter (for a further mark).

Exemplar Question 5

Foundation tier Paper 3

14 Here are the marks 20 students got in a French test.

76	82	84	69	80	64	70	81	75	91
87	67	80	70	94	76	81	69	71	77

(*a*) Show this information in a stem and leaf diagram.

(3)

One of these students is going to be chosen at random.

The pass mark in the French test is 71.

Omar writes,

The probability that this student failed the French test is $\frac{1}{4}$

Omar is wrong.

(*b*) Explain why.

.....

.....

(2)

(Total for Question 14 is 5 marks)

Examiner Comments

This question is designed to assess the ability of students to construct and interpret statistical diagrams, in this case a stem & leaf diagram. Common errors will include the failure to include a key, and to present a diagram that is unordered. In part (b) students are expected to work with probabilities, and to relate relative expected frequencies to theoretical probability. Part (b) can be answered either by considering fractions or by working with fractions of quantities.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
14(a)	6 | 4799 7 | 0015667 8 | 0011247 9 | 14	B2 (B1 B1	for correct ordered stem and leaf for fully correct unordered or ordered with one error or omission) (indep) for key (units not required but must be correct if stated) e.g. 6 | 4 = 64 (marks)	
(b)	Explanation	C1 C1	for identifying "6" students failed (ft their diagram) OR for 20 ÷ 4 (= 5) for comparing $\frac{1}{4}$ with $\frac{6}{20}$ or $\frac{3}{10}$ (ft their diagram) OR for comparing "6" with 5	Explanation does not need to state that Omar is wrong, but just needs to provide two comparable values (that are not the same) unless ft values show that Omar is not wrong in which case a statement is needed.

Examiner Comments

Part (a) The mark for providing the key is independent, but must be consistent with the diagram. For example, the diagram could have incorrect stems, but if those are used in the key then that mark could still be available. In terms of an error, one number placed on the wrong row is one error, not two. Stem numbers could run from bottom to top (rather than top to bottom as shown).

Part (b) Note the additional guidance; in this question presentation of comparable values is sufficient, without need to give an explanation in words. They do not need to state "$\frac{1}{4}$" since that is provided in the question: a statement that includes $\frac{6}{20}$ (or an equivalent fraction) is considered sufficient. The alternative route to the award of marks is to compare the number of students who failed (6) with one quarter of 20 (which is 5).

Student Response A

14 Here are the marks 20 students got in a French test.

76 82 84 69 80 64 70 84 75 91
87 62 80 70 94 76 81 69 71 77

(a) Show this information in a stem and leaf diagram.

6	4 7 9 9
7	0 0 1 5 6 6 7
8	0 0 1 1 2 4 7
9	1 4

Key: 6|7 = 67 marks

(3)

3/3

One of these students is going to be chosen at random.

The pass mark in the French test is 71

Omar writes,

The probability that this student failed the French test is $\frac{1}{4} \times 5 = \frac{5}{20}$

Omar is wrong.

(b) Explain why.

he's wrong because 6 people have failed so it's $\frac{6}{20} \rightarrow \frac{3}{10}$ so it's $\frac{3}{10}$ that student failed (2)

(Total for Question 14 is 5 marks)

2/2

Examiner Comments

This is a fully correct solution. In part (a) a fully correct and ordered stem & leaf diagram with a key provided and in part (b) a statement of $\frac{6}{20}$ which is sufficient (no need to reference the $\frac{1}{4}$ or try to work with equivalent fractions).

Student Response B

14 Here are the marks 20 students got in a French test.

76 82 84 69 80 64 76 81 75 91
87 67 86 76 94 76 81 69 71 77

(a) Show this information in a stem and leaf diagram.

6	9, 4, 7, 9,
7	6, 0, 5, 0, 8, 1, 7,
8	2, 4, 0, 1, 7, 0, 1,
9	1, 4,

Key = 6 | 9
= 69 marks

6	4, 7, 9, 9
7	0, 0, 1, 6, 6, 7
8	0, 0, 1, 1, 2, 4, 7
9	1, 4

(3)

2/3

One of these students is going to be chosen at random.

The pass mark in the French test is 71

Omar writes,

The probability that this student failed the French test is $\frac{1}{4}$

Omar is wrong.

(b) Explain why.

6 out of 20 students got under 71 which is 30%. so $\frac{1}{4}$ is 25% so it's more.

(2)

(Total for Question 14 is 5 marks)

2/2

Examiner Comments

Part (a) There is a correct key for 1 mark. A correctly ordered stem & leaf diagram is presented but there is one error since 75 has not been included.

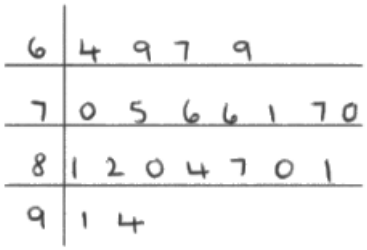
Part (b) 2 marks can be awarded for identifying "6" students failed and for a correct comparison using percentages instead of fractions. Note: 2 marks could also be awarded for "6 out of 20".

Student Response C

14 Here are the marks 20 students got in a French test.

76	82	84	69	80	64	70	81	75	91
87	67	80	70	94	76	81	69	71	77

(a) Show this information in a stem and leaf diagram.



(3)

1/3

One of these students is going to be chosen at random.

The pass mark in the French test is 71

Omar writes,

The probability that this student failed the French test is $\frac{1}{4}$

Omar is wrong.

(b) Explain why.

$\frac{1}{4}$ of 20 = 5 ~~one~~ 14 passed

(2)

(Total for Question 14 is 5 marks)

1/2

Examiner Comments

Part (a) 1 mark is awarded for a fully correct but unordered stem and leaf; there is no key so the 1 mark is the only mark.

Part (b) 1 mark is given for stating that $\frac{1}{4}$ of 20 equals 5. In this case we do need to see the 5 as no calculation has been shown (i.e. $\frac{1}{4} \times 20$), but no further marks. "14 passed" is insufficient for any further credit.

Exemplar Question 6

Foundation tier Paper 3

15 Jenny is asked to find the value of $12 – 2 \times 4$

Here is her working.

$$12 – 2 \times 4 = 10 \times 4 = 40$$

Jenny's answer is wrong.

(*a*) Explain what Jenny has done wrong.

.....

.....

(1)

Rehan is asked to find the range of the numbers 3 1 8 7 5

Here is his working.

$$\text{Range} = 5 – 3 = 2$$

This is wrong.

(*b*) Explain why.

.....

.....

1)

(Total for Question 15 is 2 marks)

Examiner Comments

These questions are written to assess the ability of the student to evaluate methods used.

In part (a) this is within the context of recognising and using relationship between operations and in part (b) work on statistics.

In part (a) students had to identify what Jenny did wrong. It was insufficient merely to state what should have been done, but if the student were to present fully correct working (not just the correct answer), or put brackets in the correct place this would be sufficient. Weaker students may find this difficult if they cannot recognise the error in the order of operations.

In part (b) weaker students may be confused with trying to describe the mean, mode or median. Showing correct working to find the range would be sufficient to gain the mark, as would a description of subtracting the highest from the lowest.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
15(a)	Incorrect order of operation	C1	for identifying an incorrect order of operation, e.g. should be 12 – 8 or "should multiply first"	Showing that 12 – 2 × 4 is 4 (and not 40) is insufficient for this mark; the explanation should focus on what Jenny has done wrong.
(b)	Statement	C1	for stating that the range is the difference between the greatest and least values, oe. or stating that he didn't put numbers in order	Stating the correct calculation for the range (8 – 1) or stating the (correct) range as 7 is sufficient for this mark.

Examiner Comments

In both parts students had to present their answers with clarity. An answer was not awarded a mark if the response included incorrect mathematics, even if this was accompanied by correct mathematics e.g. "range is biggest – smallest 7−1 = 6 (0 marks).

Student Response A

15 Jenny is asked to find the value of $12 - 2 \times 4$

Here is her working.

$$12 - 2 \times 4 = 10 \times 4 = 40$$

Jenny's answer is wrong.

(a) Explain what Jenny has done wrong.

because she was suposed to do the multplication first

(1)

1/1

Rehan is asked to find the range of the numbers 3 1 8 7 5

Here is his working.

$$\text{Range} = 5 - 3 = 2$$

This is wrong.

(b) Explain why.

The ranege is the biggest number take away the smallest The biggest there is 8. it would've been 8 - 1.

(1)

1/1

Examiner Comments

Full marks in both marks.

Part (a) The mark is awarded since the student has identified that the multiplication needs to be done first.

Part (b) The mark can either be awarded for "biggest number take away smallest number" or for 8-1.

Student Response B

15 Jenny is asked to find the value of $12 - 2 \times 4$

BIDMAS

Here is her working.

$12 - 2 \times 4 = 10 \times 4 = 40$

Jenny's answer is wrong.

$12-(2\times4)=4$

(a) Explain what Jenny has done wrong.

Jenny didnt put in her brackets so her answer is wrong she should have put $12-(2\times4)=4$

(1)

1/1

Rehan is asked to find the range of the numbers 3 1 8 7 5

Here is his working.

Range = 5 – 3 = 2

This is wrong.

(b) Explain why.

she is wrong because the range is incorrect.

(1)

(Total for Question 15 is 2 marks)

0/1

Examiner Comments

Part (a) The student has inserted the brackets in the correct place and this is sufficient to award the mark.

Part (b) Merely stating the range is "incorrect" is not sufficient. We need to know what is wrong with the working.

Student Response C

15 Jenny is asked to find the value of $12 - 2 \times 4$

Here is her working.

$$12 - 2 \times 4 = 10 \times 4 = 40$$

Jenny's answer is wrong.

(a) Explain what Jenny has done wrong.

12-2=10, 10x4=40 / Jenny hasnt used BIDMAS

(1)

0/1

Rehan is asked to find the range of the numbers 3 1 8 7 5

Here is his working.

$$\text{Range} = 5 - 3 = 2$$

This is wrong.

(b) Explain why.

The range is all the numbers added together.

(1)

0/1

Examiner Comments

Part (a) The student has restated what Jenny has done. The response has not explained what Jenny has done wrong: merely stating BIDMAS is not enough.

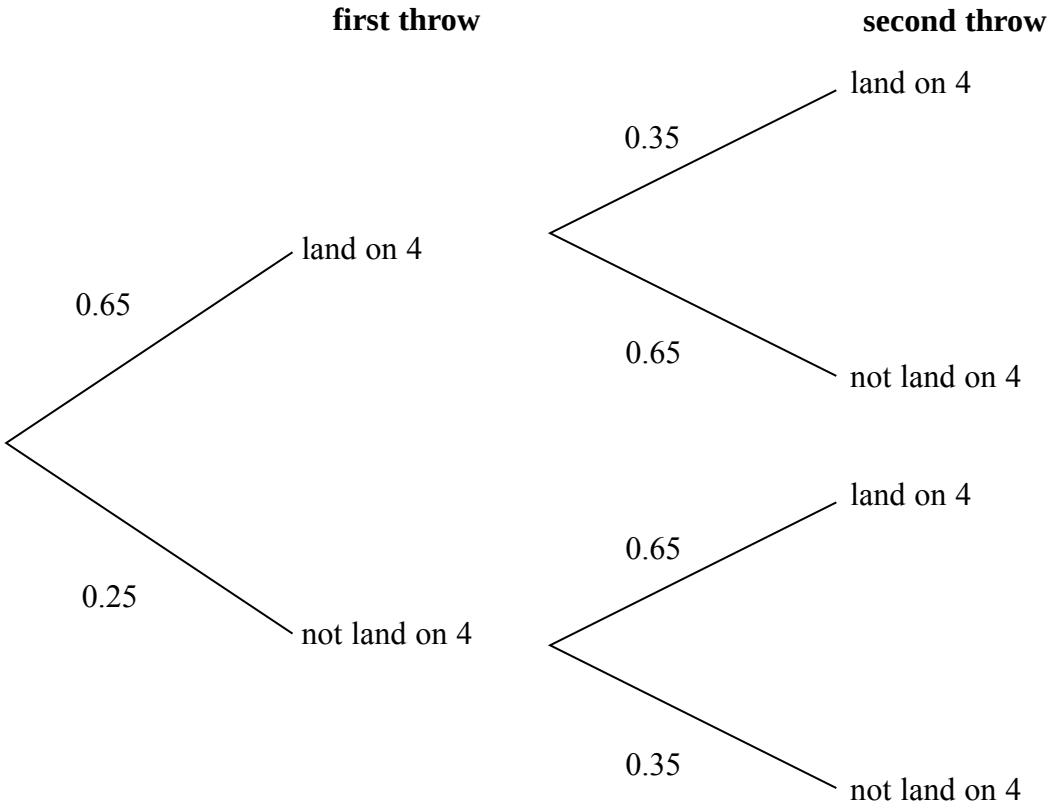
Part (b) The student appears to be confusing range with mean.

Exemplar Question 7

Foundation tier/Higher tier Paper 3

22 When a biased 6-sided dice is thrown once, the probability that it will land on 4 is 0.65
The biased dice is thrown twice.

Amir draws this probability tree diagram.
The diagram is **not** correct.



Write down **two** things that are wrong with the probability tree diagram.

1.....

.....

2 .....

.....

(Total for Question 22 is 2 marks)

Examiner Comments

This question is designed to assess the ability of students to critically evaluate a given way of presenting information within the context of probability. Students need to use their knowledge of probability and tree diagrams to identify the errors presented. They then need to express these errors with clarity, and without contradiction.

Mark Scheme

Question	Answer	Mark	Mark scheme	Additional guidance
22	Probabilities should sum to 1	C1	for stating that the probabilities should total 1 e.g. 0.25 should be 0.35	
	0.35 and 0.65 reversed	C1	for recognising that the 0.35 and 0.65 in the first branches for the 2nd throw should be reversed e.g., "for the second throw, the probability it lands on 4 should be 0.65"	Can be shown on the diagram

Examiner Comments

Sometimes students will present one answer written two different ways (which would be only 1 mark). Alternative ways of identifying the error are acceptable. Examples include:

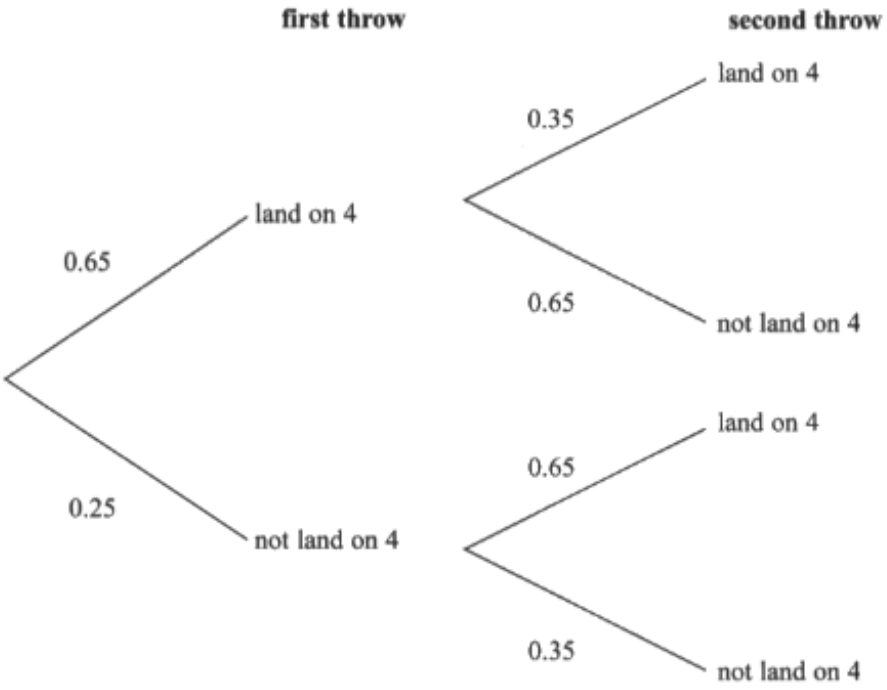
(i) for the first reason "has to equal 1 on the first throw", "0.25 should be 0.35 on the first throw"

(ii) for the second reason "in the second throw the probability of landing on 4 is 0.65 not 0.35", "you need to swap 0.35 and 0.65 for the top part of the second throw".

Student Response A

22 When a biased 6-sided dice is thrown once, the probability that it will land on 4 is 0.65
The biased dice is thrown twice.

Amir draws this probability tree diagram.
The diagram is **not** correct.



Write down **two** things that are wrong with the probability tree diagram.

1 probability is out of 1 ~~.~~ 1−0.65 = 0.35 not 0.25.

2 the second throw should be 0.65 land on a 4 not 0.35 as the same dice is thrown. so the probability stays the same.

(Total for Question 22 is 2 marks)

2/2

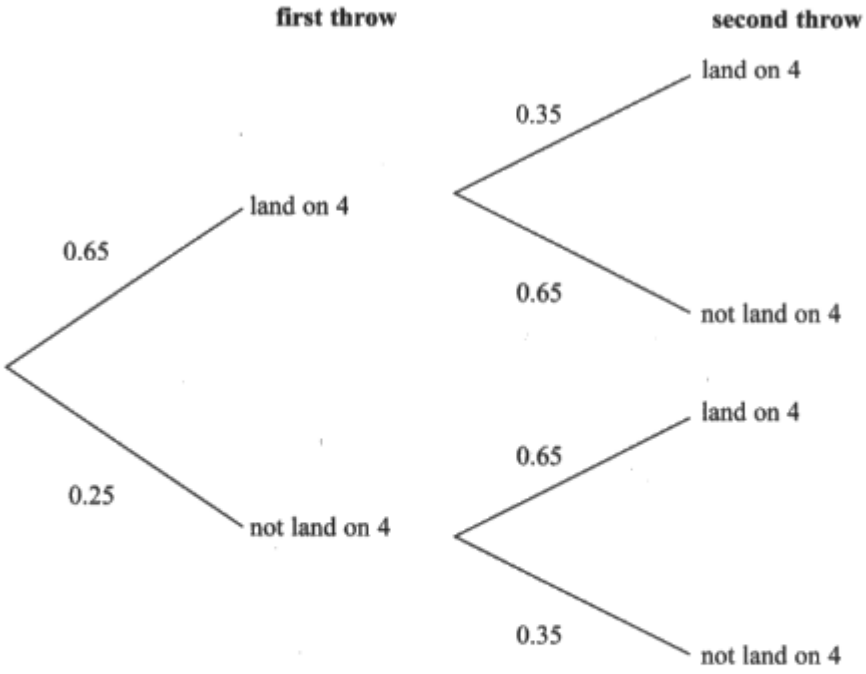
Examiner Comments

Two different responses given: the first showing the probability was out of 1, the second stating that the 0.65 should be 0.35 (on the second throw).

Student Response B

22 When a biased 6-sided dice is thrown once, the probability that it will land on 4 is 0.65
The biased dice is thrown twice.

Amir draws this probability tree diagram.
The diagram is **not** correct.



Write down **two** things that are wrong with the probability tree diagram.

1 0.25 not land on 4

2 second ~~re~~ throw ~~land on~~ first on 0.35 land on four should be 0.65

(Total for Question 22 is 2 marks)

1/2

Examiner Comments

The mark is not awarded for the first response since "0.25 not land on 4" is insufficient to award the mark as it is not clear why this is wrong. Had they added "should be 0.35" they would have gained this mark. There must be some implication that the probabilities should total 1. The mark can be awarded for the second response since "second throw first on 0.35 land on 4 should be 0.65" is enough.

Student Response C

Write down **two** things that are wrong with the probability tree diagram.

1 It can't be half between, it is either going to land on 4 or it isn't going to.

2 0.65 + 0.25 does not add up to 10 so the calculations are also wrong.

(Total for Question 22 is 2 marks)

0/2

Examiner Comments

In the first response no marks are awarded since this is just an incorrect statement with no reference to probability totalling 1. In the second response the statement "0.65+0.25 does not add up to 10" is also an incorrect statement. Had they written "should add up to 1" the mark would have been awarded.