Unit 2 Number and Algebra - Foundation tier (43602F)

Question 3

3 Jay has £1.50 in change.
She only has 20 pence and 10 pence coins.
She has twice as many 20 pence coins as 10 pence coins.

How many 20 pence coins does she have? *(2 marks)*

Mark scheme:

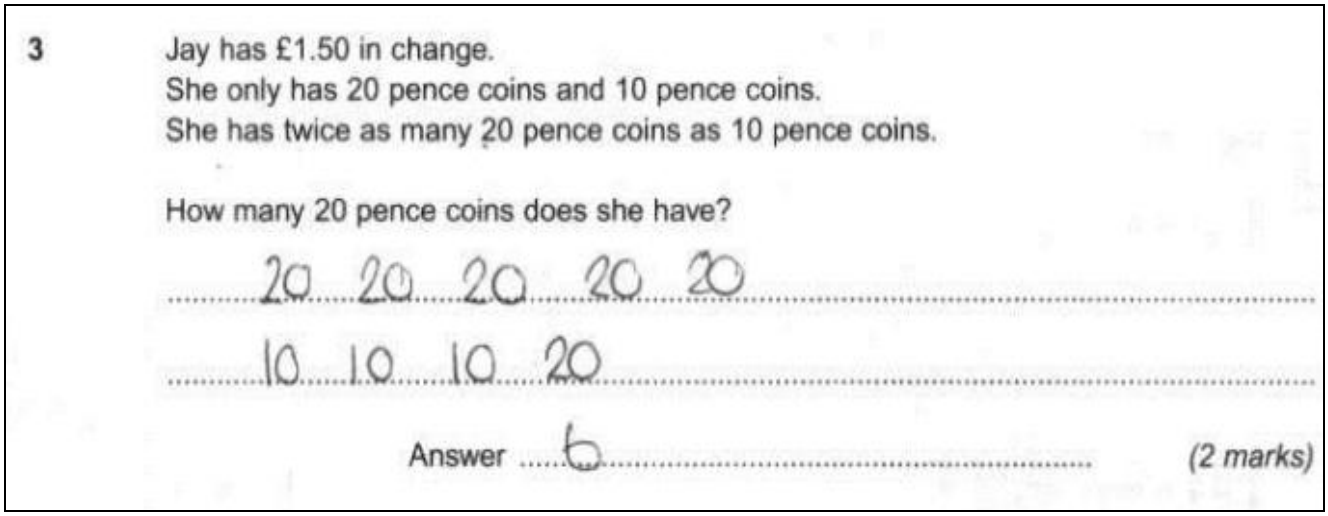
3	6	B2	B1 for twice as many 20s as 10s or coins total £1.50

This question was targeted at grade G and assessed AO3.

The most common strategy was to list coins and then use trials to work out the answer, usually by listing coins and figuring out the correct response by trial.

The mean score was 1.35 out of 2 with 63% of candidates scoring the full 2 marks.

Candidate A



3 Jay has £1.50 in change.
She only has 20 pence coins and 10 pence coins.
She has twice as many 20 pence coins as 10 pence coins.

How many 20 pence coins does she have?

20 20 20 20 20

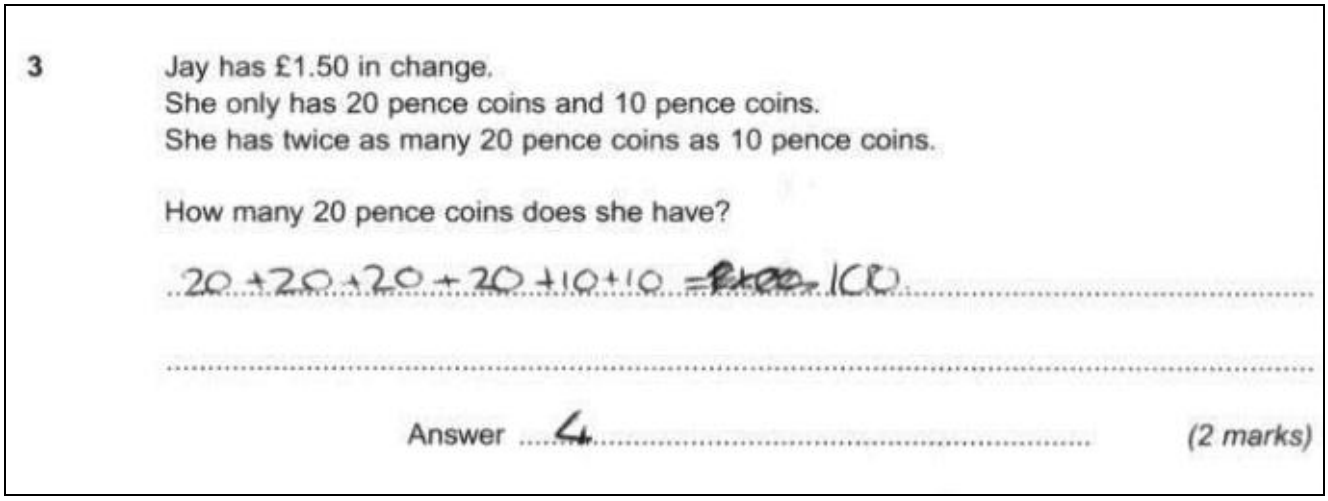
10 10 10 20

Answer 6 (2 marks)

The candidate matched up 10p and 20p coins as far as 90p then realised that three more 20p coins were needed to achieve the correct result.

Mark awarded = 2

Candidate B



3 Jay has £1.50 in change.
She only has 20 pence coins and 10 pence coins.
She has twice as many 20 pence coins as 10 pence coins.

How many 20 pence coins does she have?

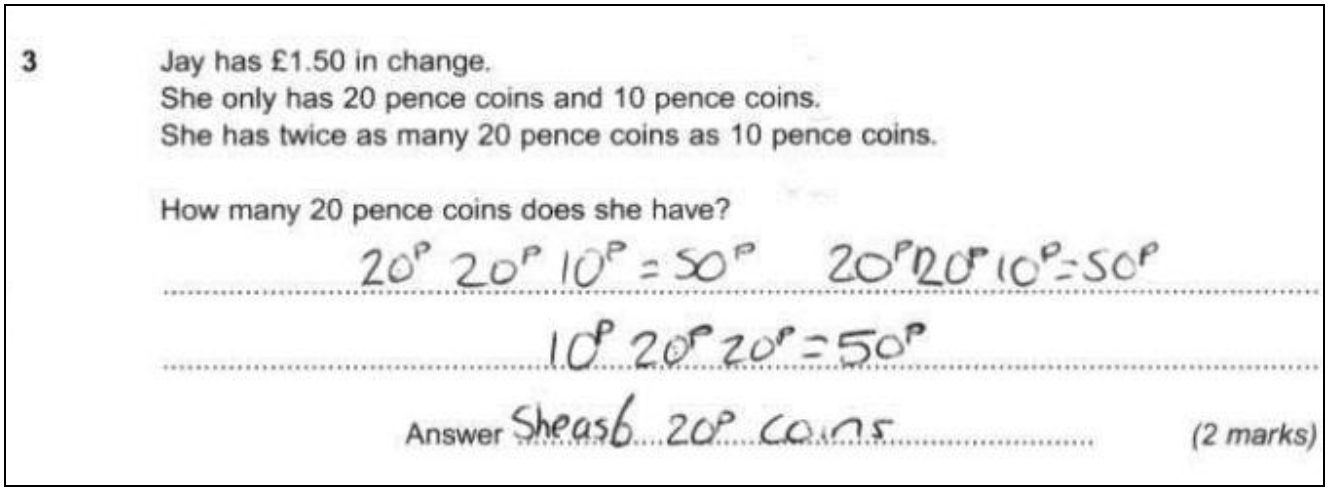
20+20+20+20+10+10 = ~~100~~ 100

Answer 4 (2 marks)

This candidate scored 1 mark for having twice as many 20p coins as 10p coins, even though the total is not £1.50.

Mark awarded = 1

Candidate C


3 Jay has £1.50 in change.
She only has 20 pence coins and 10 pence coins.
She has twice as many 20 pence coins as 10 pence coins.

How many 20 pence coins does she have?

20p 20p 10p = 50p 20p 20p 10p = 50p

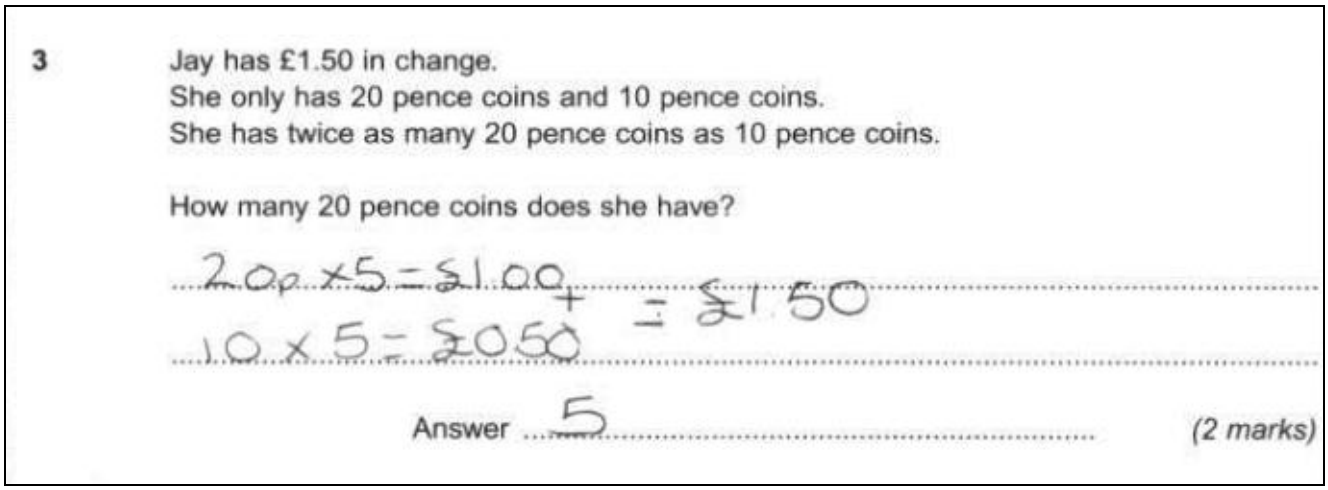
10p 20p 20p = 50p

Answer She has 6 20p coins (2 marks)

This candidate grouped the coins into 2 × 20p and 1 × 10p giving subtotals of 50p. Having formed three groups of 50p to make £1.50 the 20p coins are then counted for the answer.

Mark awarded = 2

Candidate D


3 Jay has £1.50 in change.
She only has 20 pence coins and 10 pence coins.
She has twice as many 20 pence coins as 10 pence coins.

How many 20 pence coins does she have?

20p × 5 = £1.00 + = £1.50

10 × 5 = £0.50

Answer 5 (2 marks)

This candidate scored 1 mark because the total of £1.50 given is correct, although the 'twice as many' requirement has not been met.

Mark awarded = 1

Question 6

***6** Here are the monthly charges for Mark's mobile phone.

Monthly charge £15 100 free minutes then 12p per minute 200 free texts then 10p per text

During one month, Mark makes 150 minutes of calls and sends 285 texts.

Work out the total charge for the month. *(5 marks)*

Mark scheme:

6	150 – 100 or 50 or 285 – 200 or 85	M1	
	their 50 × 12 or 600 or 6	M1	
	their 85 × 10 or 850 or 8.5(0)	M1	
	their 6 + their 8.5(0) + 15	M1	oe allow mixed units
	29.50	Q1	strand (i) correct notation do not accept 29.5 SC4 for 14.50 SC3 for 14.5

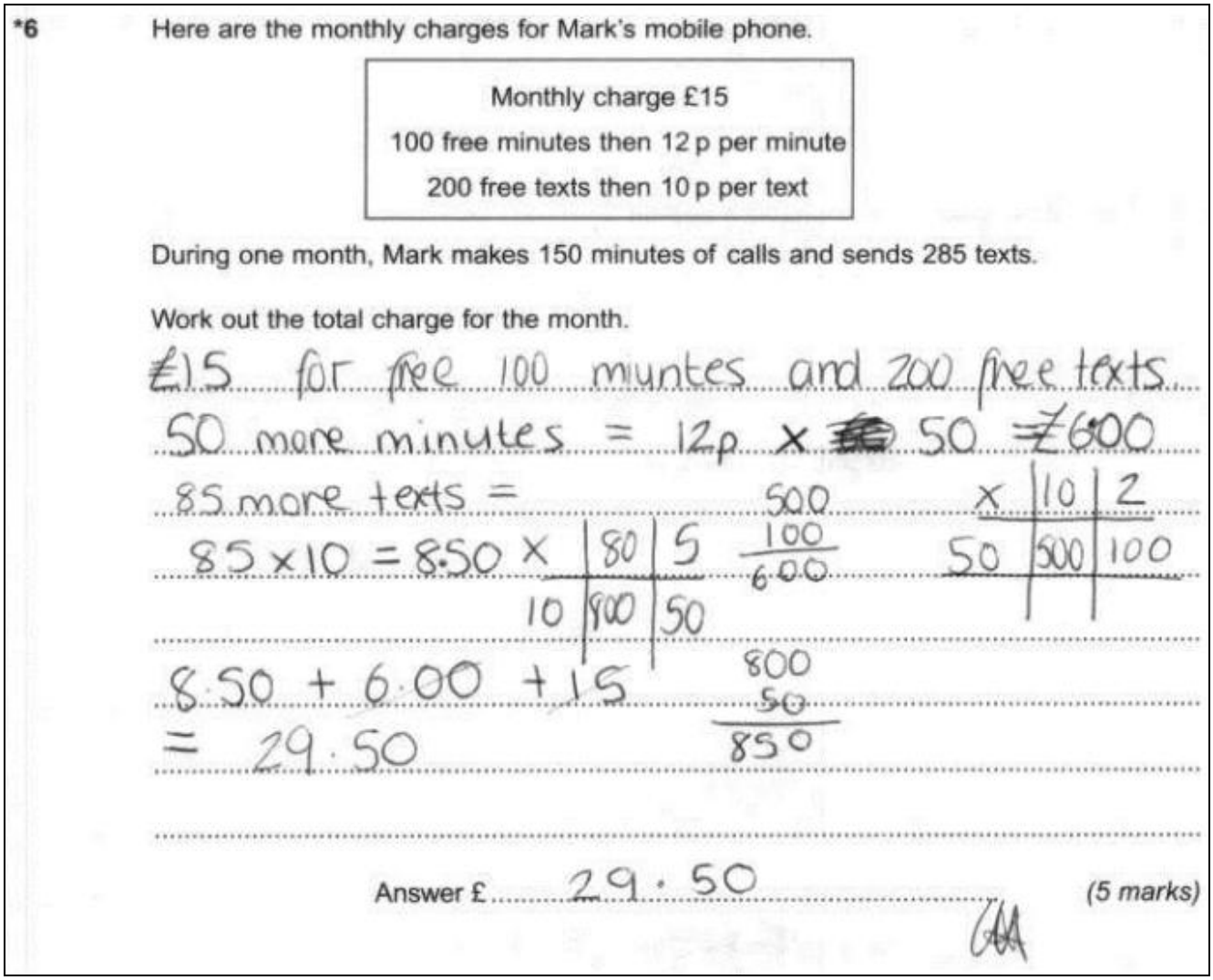
This question targeted grade F and assessed AO2 and functionality.

There were many good answers. Over 70% of candidates scored at least 3 of the possible 5 marks.

The mean mark was 3.36.

The most common error was to omit the £15 monthly charge.

Candidate E



*6 Here are the monthly charges for Mark's mobile phone.

Monthly charge £15
100 free minutes then 12 p per minute
200 free texts then 10 p per text

During one month, Mark makes 150 minutes of calls and sends 285 texts.

Work out the total charge for the month.

£15 for free 100 miuntes and 200 free texts.
50 more minutes = 12p x 50 = £600
85 more texts =
85 x 10 = 8.50 x | 80 | 5 | 10 | 800 | 50
8.50 + 6.00 + 15
= 29.50

500 + 100 = 600
800 + 50 = 850

x | 10 | 2 | 50 | 500 | 100

Answer £ 29.50 (5 marks)

A fully correct and well explained solution.

Mark awarded = 5

Candidate F

*6 Here are the monthly charges for Mark's mobile phone.

Monthly charge £15
100 free minutes then 12 p per minute
200 free texts then 10 p per text

During one month, Mark makes 150 minutes of calls and sends 285 texts.

Work out the total charge for the month.

150 − 100 = 50 50 × 12 = 600 (£6.00)

12, 24, 36, 48, 60...

285 − 200 = 85 85 × 10 = 850 (£8.50)

£6.00 + £8.50 = £14.50

Answer £ 14.50 (5 marks)

This candidate has omitted the £15 charge.

Mark awarded = 4

Candidate G

*6 Here are the monthly charges for Mark's mobile phone.

Monthly charge £15
100 free minutes then 12 p per minute
200 free texts then 10 p per text

During one month, Mark makes 150 minutes of calls and sends 285 texts.

Work out the total charge for the month.

Limit is 100 mins 12 x 150 = 600

£6 5 x 85 = £4.85

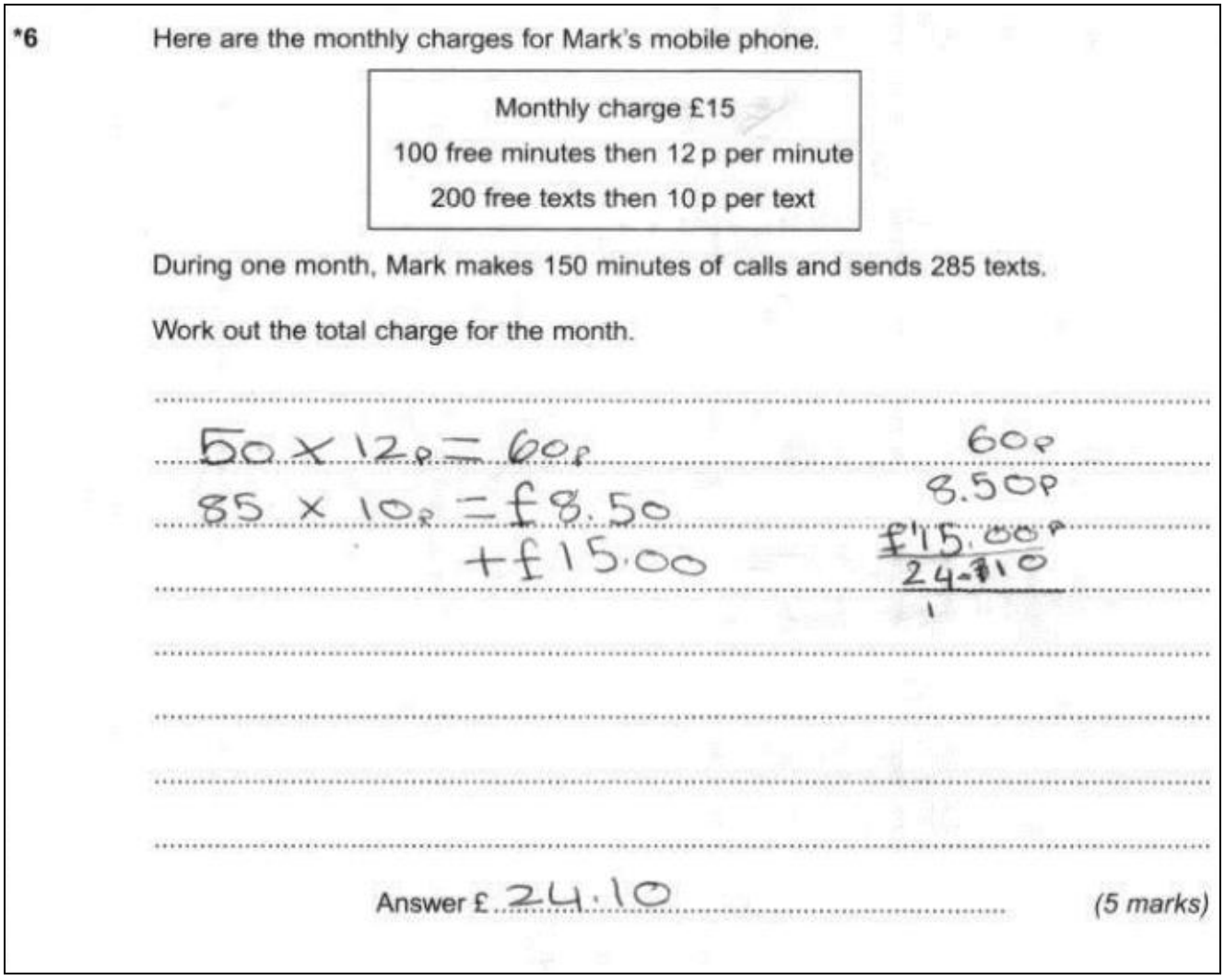
£4.85 + £6 = £10.85

Answer £ 10.85 (5 marks)

This candidate calculates 50 × 12p = £6.00, but then multiplies 85 by 5 instead of 10. The candidate also omits the £15.

Mark awarded = 2

Candidate H



*6 Here are the monthly charges for Mark's mobile phone.

Monthly charge £15
100 free minutes then 12 p per minute
200 free texts then 10 p per text

During one month, Mark makes 150 minutes of calls and sends 285 texts.

Work out the total charge for the month.

50 x 12p = 60p

85 x 10p = £8.50

+£15.00

60p

8.50p

£15.00p

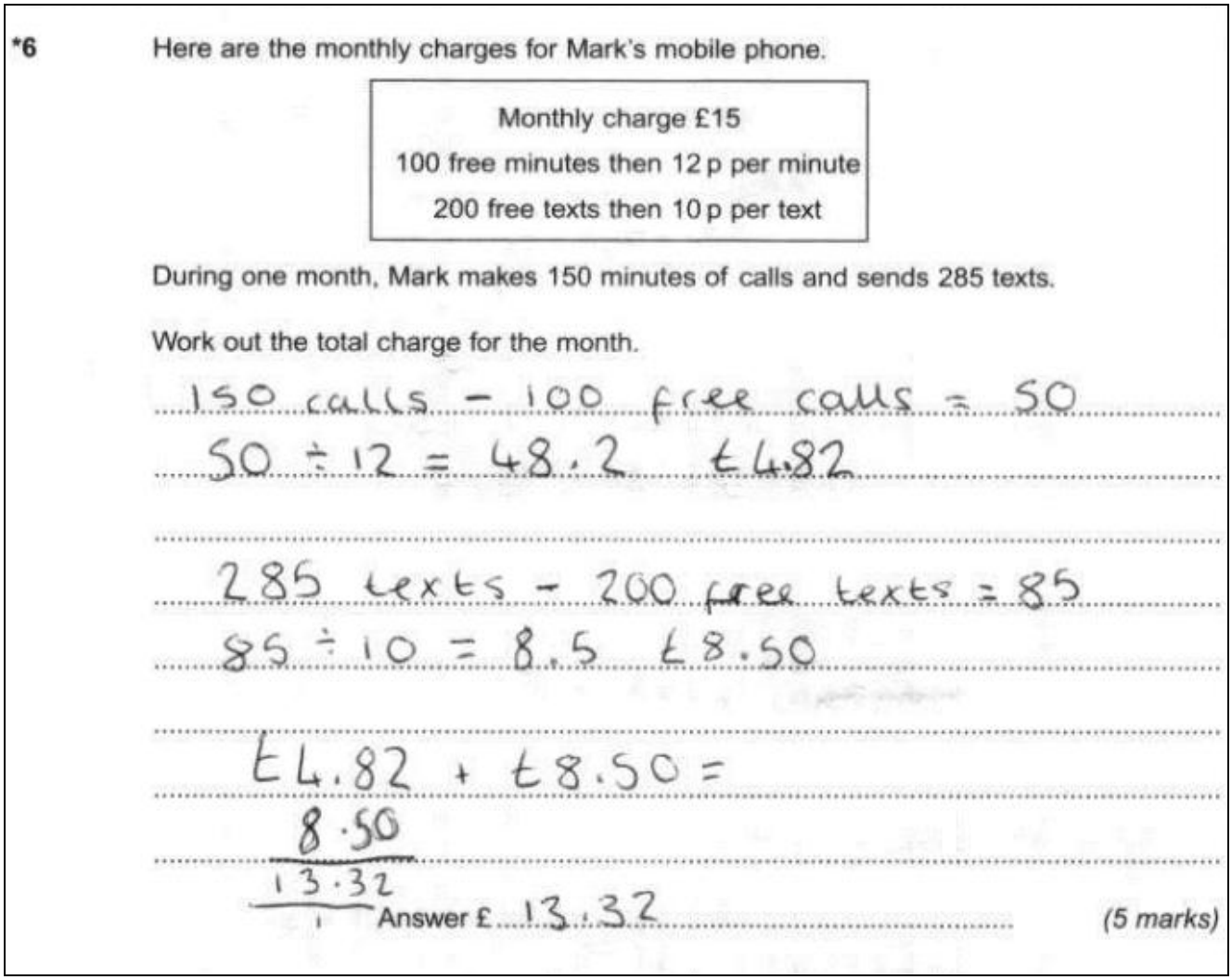
24-10

Answer £ 24.10 (5 marks)

This candidate makes an arithmetic error, giving 50 × 12p = 60p. This is the only error.

Mark awarded = 4

Candidate I



*6 Here are the monthly charges for Mark's mobile phone.

Monthly charge £15
100 free minutes then 12 p per minute
200 free texts then 10 p per text

During one month, Mark makes 150 minutes of calls and sends 285 texts.

Work out the total charge for the month.

150 calls - 100 free calls = 50

50 ÷ 12 = 48.2 £4.82

285 texts - 200 free texts = 85

85 ÷ 10 = 8.5 £8.50

£4.82 + £8.50 =

8.50

13.32

Answer £ 13.32 (5 marks)

This candidate used an incorrect method, giving 50 ÷ 12 and 85 ÷ 10. £8.50 has been obtained using the same incorrect method.

Mark awarded = 1 (for using 50 and 85 for the 'extra' minutes and texts).

Question 7

7 Kay has 325 beads.
Sharon has 165 beads.
Kay gives Sharon some beads.
They now have the same number of beads.

How many beads does Kay give Sharon? *(3 marks)*

Mark scheme:

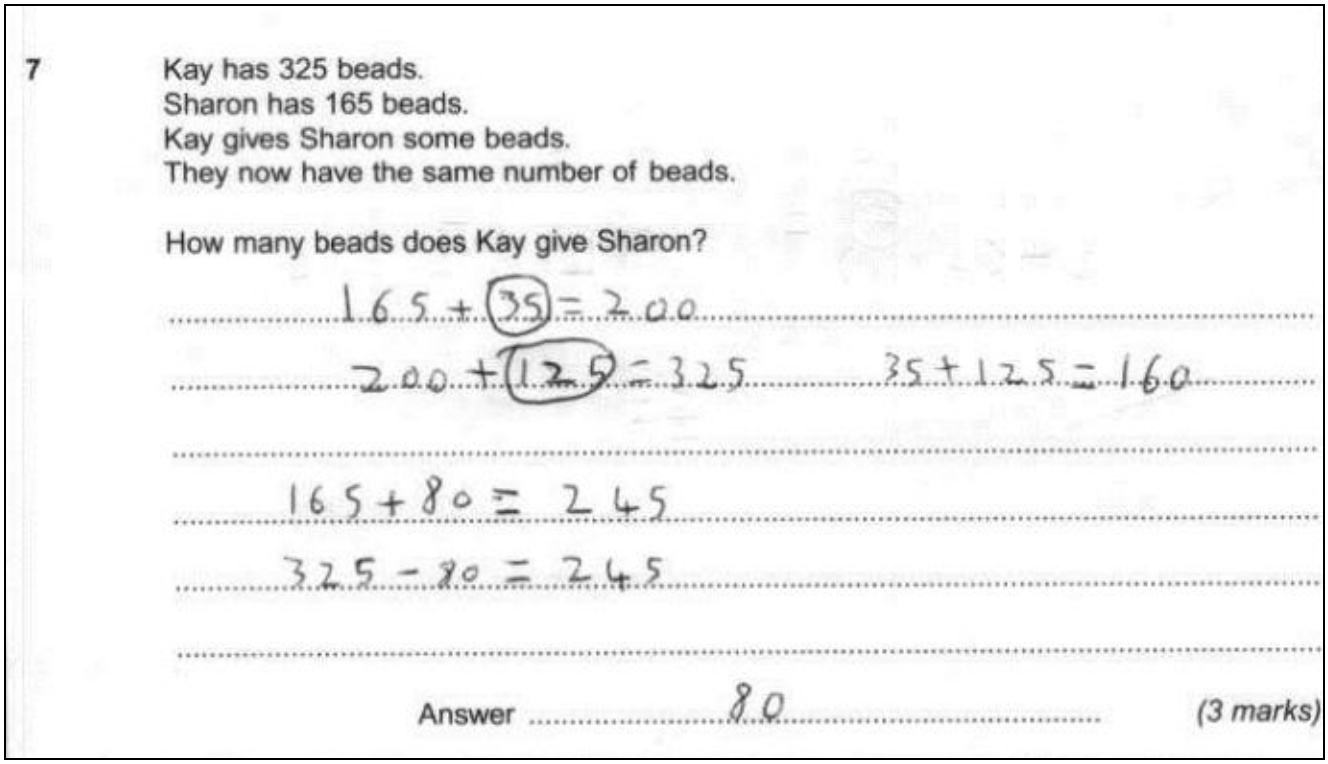
7	325 + 165 (=490)	M1	or 325 – 165 (= 160)
	their 490 ÷ 2 (=245)	M1dep	or their 160 ÷ 2
	80	A1	
	alternative method		
	Correct trial to make difference smaller eg. 300 and 190	M1	
	Improved correct trial eg. 225 and 265	M1	
	80	A1	

This question was targeted at grade F and assessed AO3.

Many candidates set out a correct method, but poor arithmetic frequently resulted in incorrect answers.

The mean mark was 1.77 out of 3 with over 50% of the candidates scoring 2 or the full 3 marks.

Candidate J



7 Kay has 325 beads.
Sharon has 165 beads.
Kay gives Sharon some beads.
They now have the same number of beads.

How many beads does Kay give Sharon?

165 + 35 = 200

200 + 125 = 325 35 + 125 = 160

165 + 80 = 245

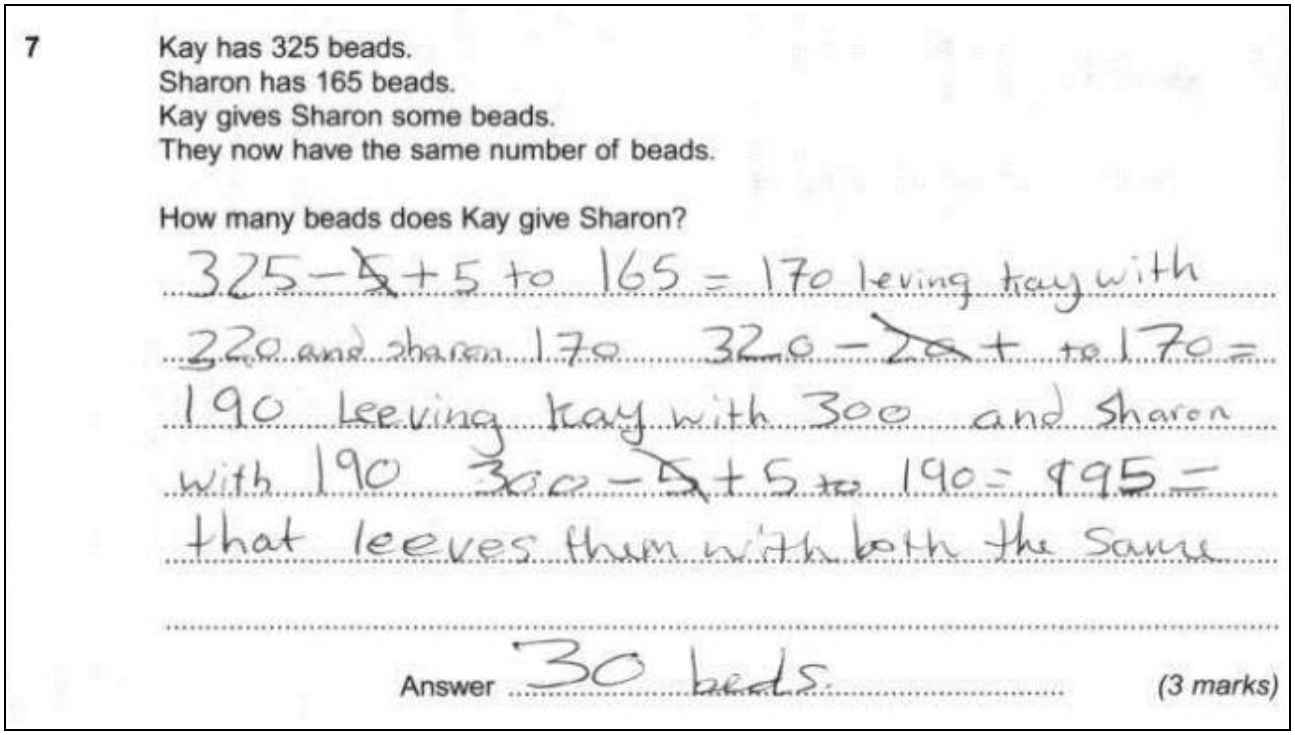
325 - 80 = 245

Answer 80 (3 marks)

This candidate works out the difference of 160 and correctly adds/subtracts 80 from each.

Mark awarded = 3

Candidate K



7 Kay has 325 beads.
Sharon has 165 beads.
Kay gives Sharon some beads.
They now have the same number of beads.

How many beads does Kay give Sharon?

325 − 5 + 5 to 165 = 170 leving kay with 320 and sharon 170 320 − 20 + to 170 = 190 leeving kay with 300 and sharon with 190 300 − 5 + 5 to 190 = 195 = that leeves them with both the same

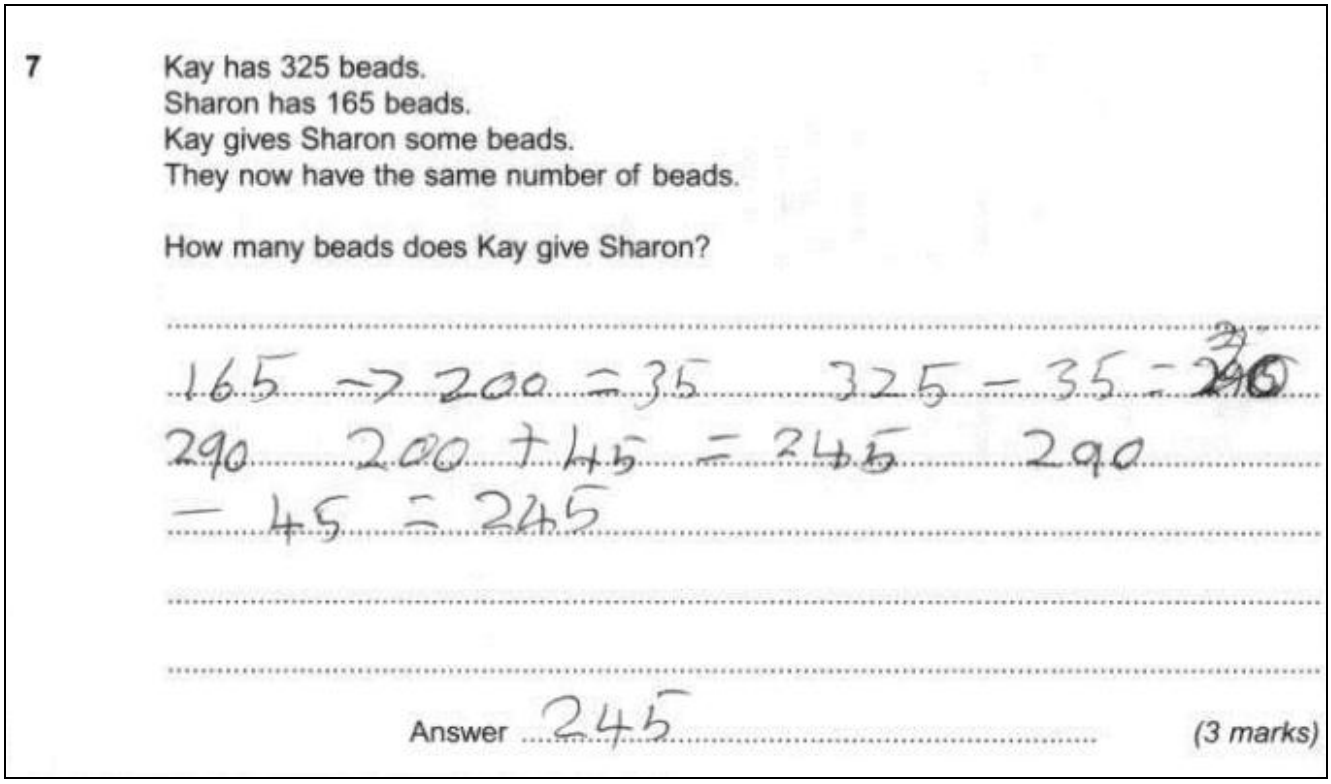
Answer 30 beds (3 marks)

This candidate uses a strategy of adding and subtracting equal amounts, starting with 5 and then 20. However, at the third step an arithmetic error is made, 300 – 5 = 195, which leads to an incorrect answer.

Marks are awarded for correct trial followed by an improved correct trial.

Mark awarded = 2

Candidate L



7 Kay has 325 beads.
Sharon has 165 beads.
Kay gives Sharon some beads.
They now have the same number of beads.

How many beads does Kay give Sharon?

165 → 200 = 35 325 − 35 = 290

290 200 + 45 = 245 290

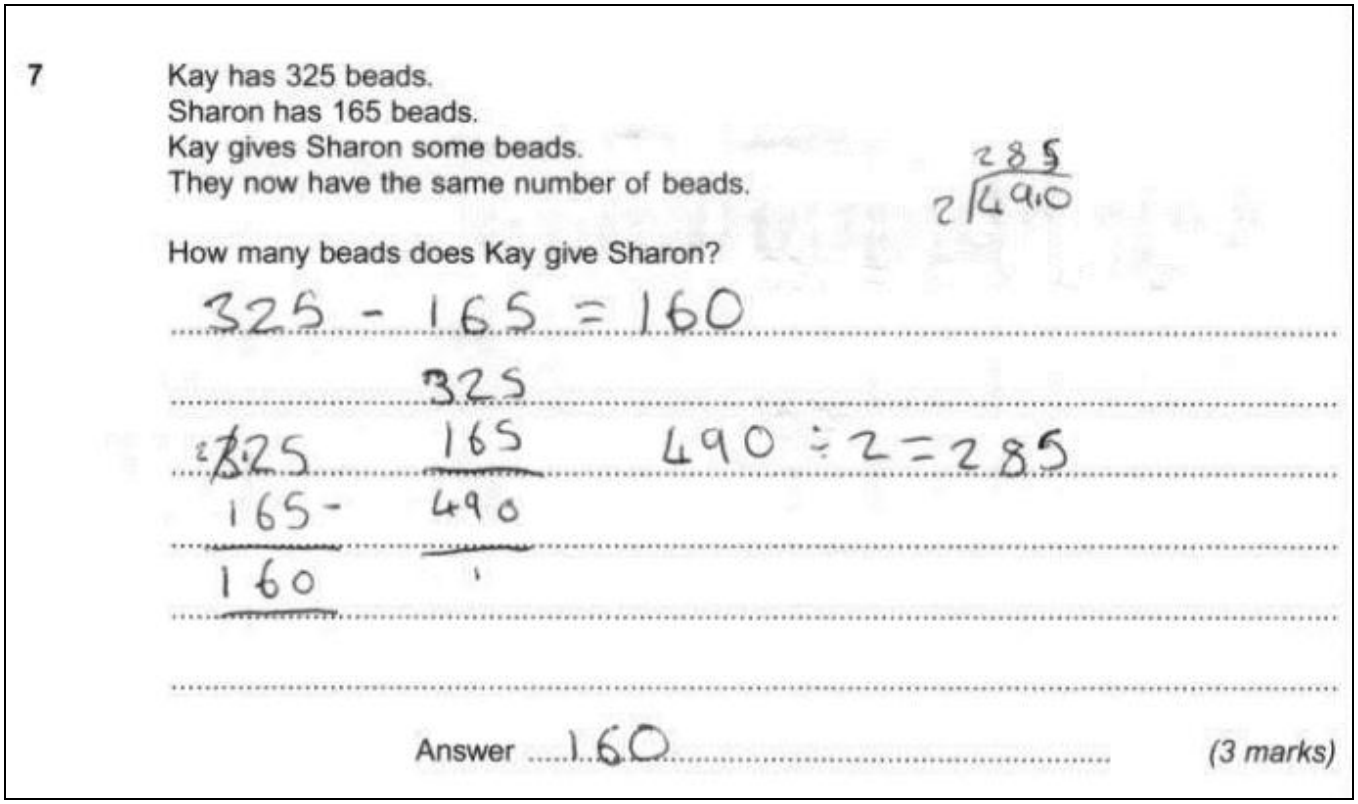
− 45 = 245

Answer 245 (3 marks)

This candidate uses the same strategy as in the previous example and is successful in reaching a final total of 245 for each person. However, the final step of stating the number of beads given to Sharon is omitted.

Mark awarded = 2

Candidate M



7 Kay has 325 beads.
Sharon has 165 beads.
Kay gives Sharon some beads.
They now have the same number of beads.

How many beads does Kay give Sharon?

325 - 165 = 160

325
165
490

325
165-
160

490 ÷ 2 = 285

285
2|490

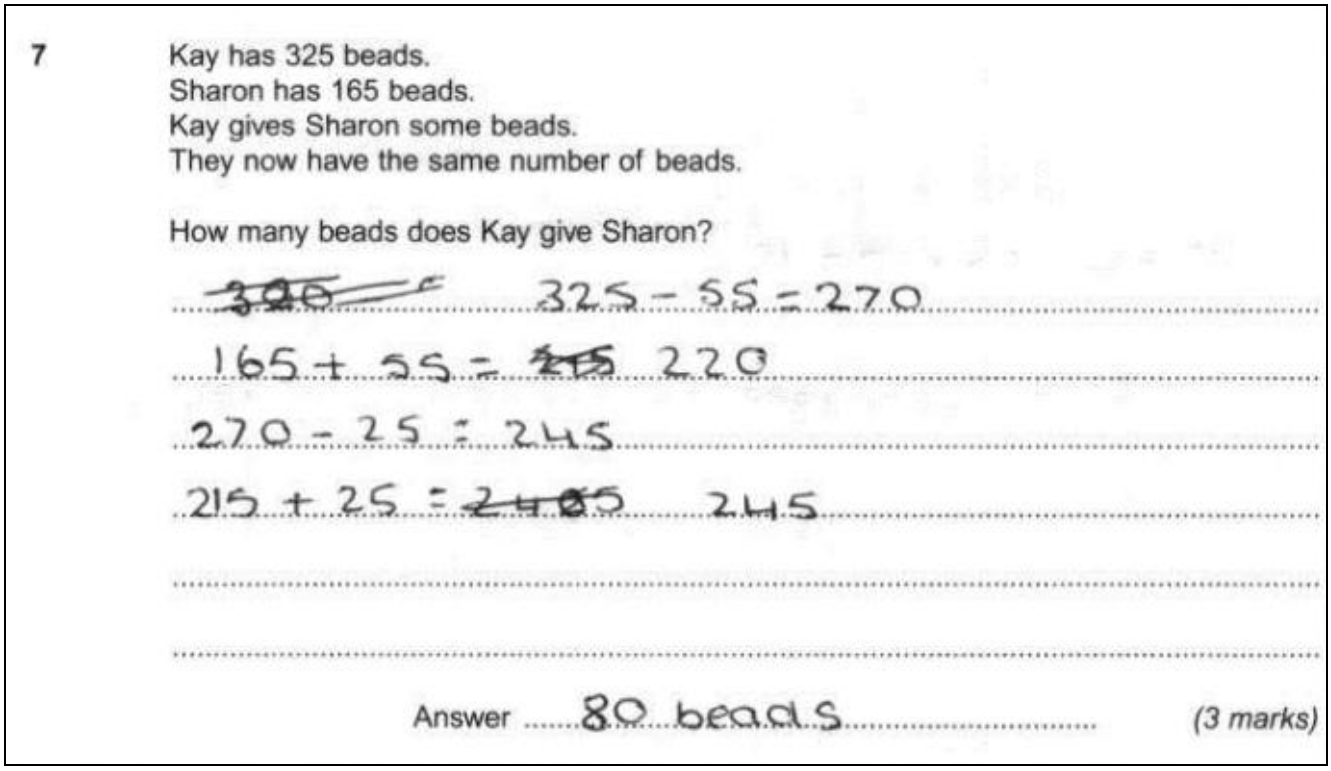
Answer 160 (3 marks)

This candidate uses two methods, but marks are awarded for correct steps in either method.

Initially the candidate subtracts 165 from 325 to correctly obtain 160. The candidate then restarts by adding 165 to 325 to obtain the total number of beads, 490. This is followed by an attempt to divide by 2. The arithmetic in the calculation is incorrect. Finally, the candidate gives 160 as the answer.

Mark awarded = 2

Candidate N



7 Kay has 325 beads.
Sharon has 165 beads.
Kay gives Sharon some beads.
They now have the same number of beads.

How many beads does Kay give Sharon?

~~300~~ 325 - 55 = 270

165 + 55 = ~~215~~ 220

270 - 25 = 245

215 + 25 = ~~240~~ 245

Answer 80 beads (3 marks)

This candidate used the strategy of adding and subtracting equal values to balance the number of beads. The candidate then deduced the correct answer.

Mark awarded = 3

Question 8

8 (b) The numbers in this different sequence decrease by the same amount each time.

26 …… …… …… 6

What are the **three** missing numbers? *(2 marks)*

Mark scheme:

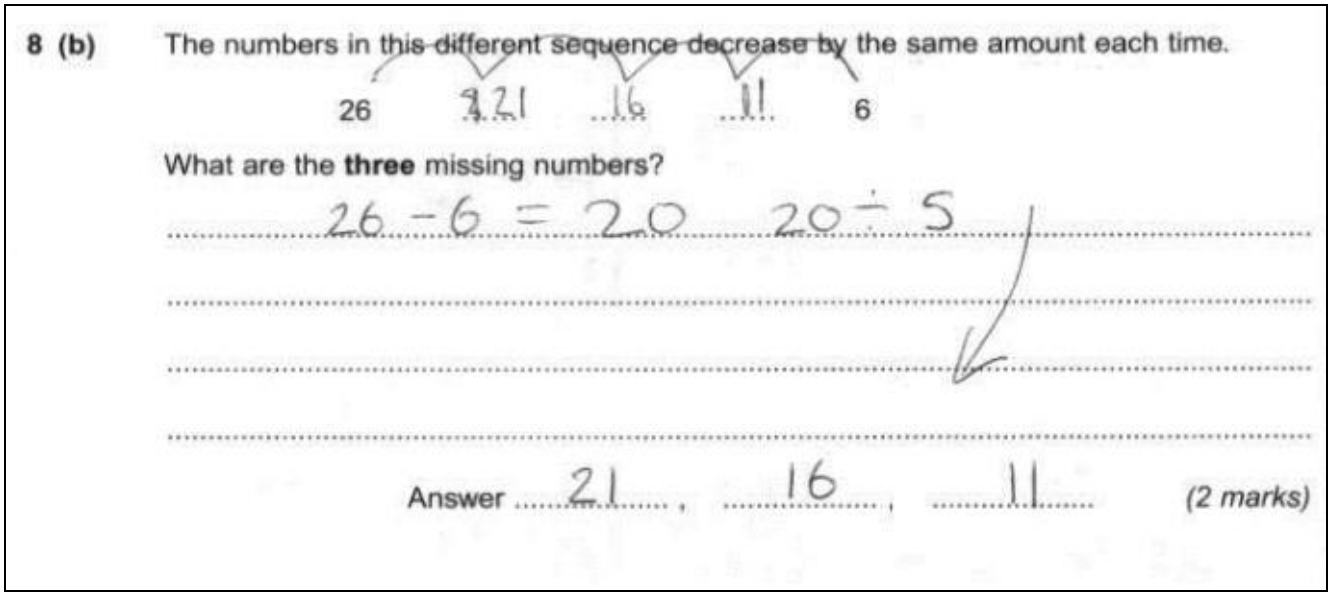
8(b)	(26 – 6) ÷ 4 or 5 seen	M1	or their difference ÷ 4
	21, 16, 11	A1	Any order

This question was targeted at grade F and assessed AO3.

Many correct answers were given (over 66% of candidates) and a mean mark of 1.35 out of 2 was achieved.

The most common strategy was to use trial and improvement.

Candidate O



8 (b) The numbers in this different sequence decrease by the same amount each time.

26 21 16 11 6

What are the **three** missing numbers?

26 - 6 = 20 20 ÷ 5

Answer 21, 16, 11 *(2 marks)*

This candidate correctly works out the difference between the given terms as 20. 20 ÷ 5 could be an attempt to verify that gaps of 5 give 4 steps, as marked on the sequence. The correct answer is then given leading to full marks.

Mark awarded = 2

Candidate P

8 (b) The numbers in this different sequence decrease by the same amount each time.

26 21. 16. 11. 6

What are the **three** missing numbers?

26 - 8 = 18 26 - 4 = 22 26 - 5 = 21

18 - 8 = 10 22 - 4 = 18 21 - 5 = 16

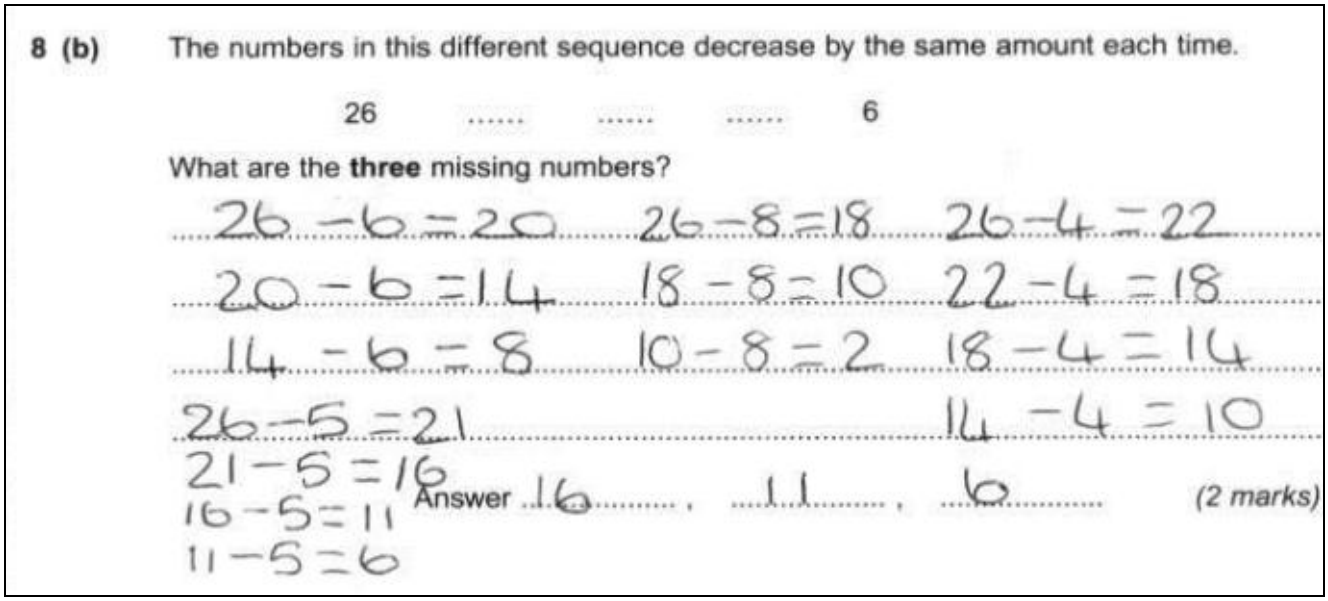
10 - 8 = 2 18 - 4 = 14 21 - 5 = 11

Answer 21 , 16 , 11 *(2 marks)*

This was a typical solution using trial and improvement. The candidate tried a gap of 8 then 4 then 5 - the correct amount.

Mark awarded = 2

Candidate Q



8 (b) The numbers in this different sequence decrease by the same amount each time.

26 6

What are the **three** missing numbers?

26 − 6 = 20 26 − 8 = 18 26 − 4 = 22

20 − 6 = 14 18 − 8 = 10 22 − 4 = 18

14 − 6 = 8 10 − 8 = 2 18 − 4 = 14

26 − 5 = 21 14 − 4 = 10

21 − 5 = 16

16 − 5 = 11

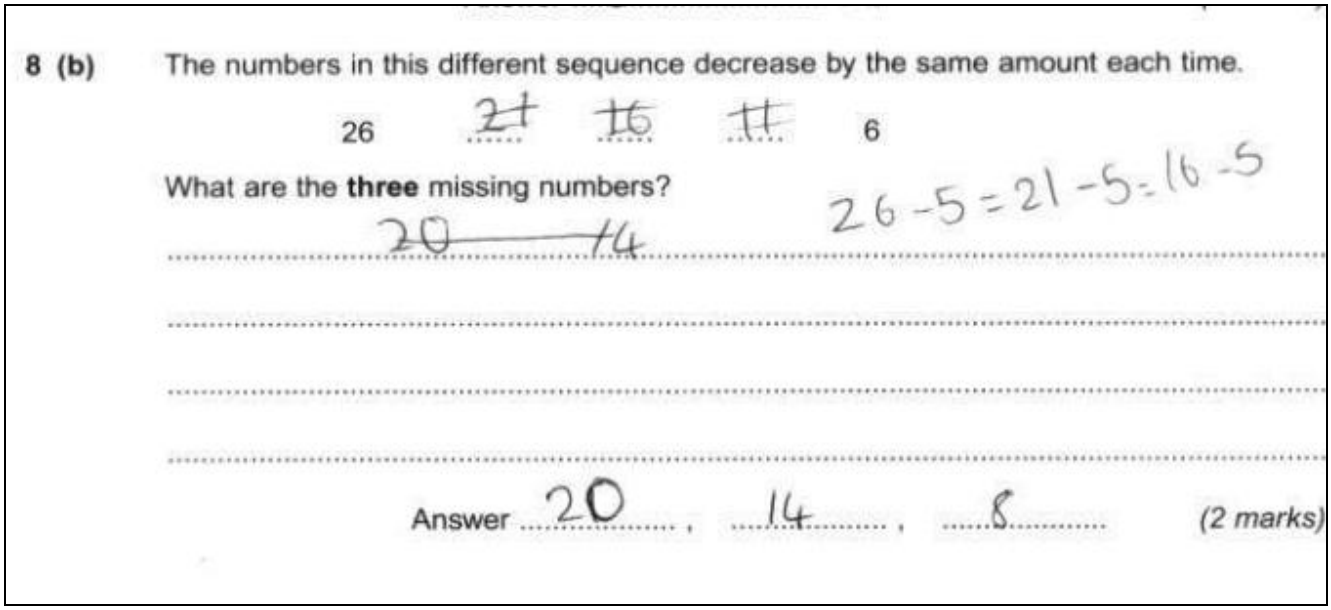
11 − 5 = 6

Answer 16 , 11 , 6 (2 marks)

This shows another trial and improvement solution. The candidate tried 6 then 8 then 4 then identifies 5 as the correct difference. However, the solution is then given as 16 11 6, omitting the second term.

Mark awarded = 1

Candidate R



8 (b) The numbers in this different sequence decrease by the same amount each time.

26 21 16 11 6

What are the **three** missing numbers?

20 14 8

26 - 5 = 21 - 5 = 16 - 5

Answer 20 , 14 , 8 (2 marks)

This candidate shows a correct strategy and the correct answer. However, this is then replaced with an incorrect answer without any working for that shown. Consequently, this is not awarded any marks.

Mark awarded = 0

Question 11

11 I am thinking of a number.
Two-thirds of the number is 60.

What is 1½ times the number? *(3 marks)*

Mark scheme:

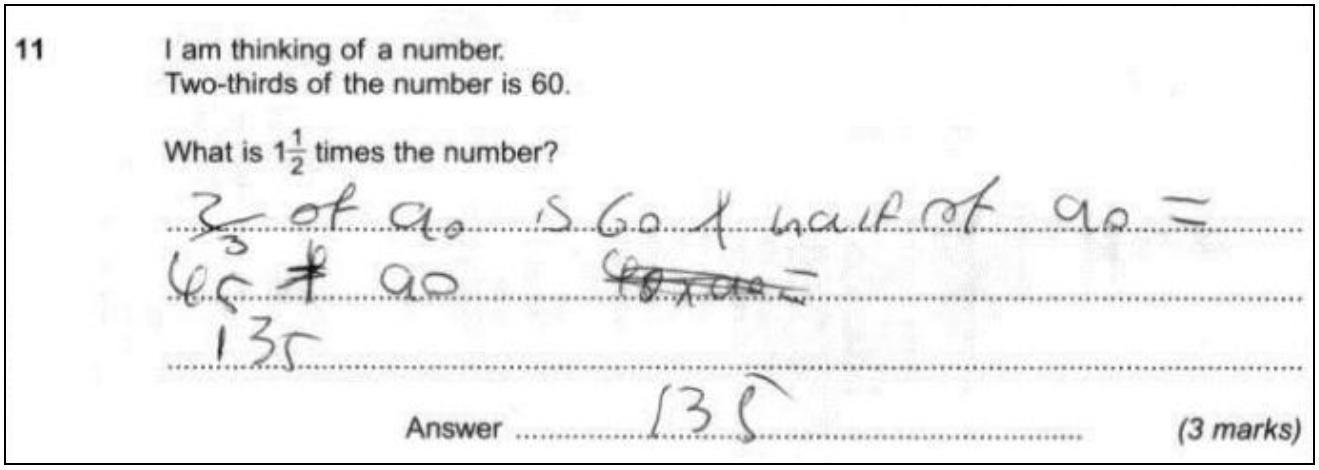
11	60 × 3 ÷ 2 or 90 seen	M1	oe
	their 90 × 3 ÷ 2	M1dep	oe
	135	A1	

This question was targeted at grade E and assessed AO3, which proved challenging for many candidates.

Common errors included working out two-thirds of 60 or multiplying 60 by $1^{1}/_{2}$, but then stopping at 90.

The mean mark was only 0.7 out of 3. Although 20% of candidates scored at least 2 marks, over half of the candidates failed to score.

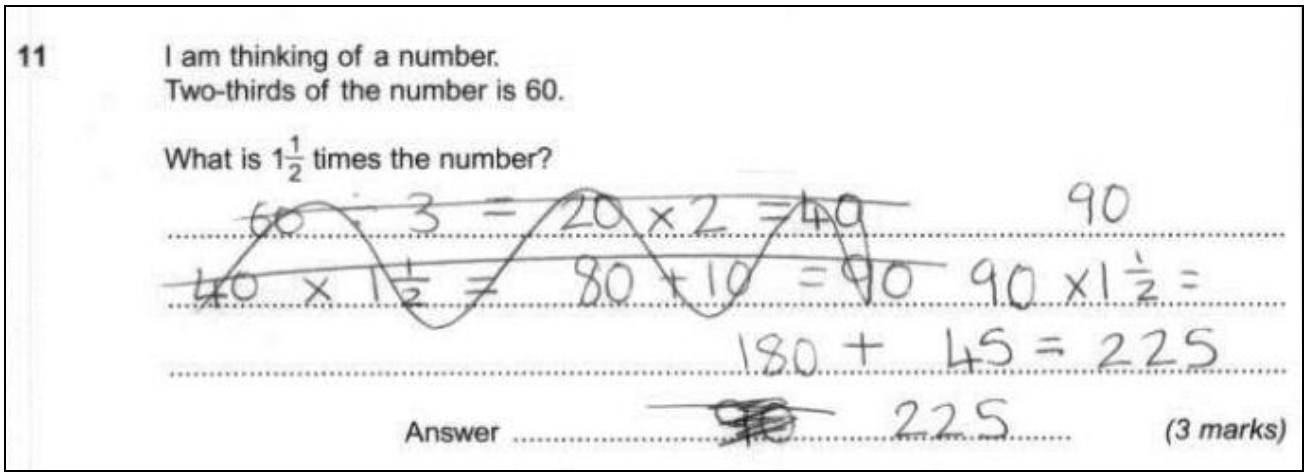
Candidate S



This candidate gave a correct solution.

Mark awarded = 3

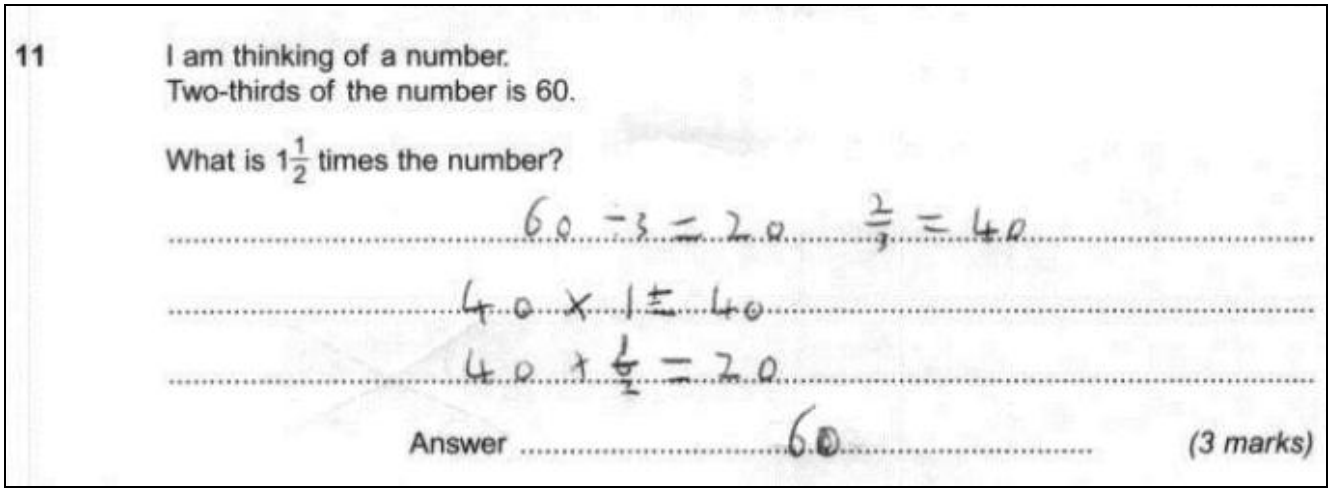
Candidate T



This candidate states 90, but then writes the correct method, however the arithmetic of 90 × 1½ is incorrect.

Mark awarded = 2

Candidate U

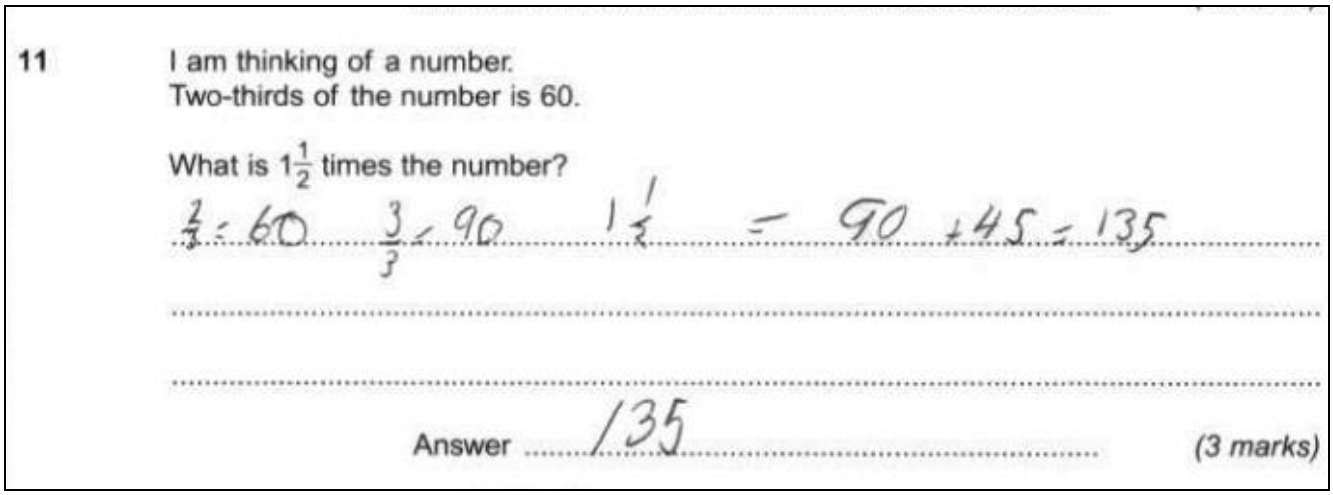


This candidate appears to misread the question, using 60 as the original number.

$^{2}/_{3}$ of 60 is calculated then multiplied by $1^{1}/_{2}$ again to get back to 60.

Mark awarded = 0

Candidate V



This candidate gives a fully correct solution. The working is very clear, showing $^{2}/_{3}$ = 60, so $^{3}/_{3}$ = 90 and 1 ½ × 90.

Mark awarded = 3

Question 14

14 Two teachers and 18 students go the theatre.
The cost of a student's ticket is half of the cost of a teacher's ticket.
The total cost of the tickets is £132.

Work out the cost of one student's ticket. *(3 marks)*

Mark scheme:

14	$2x + 2x + 18x$ or $x + x + 9x$ (= 132)	M1	oe or for 1st trial eg $2 \times 8 + 18 \times 4 = 88$
	$22x = 132$ or $11x = 132$	M1	oe or for 2nd improved trial eg $2 \times 10 + 18 \times 5 = 110$
	6	A1	
	alternative method		
	2 + 9 or 4 + 18	M1	
	132 ÷ their 11 or 132 ÷ their 22	M1 dep	
	6	A1	

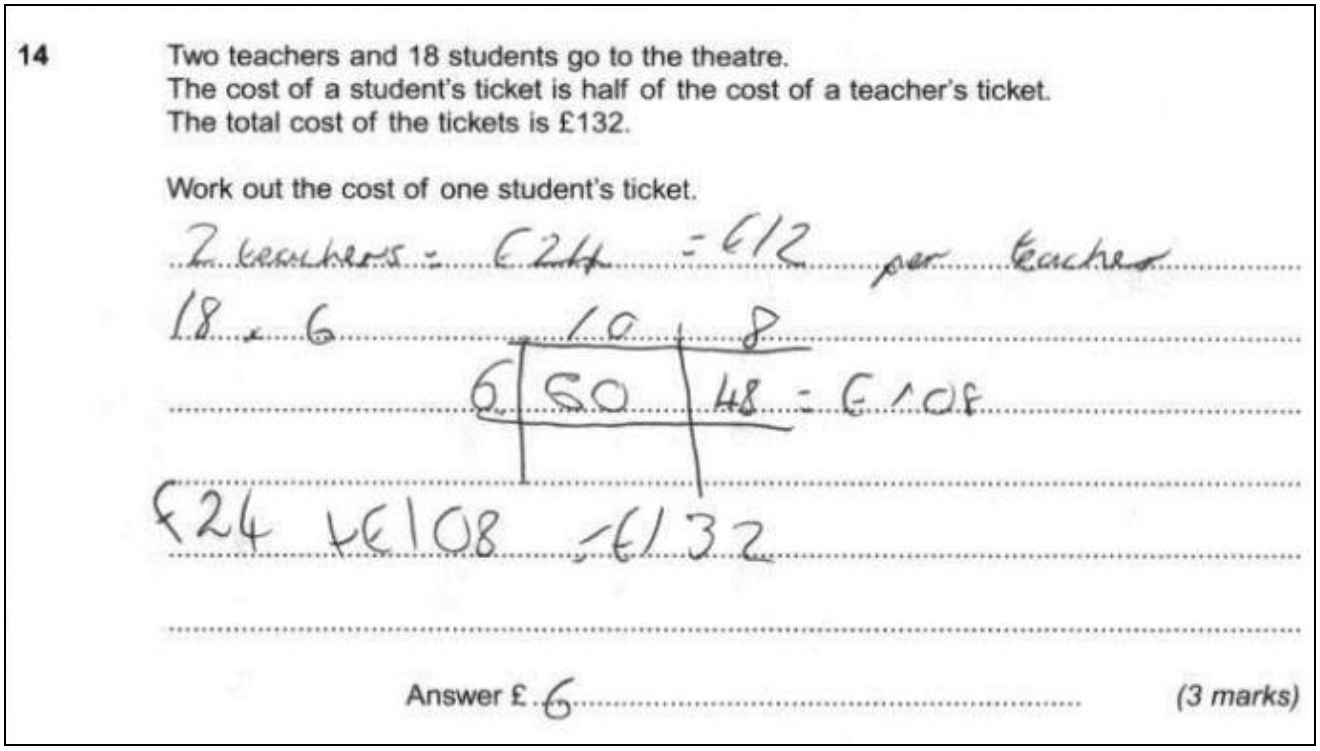
This question was targeted at grade D and assessed AO3. This proved to be a challenging question for many candidates.

The most common approach was to use trail and improvement. Using this method, candidates often used the same ticket price for both students and teachers, so division of 132 by 20 was seen.

Few candidates used an algebraic approach, which is probably the most efficient method.

The mean mark was only 0.54 out of 3 with only 17% of candidates scoring full marks.

Candidate W



14 Two teachers and 18 students go to the theatre.
The cost of a student's ticket is half of the cost of a teacher's ticket.
The total cost of the tickets is £132.

Work out the cost of one student's ticket.

2 teachers = £24 = £12 per teacher

18 × 6 10 8

6 60 48 = £108

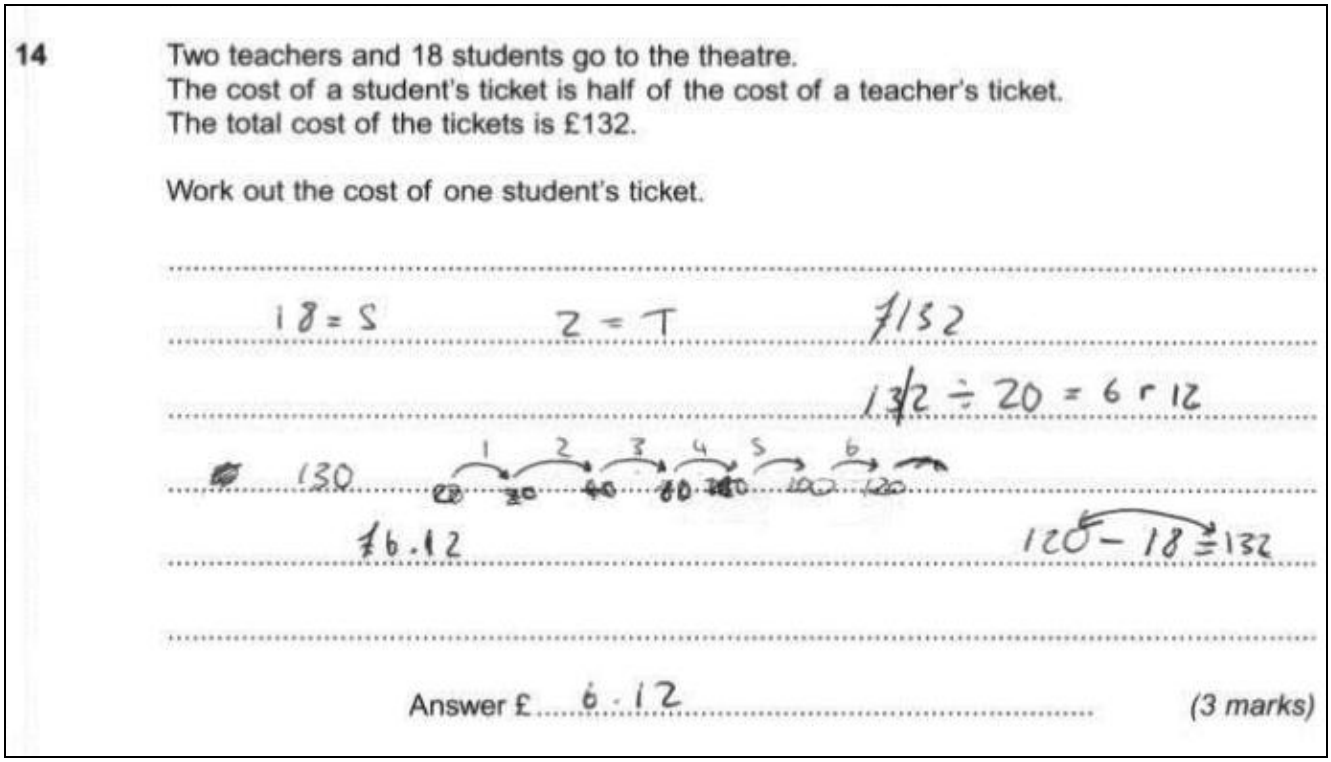
£24 + £108 = £132

Answer £ 6 (3 marks)

This candidate gives a fully correct answer. The method appears to be trial and improvement, with the first trial being successful.

Mark awarded = 3

Candidate X



14 Two teachers and 18 students go to the theatre.
The cost of a student's ticket is half of the cost of a teacher's ticket.
The total cost of the tickets is £132.

Work out the cost of one student's ticket.

18 = S 2 = T £132

132 ÷ 20 = 6 r 12

130 1 2 3 4 5 6 20 40 60 80 100 120

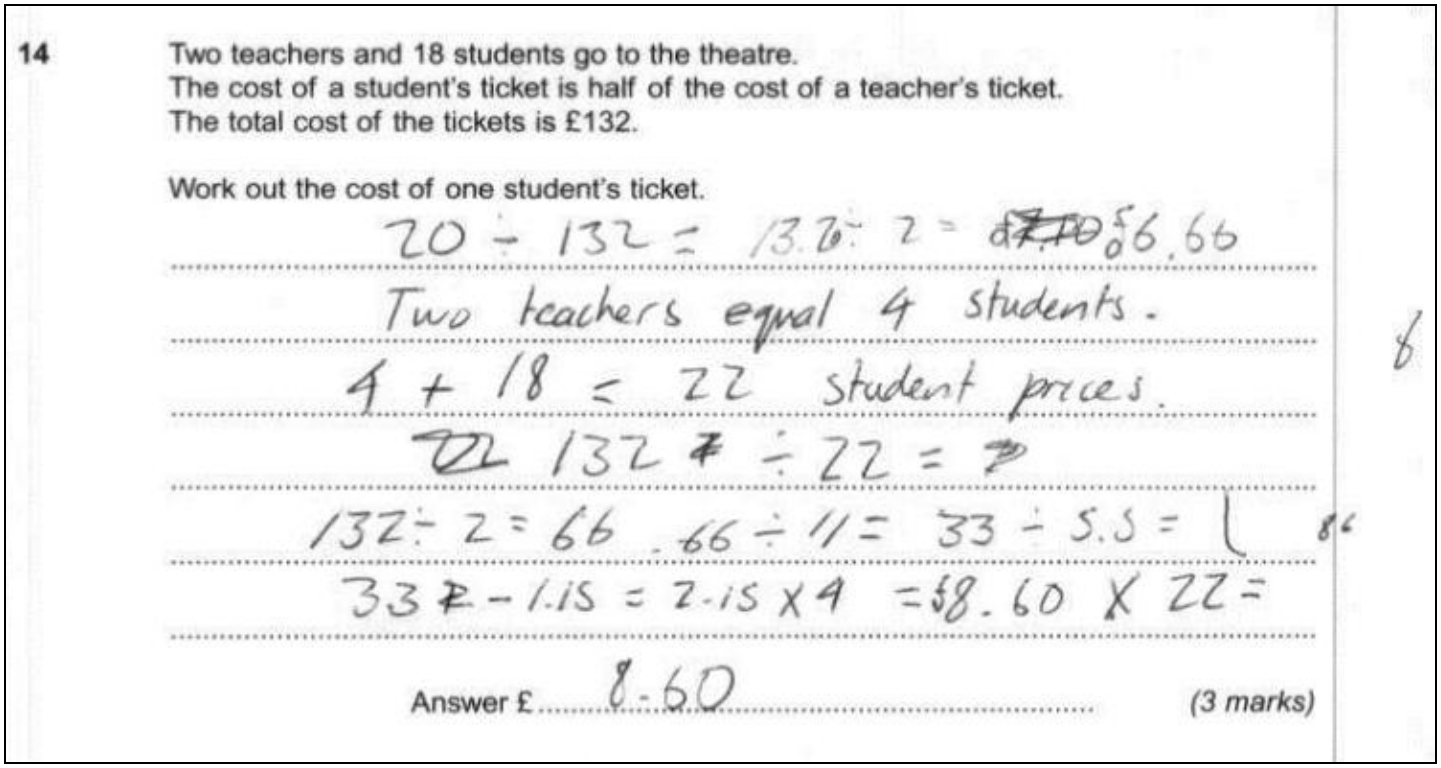
£6.12 120 − 18 = 132

Answer £ 6.12 (3 marks)

This candidate incorrectly used the same price for all tickets, working out 132 ÷ 20. This was a common error.

Mark awarded = 0

Candidate Y



14 Two teachers and 18 students go to the theatre.
The cost of a student's ticket is half of the cost of a teacher's ticket.
The total cost of the tickets is £132.

Work out the cost of one student's ticket.

20 ÷ 132 = 13.6 ÷ 2 = £6.66

Two teachers equal 4 students.

4 + 18 = 22 student prices.

132 ÷ 22 =

132 ÷ 2 = 66 . 66 ÷ 11 = 33 ÷ 5.5 =

33 - 1.15 = 2.15 x 4 = £8.60 x 22 =

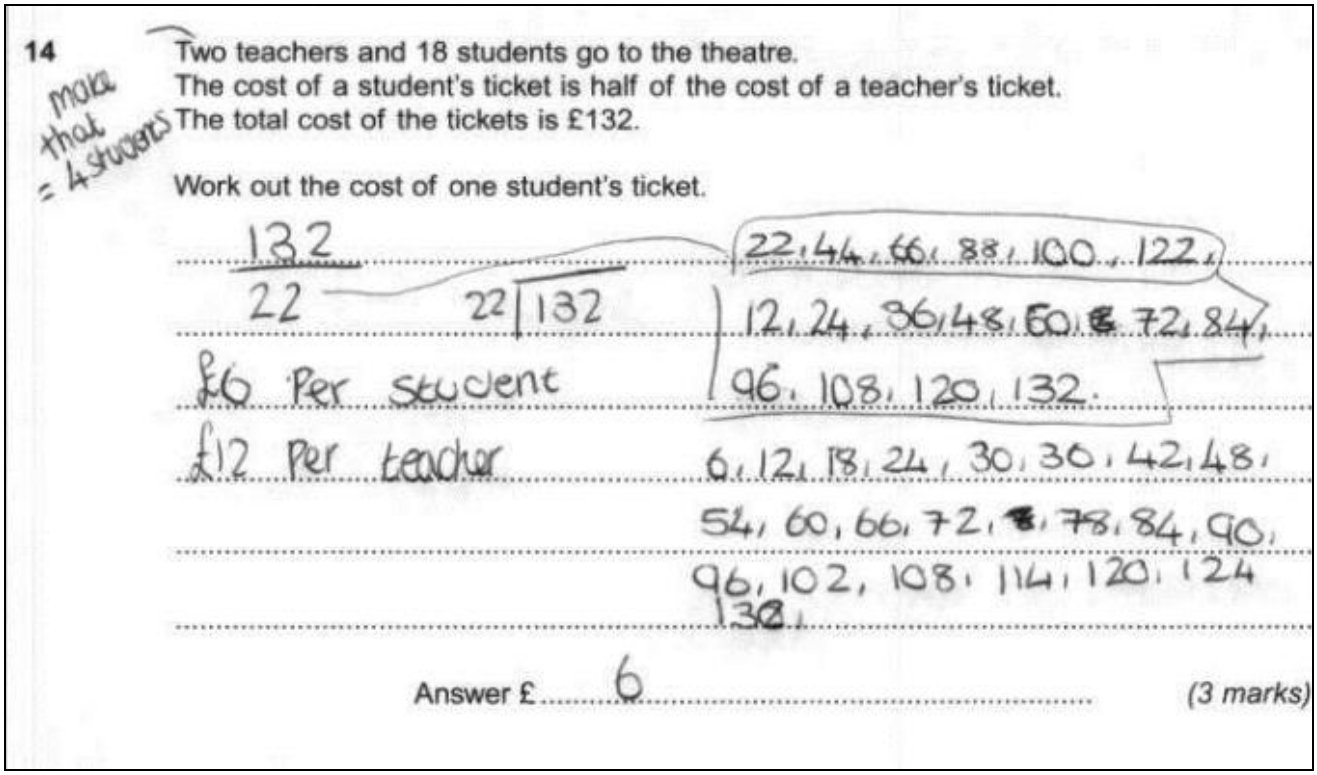
Answer £ 8.60 (3 marks)

6

This candidate used the strategy that 2 teachers = 4 students, 4 + 18 = 22 student prices. The correct method of 132 ÷ 22 is then shown and a method of reducing the calculation, effectively by cancelling fractions, is used. Errors are then made with the arithmetic.

Mark awarded = 2

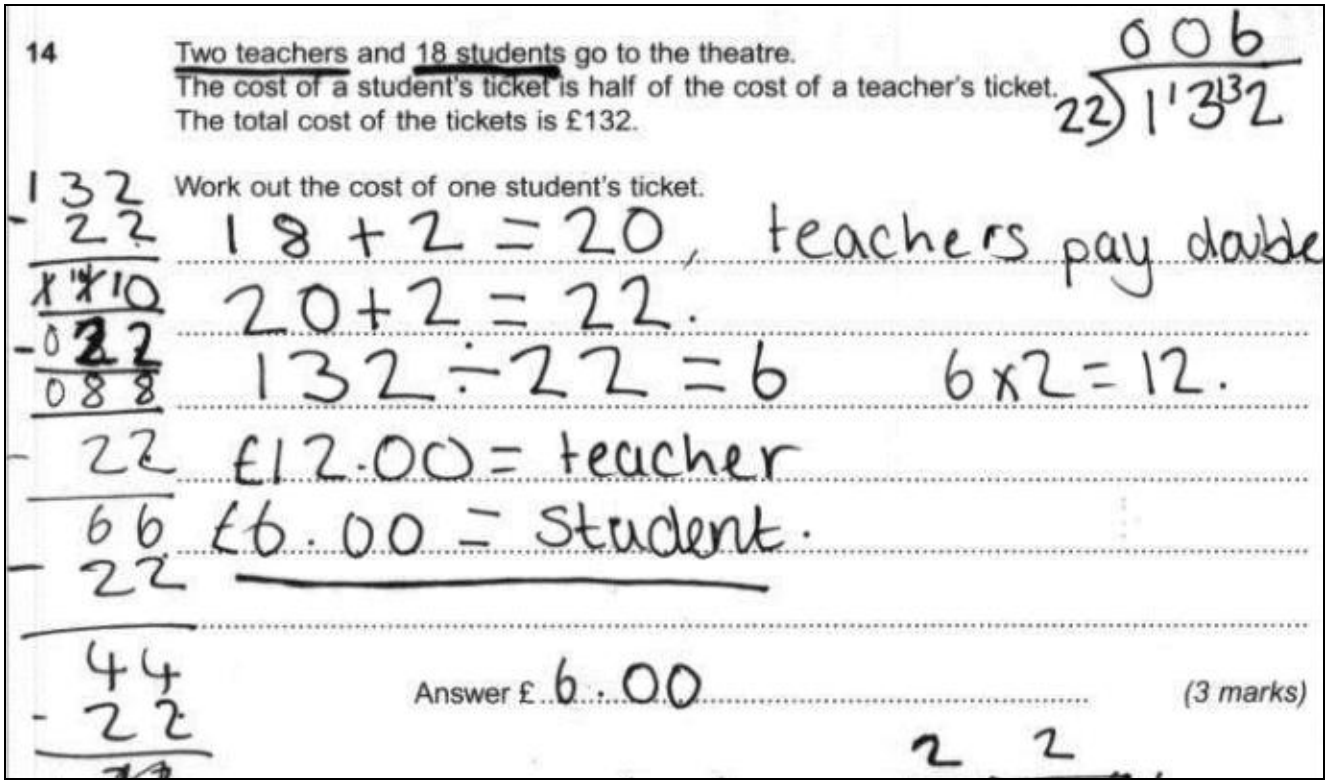
Candidate Z



This candidate uses the same strategy as in the previous example of 2 teachers = 4 students. The candidate lists multiples of 22 to work out 132 ÷ 22 and obtains the correct answer from a correct method.

Mark awarded = 3

Candidate AA



14 Two teachers and 18 students go to the theatre.
The cost of a student's ticket is half of the cost of a teacher's ticket.
The total cost of the tickets is £132.

Work out the cost of one student's ticket.

18 + 2 = 20, teachers pay double
20 + 2 = 22.
132 ÷ 22 = 6 6 x 2 = 12.
£12.00 = teacher
£6.00 = student.

Answer £ 6.00 (3 marks)

This candidate also uses the same strategy as on previous examples of 2 teachers = 4 students.

132 ÷ 22 is worked out at the top right of the page and is then checked by continued subtraction on the left hand side. This is an answer that is clearly worthy of the full 3 marks.

Mark awarded = 3