2021 Assessment resources
GCSE Mathematics

Ratio – Foundation

Answers and commentaries

The question numbers in this resource reflect the question numbers from the original papers and match the question numbers in the corresponding 2021 assessment materials

Question 6

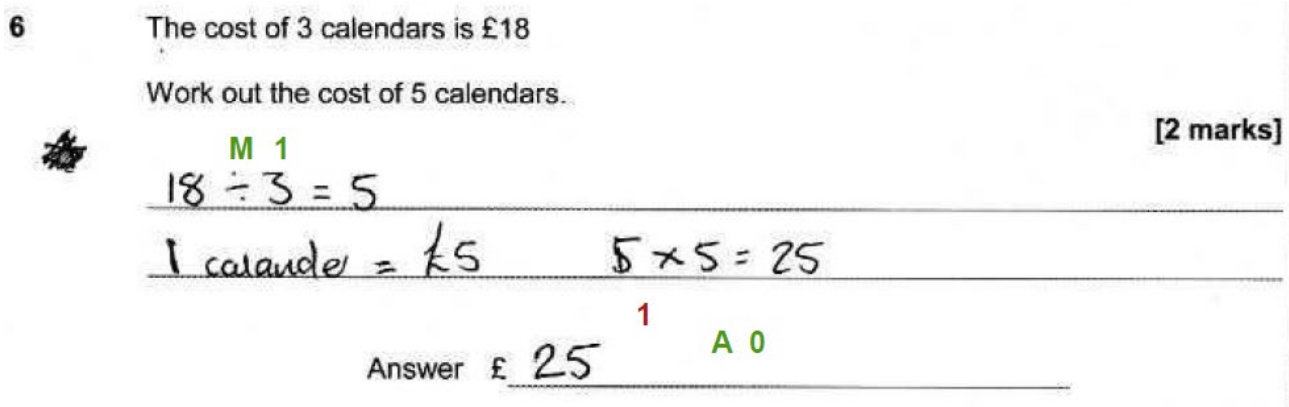
6 The cost of 3 calendars is £18

Work out the cost of 5 calendars.

[2 marks]

Answer £ _____

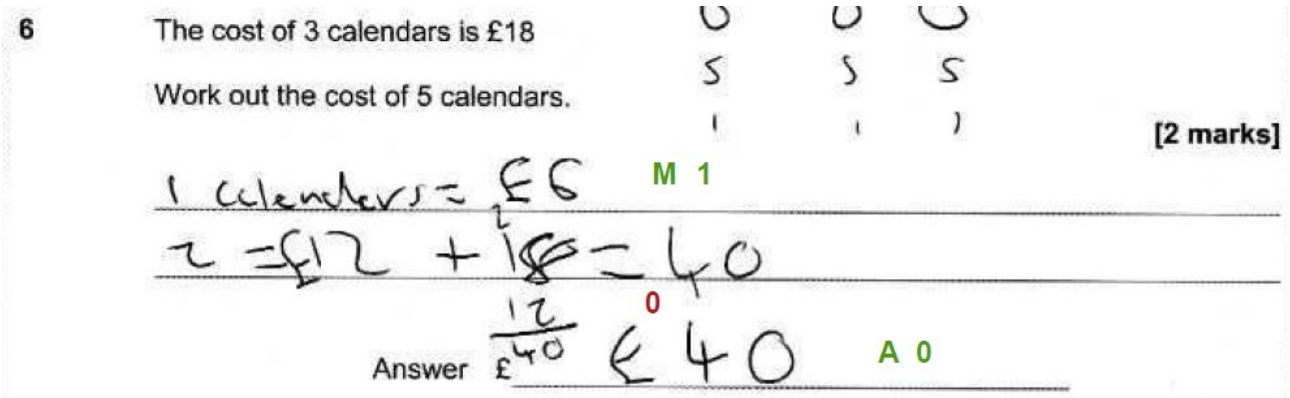
Student A



Commentary

The correct method for the cost of one calendar is shown in line 1 despite the arithmetic error.
1 mark

Student B



Commentary

The correct cost of one calendar is shown so the method is not needed. Unfortunately, the student makes an arithmetic slip in the final total.

1 mark

Question 11 (a)

11 Here is a list of ingredients needed to make 6 pancakes.

Flour	120 grams
Eggs	2
Milk	210 millilitres

11 (a) Complete the list of ingredients needed to make 9 pancakes.

[3 marks]

Flour	_____
Eggs	_____
Milk	_____

Student A

11 (a) Complete the list of ingredients needed to make 9 pancakes.

[3 marks]

~~180 A20~~

3 pancakes

60 flour

1 egg

105 milk

Flour	180
Eggs	3
Milk	315

B 2

Commentary

The student has three correct values but is missing the units. We also condoned incorrect units for B2 or B1.

2 marks

Student B

11 (a) Complete the list of ingredients needed to make 9 pancakes.

[3 marks]

120 ÷ 6 = 20 × 9 = 180

2 ÷ 6 × 9 = 3

210 ÷ 6 = 35 × 9 = 315ml

Flour	180g
Eggs	3
Milk	315ml

B 3

Commentary

The student has used the correct abbreviations for the units which is acceptable by the Additional Guidance. In the mark scheme 'eggs' is in brackets which means it does not need to be seen but cannot be anything other than eggs if it is seen.

3 marks

Student C

11 (a) Complete the list of ingredients needed to make 9 pancakes.

[3 marks]

Flour	180 grams
Eggs	4
Milk	1225 mililitres

B 1

Commentary

Only one value is correct.
1 mark

Question 12

No examples available

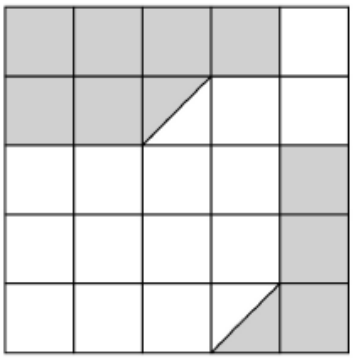
Commentary

Often students convert 1.5 litres to 150 millilitres and this will not gain the first mark. Since the second mark is dependent on the first then the student can go no further. Note that if the student does actually intend to use centilitres, as in Alternative method 3, then they will also need to show 65 so that both values are in the same units.
An answer of 850 implies that they have used 1500 and therefore scores 2 marks with the third mark available if ml or millilitres is seen.

Question 9

9 What percentage of this shape is shaded?

[2 marks]

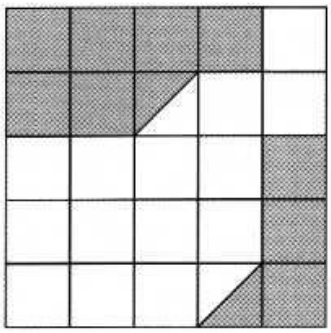


Answer _____ %

Student A

9 What percentage of this shape is shaded?

[2 marks]



5

25 10/25

Answer 4 %

Commentary

The student shows the correct proportion in the working so is awarded one mark.

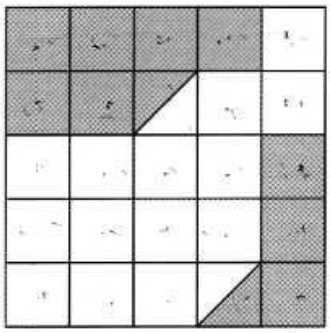
1 mark

Student B

9 What percentage of this shape is shaded?

[2 marks]

10 shaded



25 boxes

~~25~~

~~15~~

~~100% of 25 = 15~~ $\frac{15}{25} \times 100 = 60$

25 − 10 = 15

Answer 60 %

Commentary

There is one mark available for students who work out the correct percentage of white squares.
1 mark

Question 13

13 The cost of 5 kg of potatoes is £3.20

The cost of $\frac{1}{2}$ kg of carrots is 29p

Work out the **total** cost of 12 kg of potatoes and $1\frac{1}{2}$ kg of carrots.

[3 marks]

Answer £ _____

Student A

13 The cost of 5 kg of potatoes is £3.20

The cost of $\frac{1}{2}$ kg of carrots is 29p

Work out the **total** cost of 12 kg of potatoes and $1\frac{1}{2}$ kg of carrots.

[3 marks]

3·20 ÷ 5 = £0·64

£0·~~6~~64 × 12 = £7~~6~~7·68

0·29

£7·97

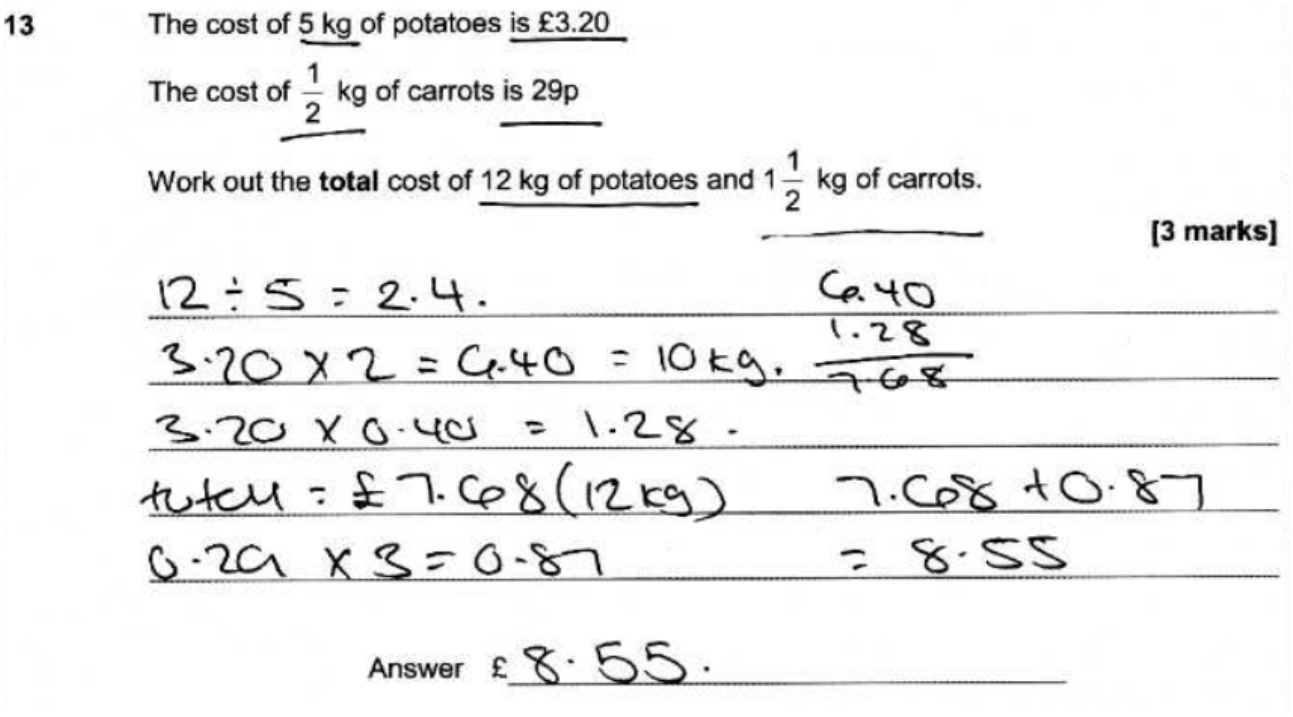
Answer £ 7·97

Commentary

The student scores the first mark for the method (or the correct value) of the price of 1 kg of potatoes. There is no second mark for working out 12 kg of potatoes, they must also add on the price of the carrots. The student has only added 0.5 kg of carrots and this would not be taken as a misread because they have made the question easier.

1 mark

Student B



13 The cost of 5 kg of potatoes is £3.20

The cost of $\frac{1}{2}$ kg of carrots is 29p

Work out the **total** cost of 12 kg of potatoes and $1\frac{1}{2}$ kg of carrots.

[3 marks]

12 ÷ 5 = 2.4.

3.20 x 2 = 6.40 = 10kg.

3.20 x 0.40 = 1.28.

total = £7.68 (12kg)

0.29 x 3 = 0.87

6.40
1.28
7.68

7.68 + 0.87
= 8.55

Answer £ 8.55.

Commentary

The student is using Alternative method 2. They build up the multiplication by multiplying by 2 and by 0.4 but that is equivalent.

3 marks

Question 17 (a)

17 (a) Simplify fully 56 : 24

[2 marks]

Answer _____ : _____

Student A

17 (a) Simplify fully 56 : 24

[2 marks]

14
4 | 56

M 1

Answer 14 : 6

Commentary

The student gains the first mark on the answer line for the equivalent ratio that is not fully simplified

1 mark

Student B

17 (a) Simplify fully 56 : 24

[2 marks]

56 : 24
9 : 6
3 : 2

0

Answer 3 : 2

Commentary

The student does not show they are dividing both sides by 8 and has made an arithmetic slip so cannot be awarded the method mark.

0 marks

Question 9

9 In this question, use

1 foot = 12 inches

1 inch = 2.5 centimetres

Change 5 feet 8 inches to centimetres.

[3 marks]

Answer _____ cm

Student A

9 In this question, use

1 foot = 12 inches

1 inch = 2.5 centimetres

Change 5 feet 8 inches to centimetres.

[3 marks]

5 feet
× 12 inches
60 inches

60
+ 8
68 inches

M 1

68 / 2.5 = 27.2 cm

Mdep 0

Answer 27.2 A 0 cm

Commentary

This response scores the first mark on Alternative method 2. However, the student has then divided rather than multiplied by 2.5 so does not gain any more credit.

1 mark

Student B

9 In this question, use

1 foot = 12 inches

1 inch = 2.5 centimetres

Change 5 feet 8 inches to centimetres.

[3 marks]

5 1 : 12 inches

5 x 12 = 60

8 x 2.5 = 22.4

82.4

M 1 Mdep 0

Answer 82.4 cm A 0

Commentary

Despite the arithmetic error, the student gains the first mark for the correct method to convert 8 inches into centimetres. Had the student also changed 60 inches into centimetres before adding then they could have been awarded the second mark.

1 mark

Student C

9 In this question, use

1 foot = 12 inches

1 inch = 2.5 centimetres

Change 5 feet 8 inches to centimetres.

[3 marks]

12 × 5

5 feet = 60 inch × 2.5 = 24 cm

2.5 × 60 = 150

M 1

Mdep 0

A 0

Answer ~~150~~ 150 cm

Commentary

The two methods are not considered a choice because the second one leads to the answer line.
The calculation for 150 is equivalent to the first mark in the scheme.

1 mark

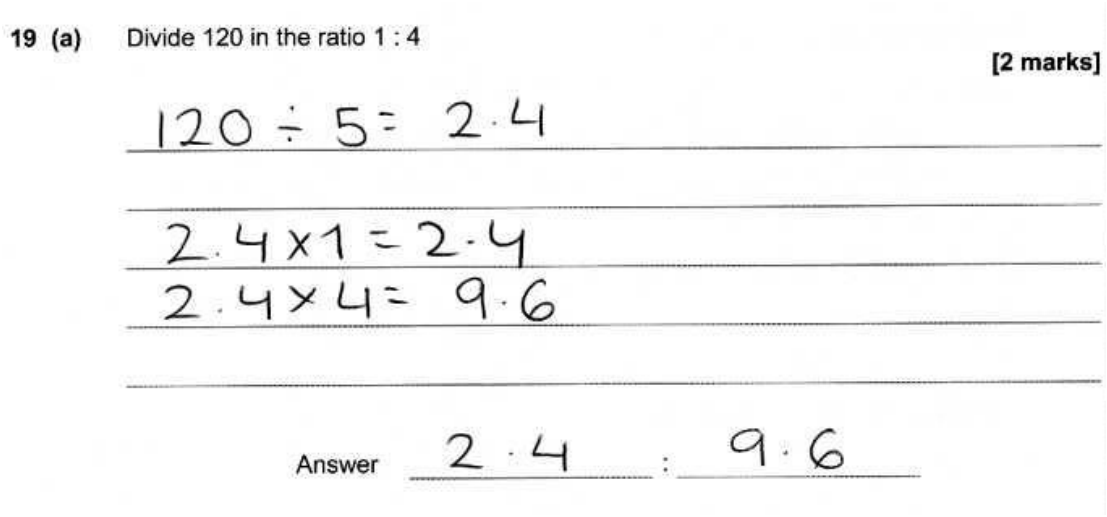
Question 19 (a)

19 (a) Divide 120 in the ratio 1 : 4

[2 marks]

Answer _____ : _____

Student A

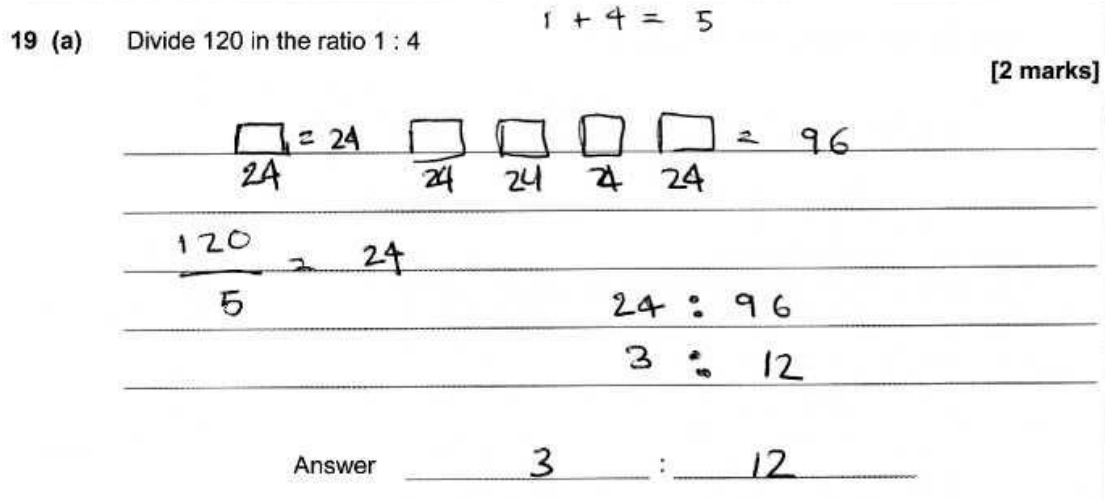


Commentary

The correct method is shown but the student has made an arithmetic error so only gains the first mark.

1 mark

Student B

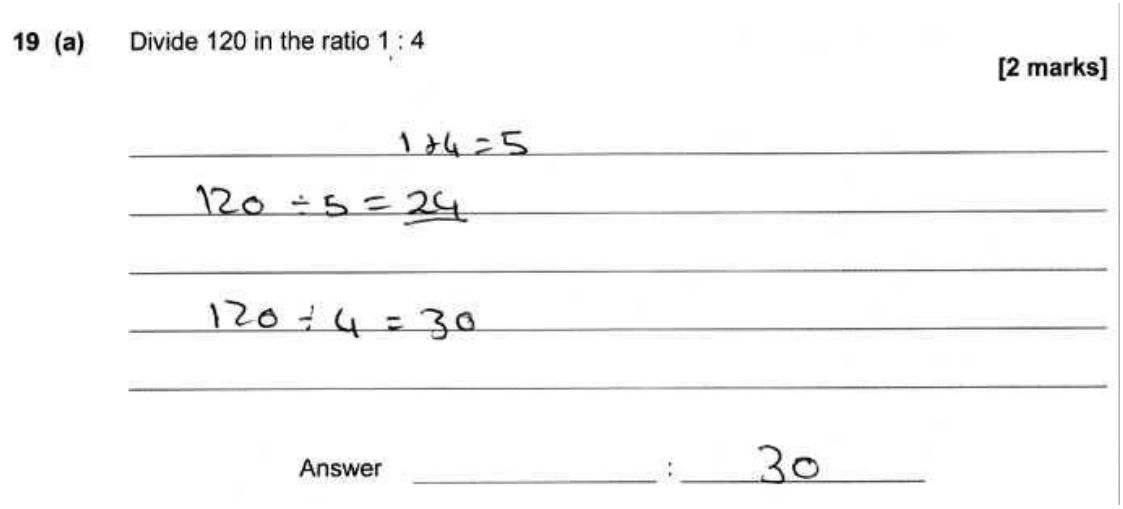


Commentary

The student reaches the right answer but then simplifies the ratio which is inappropriate in the context of this question.

1 mark

Student C



Commentary

The student is not sure whether to divide by 5 or 4 so does both. The answer comes from the division by 4 which is the wrong method, so no marks are awarded.

0 marks

Question 18 (a)

18 Mo played 30 games of chess.
He won 18 of these games.

18 (a) What fraction of the games did he win?
Give your answer in its simplest form.

[2 marks]

Answer _____

Student A

18 Mo played 30 games of chess.
He won 18 of these games.

18 (a) What fraction of the games did he win?
Give your answer in its simplest form.

$\frac{18}{30} \div 3$ $\frac{6}{10} \div 2$ $\frac{3}{5}$

[2 marks]

Answer $\frac{3}{5}$

Commentary

The correct answer is seen. The incorrect notation of showing dividing by 3 rather than dividing the numerator and the denominator is condoned because the student recovers.
2 marks

Question 18 (b)

18 Mo played 30 games of chess.

He won 18 of these games.

18 (b) He played 20 more games.

He had then won 64% of **all** of his games.

How many of the 20 games did he win?

[3 marks]

Answer _____

Student A

18 (b) He played 20 more games.

He had then won 64% of **all** of his games.

How many of the 20 games did he win?

50% = 25
10% = 5
1% = 0.5 x4=2

[3 marks]

64% ÷2=32% ALL=50

32% of 20 = 64% of 50

10% = 2 x3 = 6·4 25+5+2=32

1% = 0·20 x2 = 0.4

Answer 32

Commentary

The student has worked out 64% of 50 using a correct build-up method on the right-hand side of the answer. Unfortunately, they stop at 32 and do not subtract the original 18 wins to get the final mark.

2 marks

Question 22

22 Anna plays a computer game.

Each game is a win or a loss.

She wins three quarters of her first 24 games.

She then wins her next 12 games.

For all 36 games, work out the ratio wins : losses

Give your answer in its simplest form.

[3 marks]

Student A

22 Anna plays a computer game.

Each game is a win or a loss.

She wins three quarters of her first 24 games.

She then wins her next 12 games.

For all 36 games, work out the ratio wins : losses

Give your answer in its simplest form.

[3 marks]

$24 \div 3 = 6$ M 0

$6 + 12 = 18$

A 0

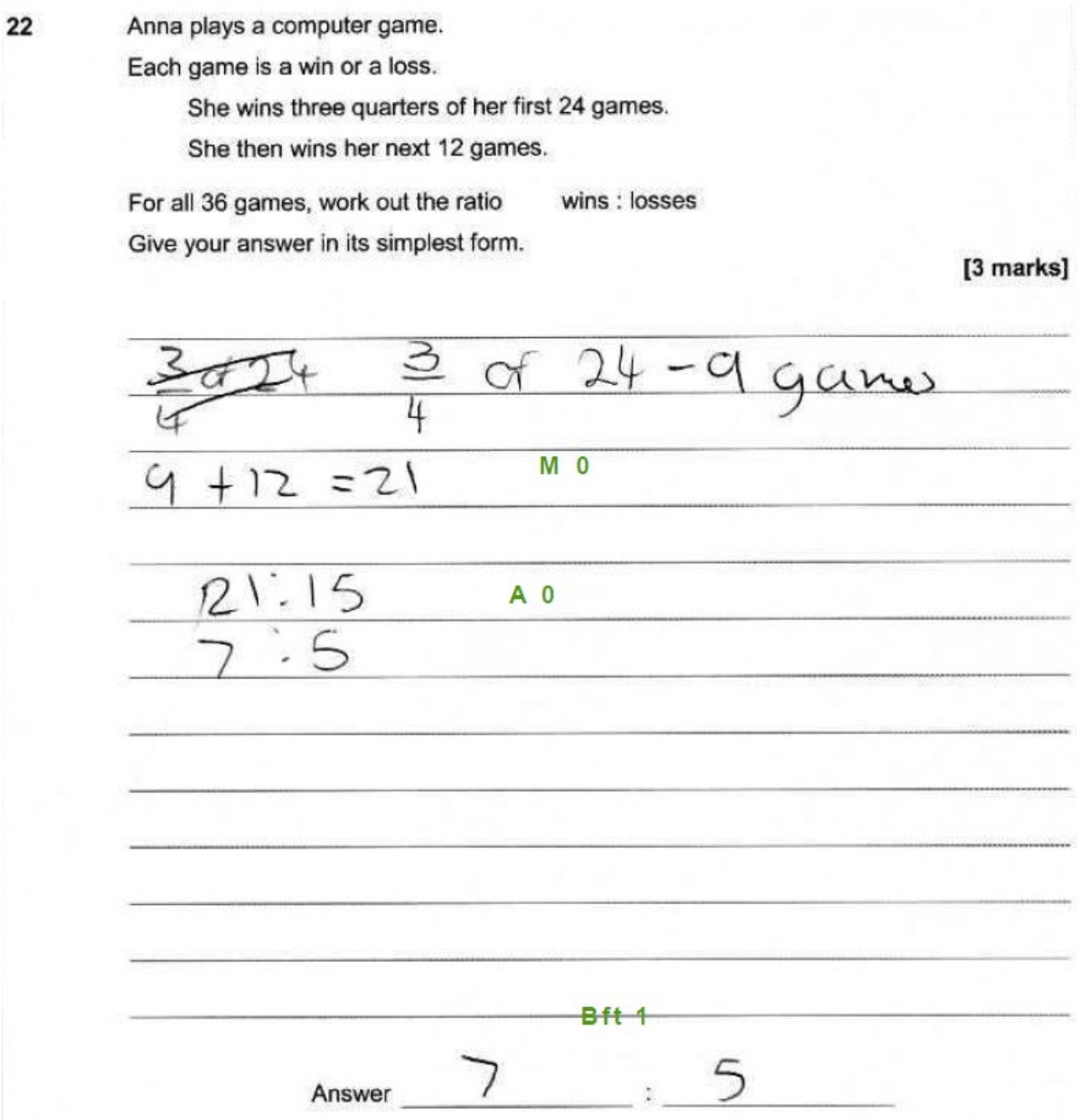
B ft 0

Answer 18 : 36

Commentary

Although 6 is seen, this does not gain the first mark because it is clearly from an incorrect method. The final mark would have been available if the student had simplified 18 : 36 to 1 : 2.
0 marks

Student B



Commentary

$\frac{3}{4}$ of 24 does not qualify as a method, we need to see the calculation shown or the answer 18 seen. However, the student does give 21 : 15 in its simplest form so gains the final mark.
1 mark

Student C

22 Anna plays a computer game.

Each game is a win or a loss.

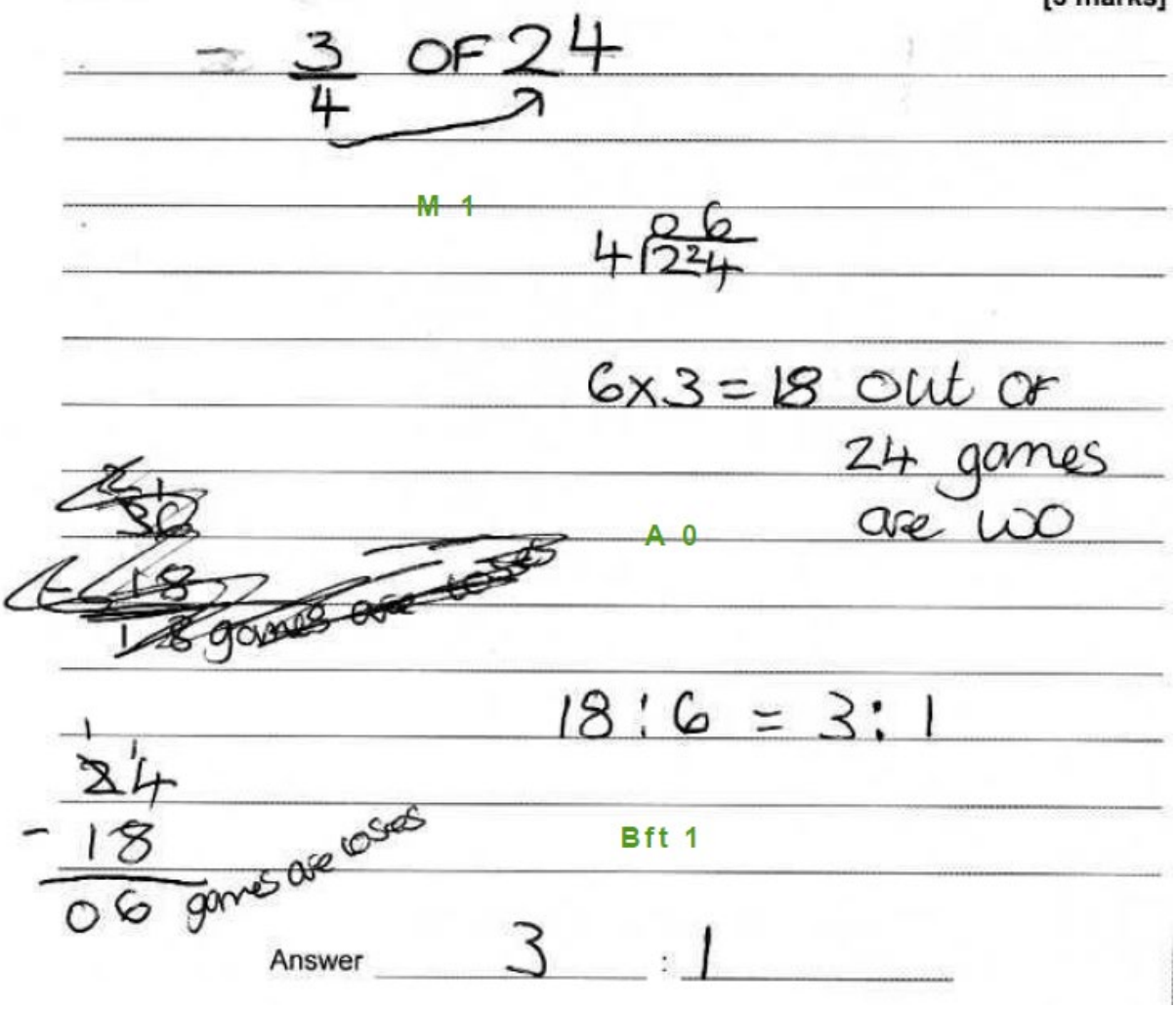
She wins three quarters of her first 24 games.

She then wins her next 12 games.

For all 36 games, work out the ratio wins : losses

Give your answer in its simplest form.

[3 marks]



Commentary

Although this student also writes $\frac{3}{4}$ of 24, they then go on to show the calculation so this scores the first mark. The ratio is incorrect, but it is the simplest form of the ratio they have written earlier so gains the final mark as well.

2 marks

Question 27

Please see the mark scheme

Question 22

22 $x : y = 7 : 4$

$x + y = 88$

Work out the value of $x - y$

[3 marks]

Answer _____

Student A

22 $x : y = 7 : 4$

$x + y = 88$

Work out the value of $x - y$

[3 marks]

7 : 4

7 + 4 = 11 × 8 = 88

Answer 11 : 8

Commentary

The student sums the parts of the ratio and shows an embedded 8 in the multiplication to 88 so gains the first mark.

1 mark

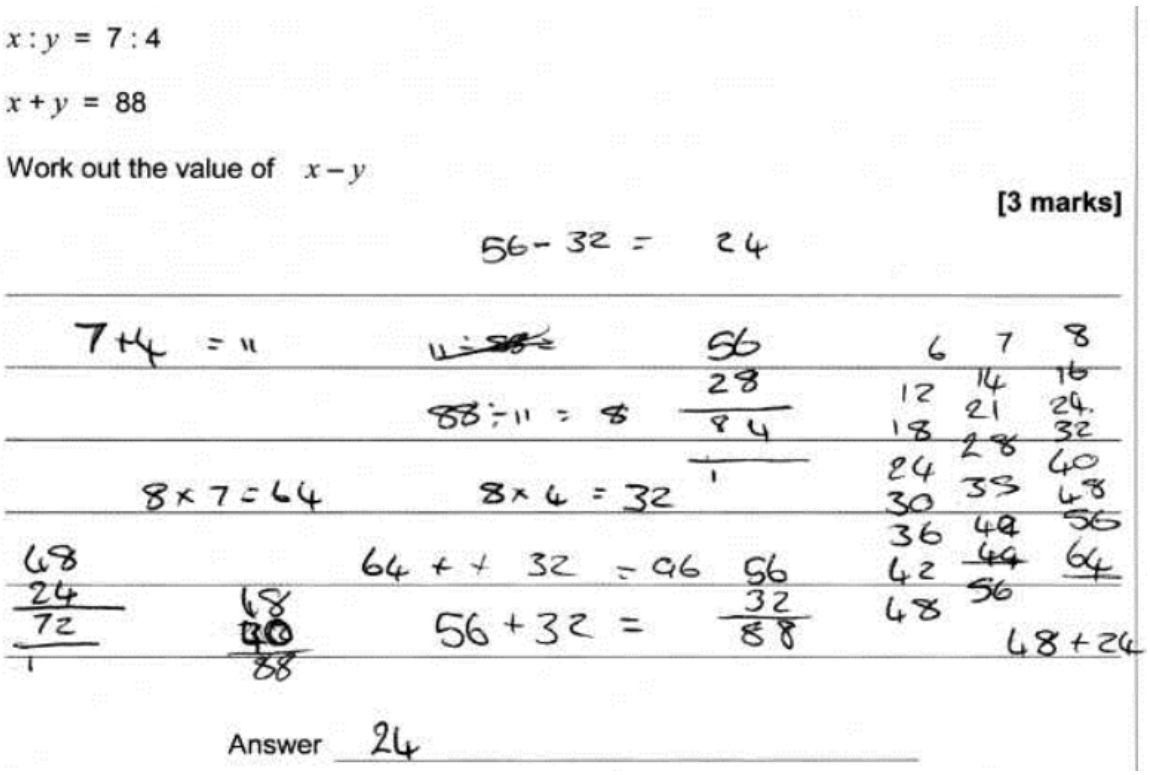
Student B

22 $x : y = 7 : 4$

$x + y = 88$

Work out the value of $x - y$

[3 marks]



Commentary

The student shows 8 × 7 and 8 × 4 so gains the first two marks. Although there is an evaluation error seen (8 × 7 = 64), their answer comes from 56 – 32 so recovery is allowed.

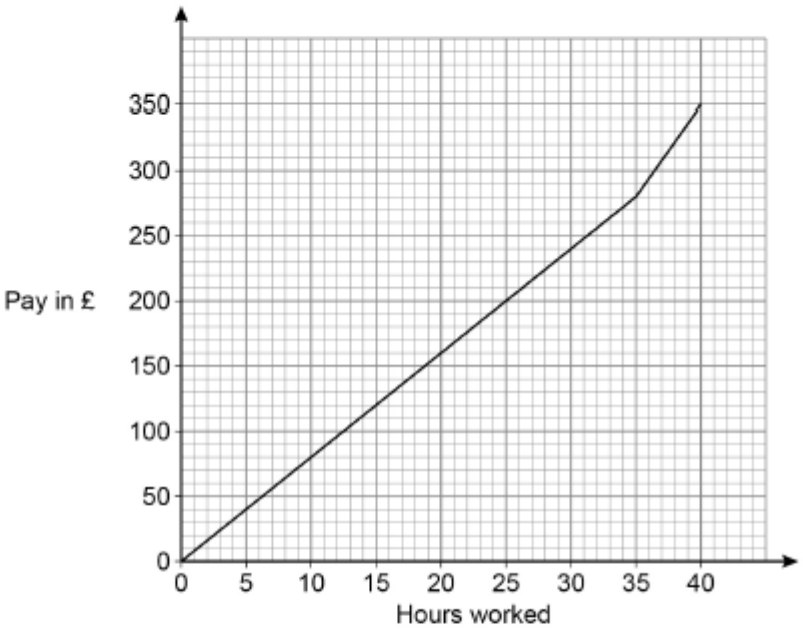
3 marks

Question 29

29 The graph shows how much Molly is paid for working for up to 40 hours.
She receives

a basic rate of pay for the first 35 hours worked

a higher rate of pay for the next 5 hours worked.

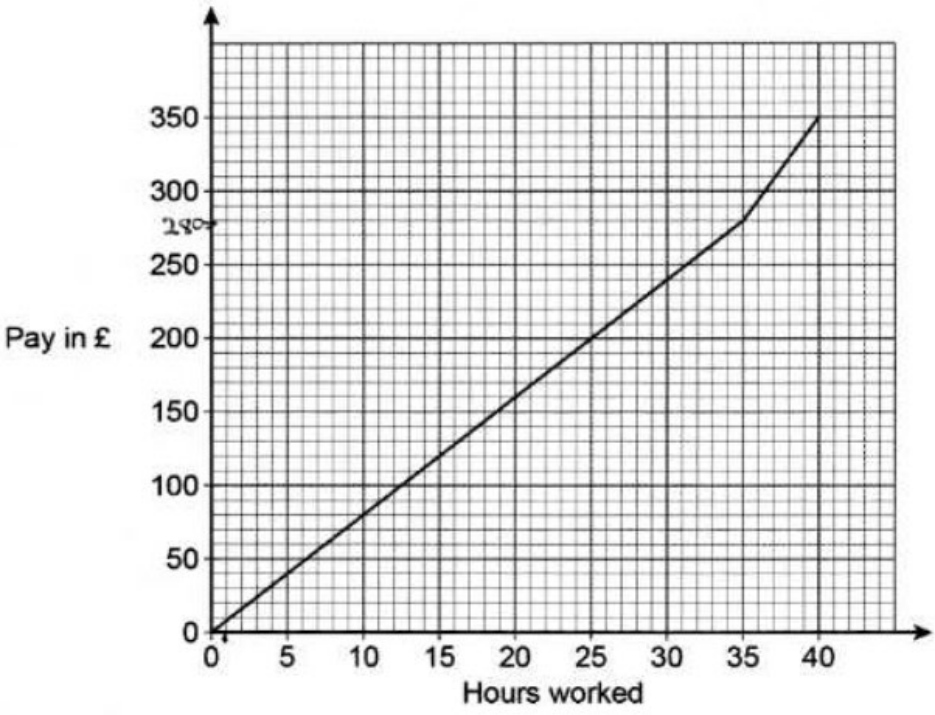


Work out the difference between the higher rate of pay and the basic rate of pay.
Give your answer in £ per hour.

[3 marks]

Answer £_____ per hour

Student A



Work out the difference between the higher rate of pay and the basic rate of pay.
Give your answer in £ per hour. 1 hour = £10 → 1 hour = £14 Tick

[3 marks]

£280 for 35 hours 350 − 280 = 70 £70 for 5 hours
£350 total 70÷1 70×7 = 490
490 higher rate for 35 hours.
280 − 70 = 210

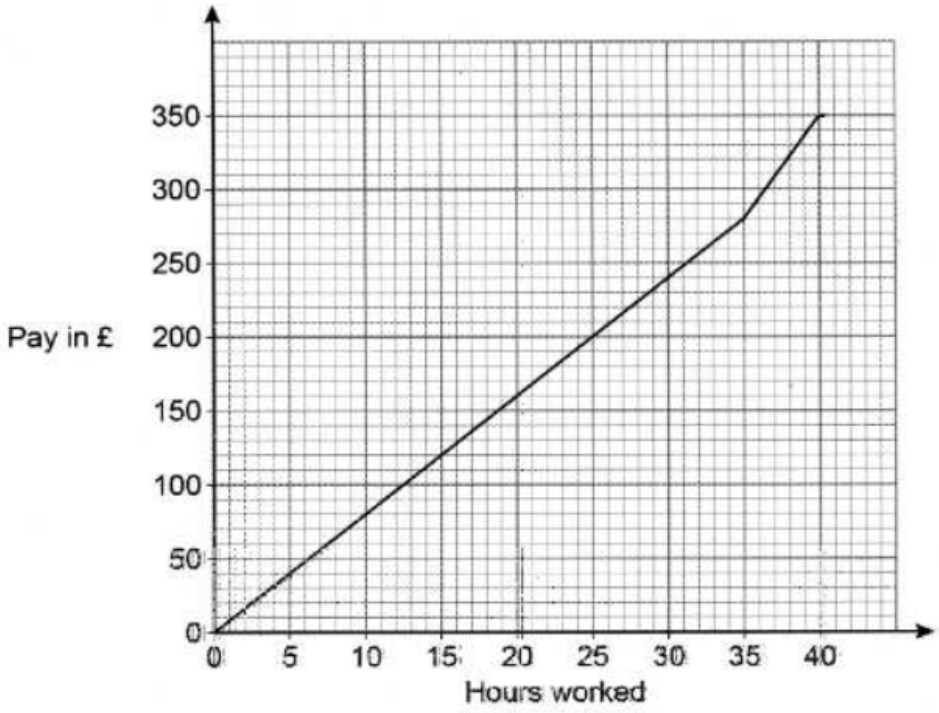
Answer £ 4 per hour

Commentary

In the first scheme, the two method marks are independent so gaining the second does not imply the first. The student has shown £14 per hour for the higher rate, which scores the second mark and £10 for the basic rate, which does not score the first mark. There is other incorrect work, but the answer comes from using the 10 and the 14 so that is what is marked.

1 mark

Student B



Work out the difference between the higher rate of pay and the basic rate of pay.
Give your answer in £ per hour.

[3 marks]

350 − 280 = 70

70 ÷ 5 = 14

280 ÷ 35 = 8

280 − 70 = 210

14 − 8 = 6

Answer £ 6 per hour

Commentary

280 – 70 = 210 is incorrect method but it is not used to reach the answer line so may be ignored and not treated as a choice of methods.

3 marks