2021 Assessment resources

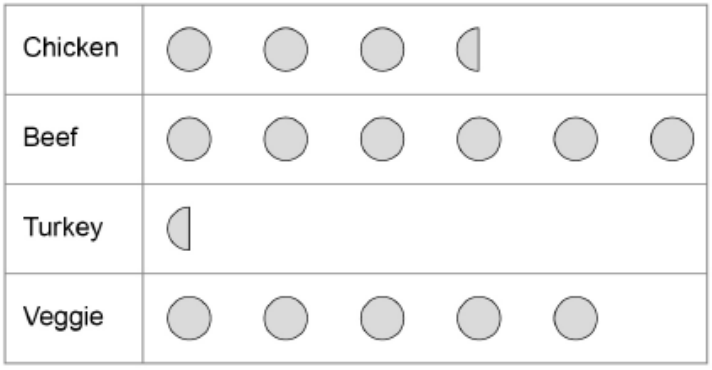
GCSE Mathematics

Probability and Statistics – Foundation

Answers and commentaries

Question 10

10 A group of students were asked to name their favourite burger.
The pictogram shows the results.
The key is missing.



40 students said Veggie.

How many students said Chicken?

[3 marks]

Answer _____

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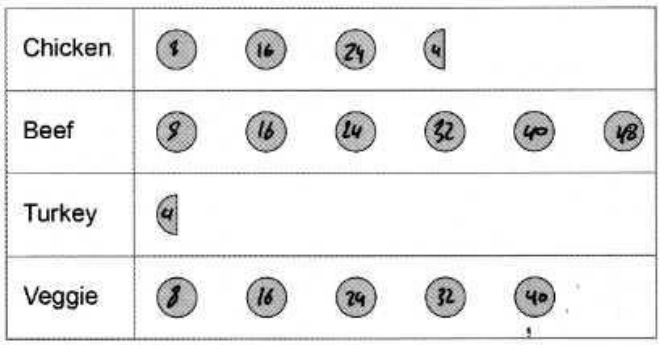
Student A

10 A group of students were asked to name their favourite burger.

The pictogram shows the results.

The key is missing.



40 students said Veggie.

How many students said Chicken?

[3 marks]

Scale = 8 $\frac{40}{5} = 8$

8 + 16 + 24 + 4 =

Answer 52

Commentary

The student has worked out the key correctly for 1 mark but does not go on to work out the number who said Chicken.

1 mark

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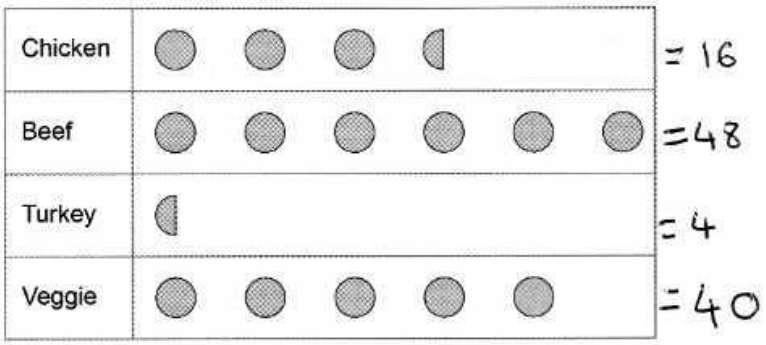
Student B

10 A group of students were asked to name their favourite burger.

The pictogram shows the results.

The key is missing.



40 students said Veggie.

How many students said Chicken?

[3 marks]

40 ÷ 5 = 8 (key)

8 × 3 = 12

$\frac{1}{2}$ of 8 = 4

12 + 4 = 16

Answer 16

Commentary

The student works out the correct key for the first mark. Their method for the number who said Chicken is correct but has an arithmetic error. Without that error they would get 28 so the second mark can also be awarded.

2 marks

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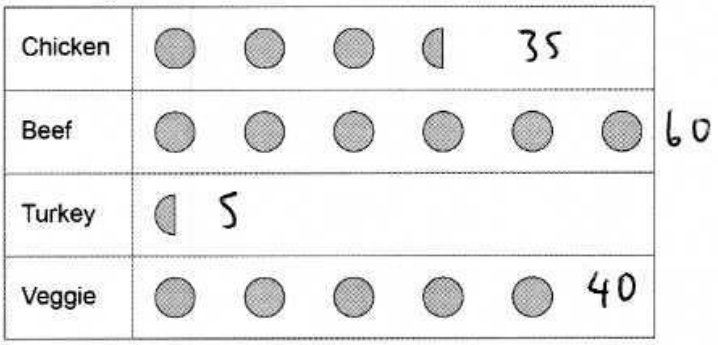
Student C

10 A group of students were asked to name their favourite burger.

The pictogram shows the results.

The key is missing.



key = ○ = 10 students

40 students said Veggie.

How many students said Chicken?

[3 marks]

10 + 10 + 10 + 5 = 35

↳ half of 10 is 5

○ = 10 students.

Answer 35 students

Commentary

The key is incorrect and no method is shown. Once the first mark is lost the student cannot gain any more marks because the marks are dependent.

0 marks

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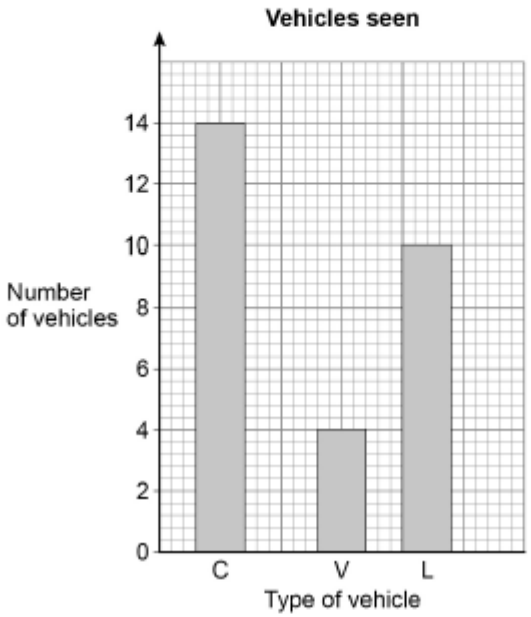
Question 11

11 On a journey, Laura sees 30 vehicles.
Each vehicle is a car, a van or a lorry.
She draws this bar chart.



Make two criticisms of her bar chart.

[2 marks]

Criticism 1 _____

Criticism 2 _____

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Student A

Criticism 1 The spaces between each vehicle aren't spaced out equally

B 1

Criticism 2 There are more then 3 vehicles on the road then a car, van or a lorry.

B 0

Commentary

The first answer refers to one of the three possible criticisms (unclear labelling of vehicles, unequal gaps, bars not totalling 30) so scores a mark. The second criticism is incorrect because line 2 of the question makes it clear that there are only three types of vehicle used in this context.

1 mark

Student B

Criticism 1 the Spaces between the actual bars are uneven

B 1

Criticism 2 C and V have a bigger gap between them compare to V and L

B 0

Commentary

Both criticisms refer to the unequal gaps and either would score.

1 mark

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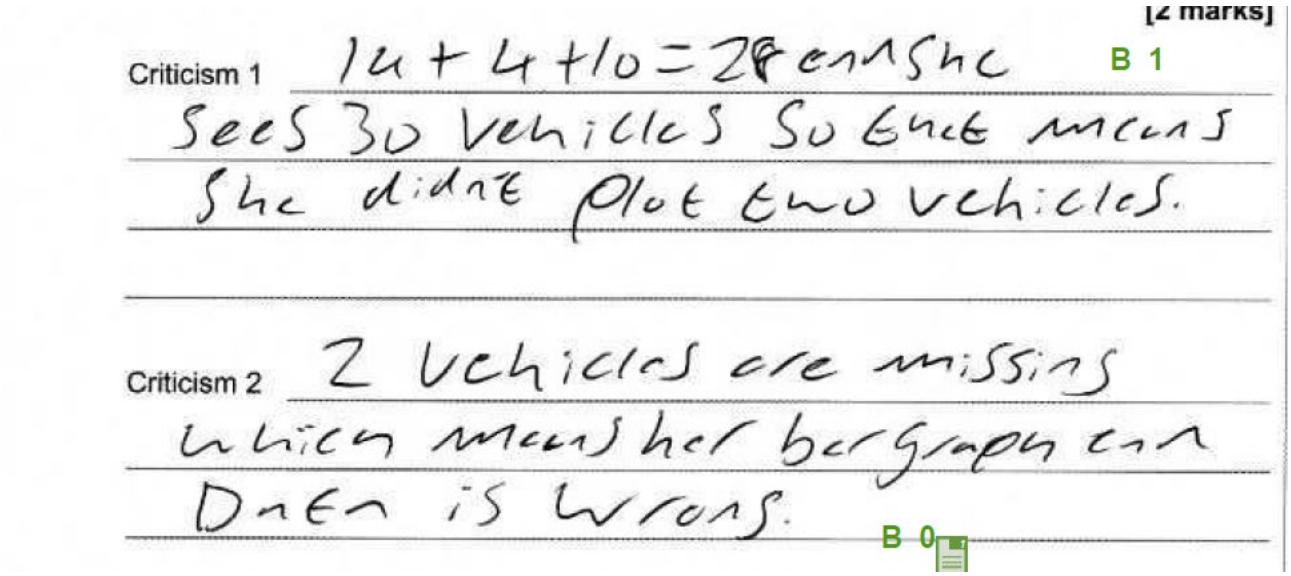
Student C



Commentary

Again, these are the same criticism about the incorrect total and either would score.
1 mark

Question 11 (a)

No examples available

Question 11 (b)

No examples available

Commentary

The first mark is for working out the number of tickets bought by men or the probability of a winning ticket being bought by a woman or child. Either the correct method shown or the value for either of these would gain the mark. In probability questions that do not ask for the simplest form, we always ignore subsequent attempts at cancelling or change of form to a fraction, decimal or percentage once the correct value has been seen.

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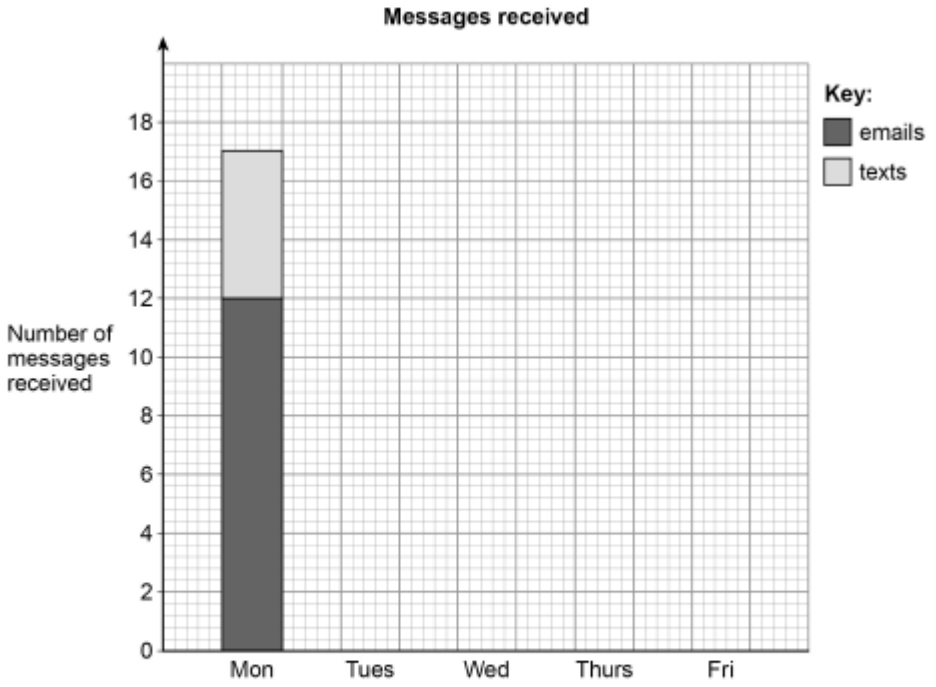
Question 9 (a)

9 The table shows the number of messages Sam received each day for five days.

	Messages	
	Number of emails	Number of texts
Monday	12	5
Tuesday	8	6
Wednesday	10	3
Thursday	6	6
Friday	12	4

9 (a) Sam draws a composite bar chart to represent the data.

He has drawn the bar for Monday.



Complete the chart.

[2 marks]

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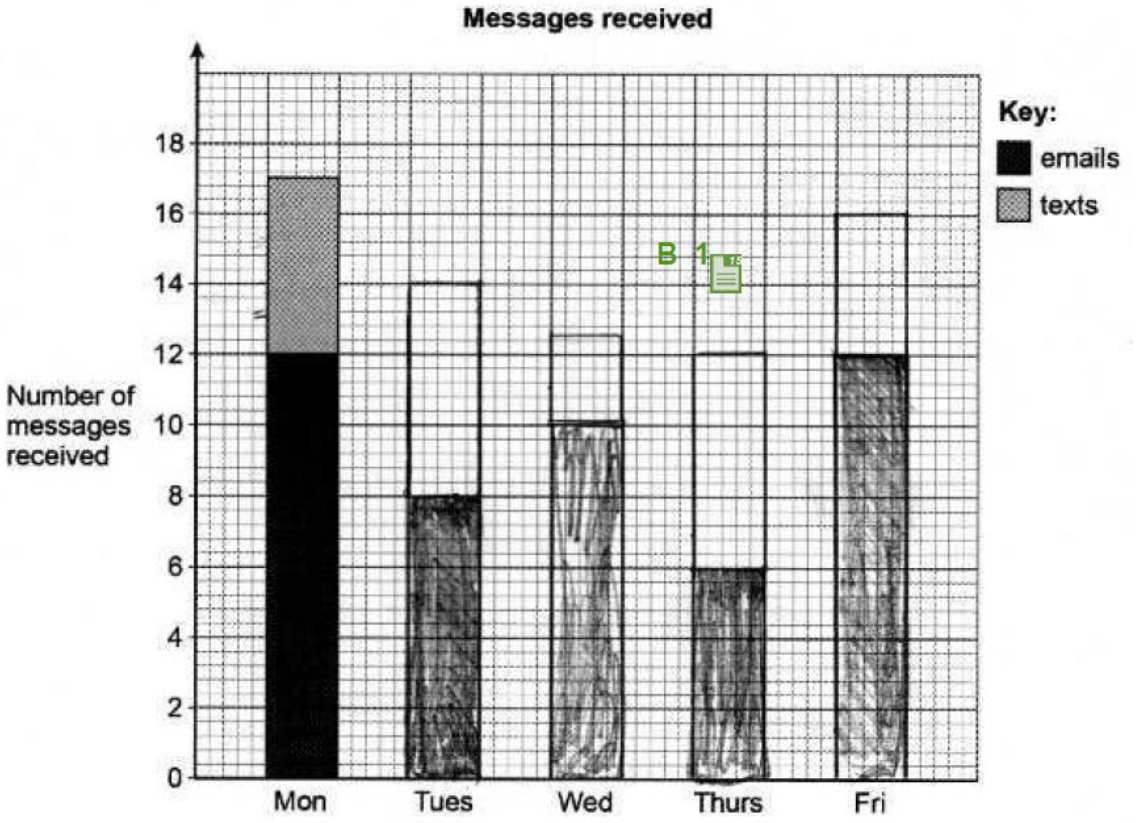
Student A

9 (a) Sam draws a composite bar chart to represent the data.

He has drawn the bar for Monday.



Commentary

The bar for Wednesday is out of tolerance but the other bars are correct (and only one is needed).

1 mark

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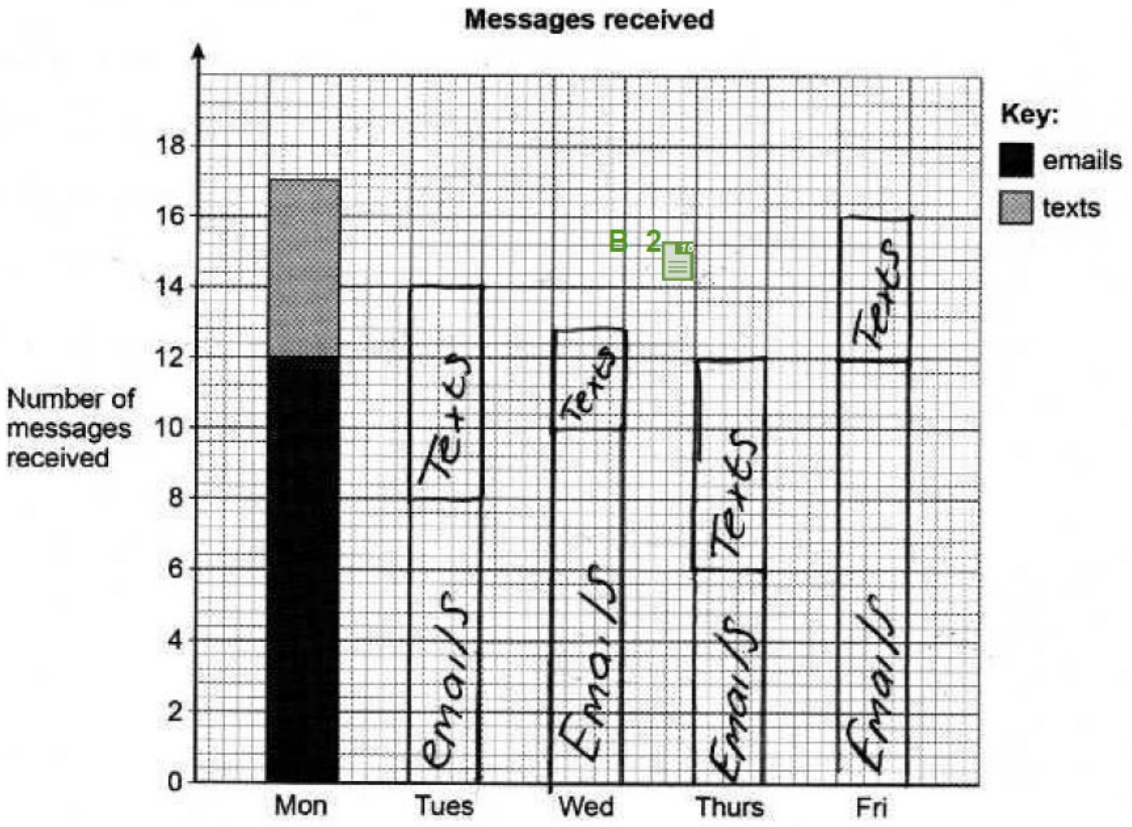
Student B

9 (a) Sam draws a composite bar chart to represent the data.

He has drawn the bar for Monday.



Commentary

The bar for Wednesday can be any height from 6.4 cm to 6.6 cm ie anywhere in the small square.
Shading can be missing or incorrect and either with or without labelling.

2 marks

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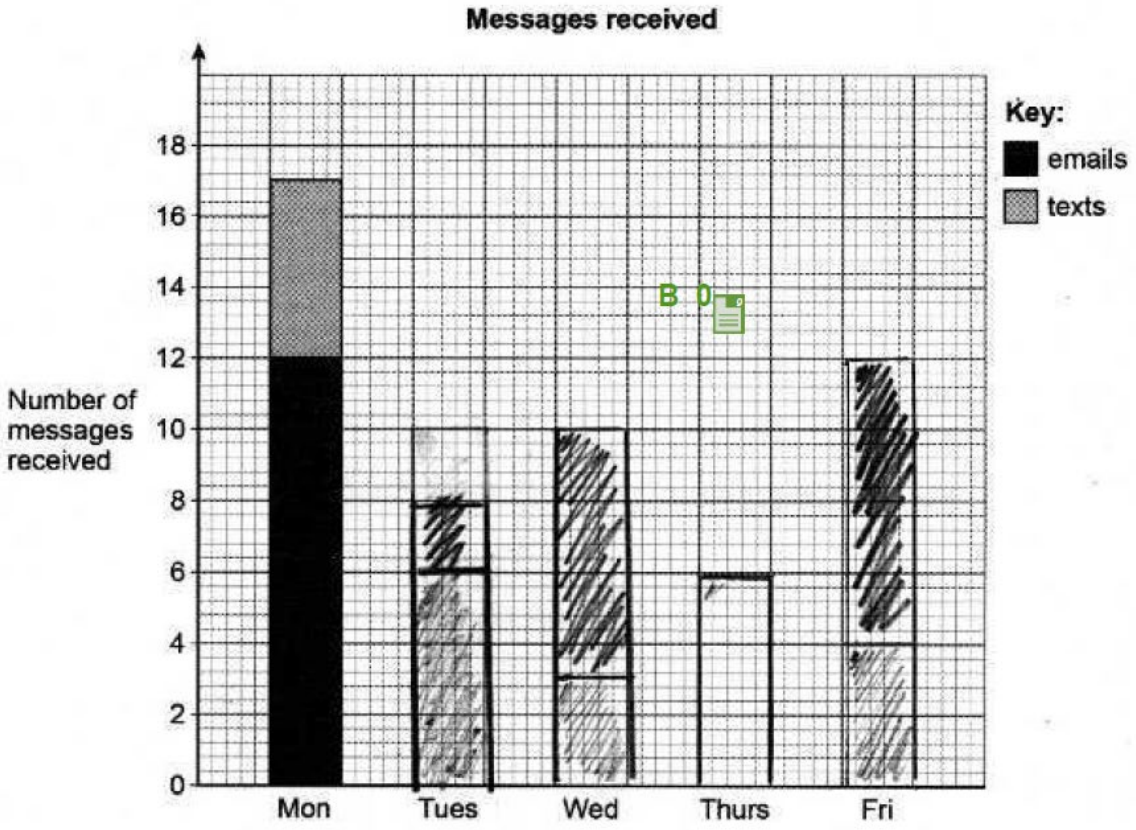
Student C

9 (a) Sam draws a composite bar chart to represent the data.

He has drawn the bar for Monday.



Commentary

These are not composite bars because the text bars have been placed in front of the email bars rather than stacking the two.

0 marks

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Question 9 (b)

9 (b) In total, what fraction of the messages were emails?
Give your answer in its simplest form.

[3 marks]

Answer _____

Student A

9 (b) In total, what fraction of the messages were emails?
Give your answer in its simplest form.

[3 marks]

M 1 $\frac{24}{72}$ $\frac{4}{12}$ $\frac{2}{6}$ $\frac{1}{3}$

A 0

Answer $\frac{1}{3}$ Aft 1

Commentary

The student scores the first mark for 24 or for 72. Their fraction is incorrect but fully simplified and follows through from their earlier fraction, so they gain the final mark.
2 marks

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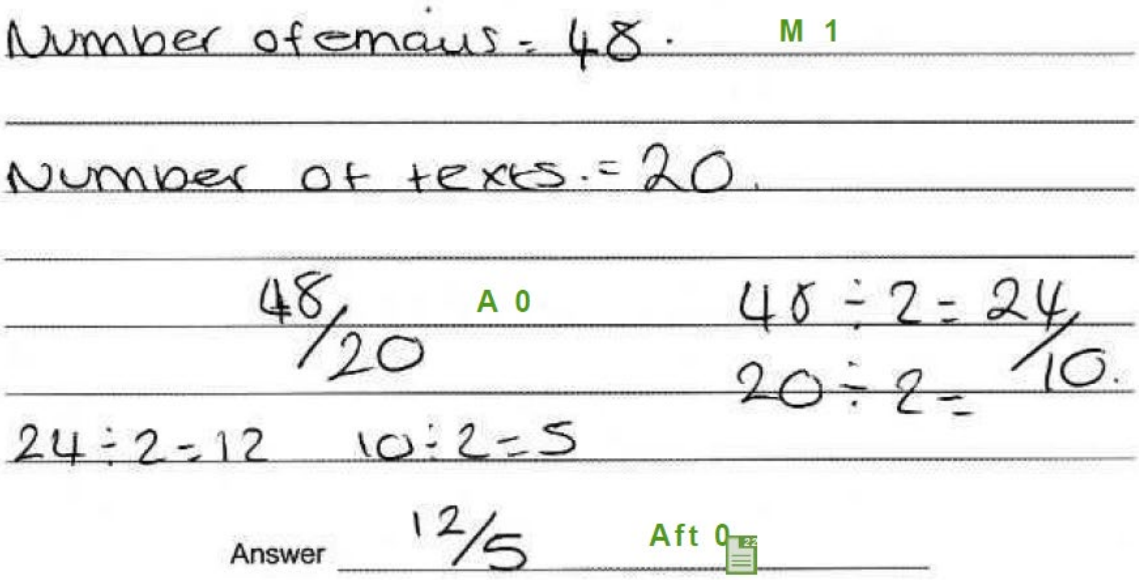
Student B

9 (b) In total, what fraction of the messages were emails?
Give your answer in its simplest form.

[3 marks]



Commentary

The student scores the first mark for 48. Although their final fraction is fully simplified it does not follow through from a fraction less than 1.

1 mark

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Student C

9 (b) In total, what fraction of the messages were emails?
Give your answer in its simplest form.

[3 marks]

12 + 13 + 13 + 12 + 16 = 71

12 + 8 + 10 + 6 + 12 = 48

M 1

48/71

A 0

Answer 48/71

Aft 0

Commentary

There is an error in line 1 because the first 13 should be 14 so the student gets a total of 71 instead of 72, however they gain the first mark for either the correct sum shown for the emails or the correct total of 48. Unfortunately, their fraction cannot be simplified so the last mark is unavailable.

1 mark

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Question 7

7 Here is a list of numbers.

21 17 23 21 29 32 21 25 36

Work out the median.

[2 marks]

Answer _____

Student A

7 **Here is a list of numbers.**

~~21~~ ~~17~~ ~~23~~ ~~21~~ ~~29~~ ~~32~~ ~~21~~ ~~25~~ ~~36~~

Work out the median.

[2 marks]

17, 21, 21, 21, 23, 25, 29, 32, 36 ÷ 9 = 25

Answer 25

Commentary

In this question that was on an early paper, we allowed the first mark for ordering the numbers even if the student went on to work out the mean. However, in later papers we have not given any credit for an ordered list within an incorrect method.

1 mark

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Question 6(a)

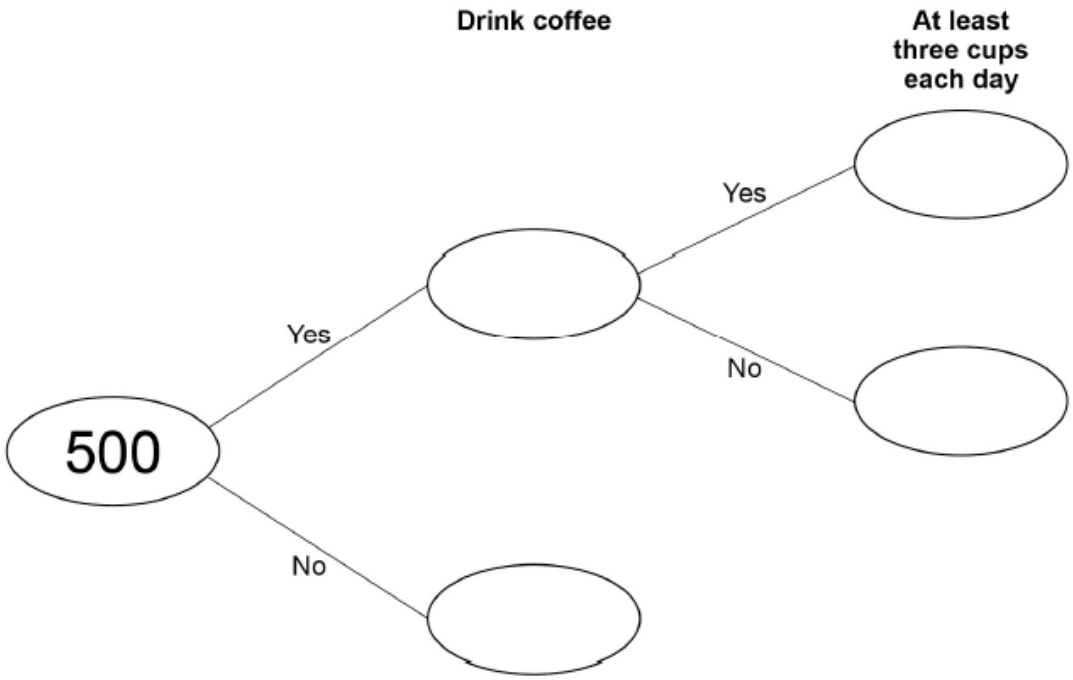
6 500 people are asked if they drink coffee.

$\frac{9}{10}$ say Yes.

20% of the people who say Yes drink at least three cups each day.

6 (a) Complete the frequency tree.

[4 marks]



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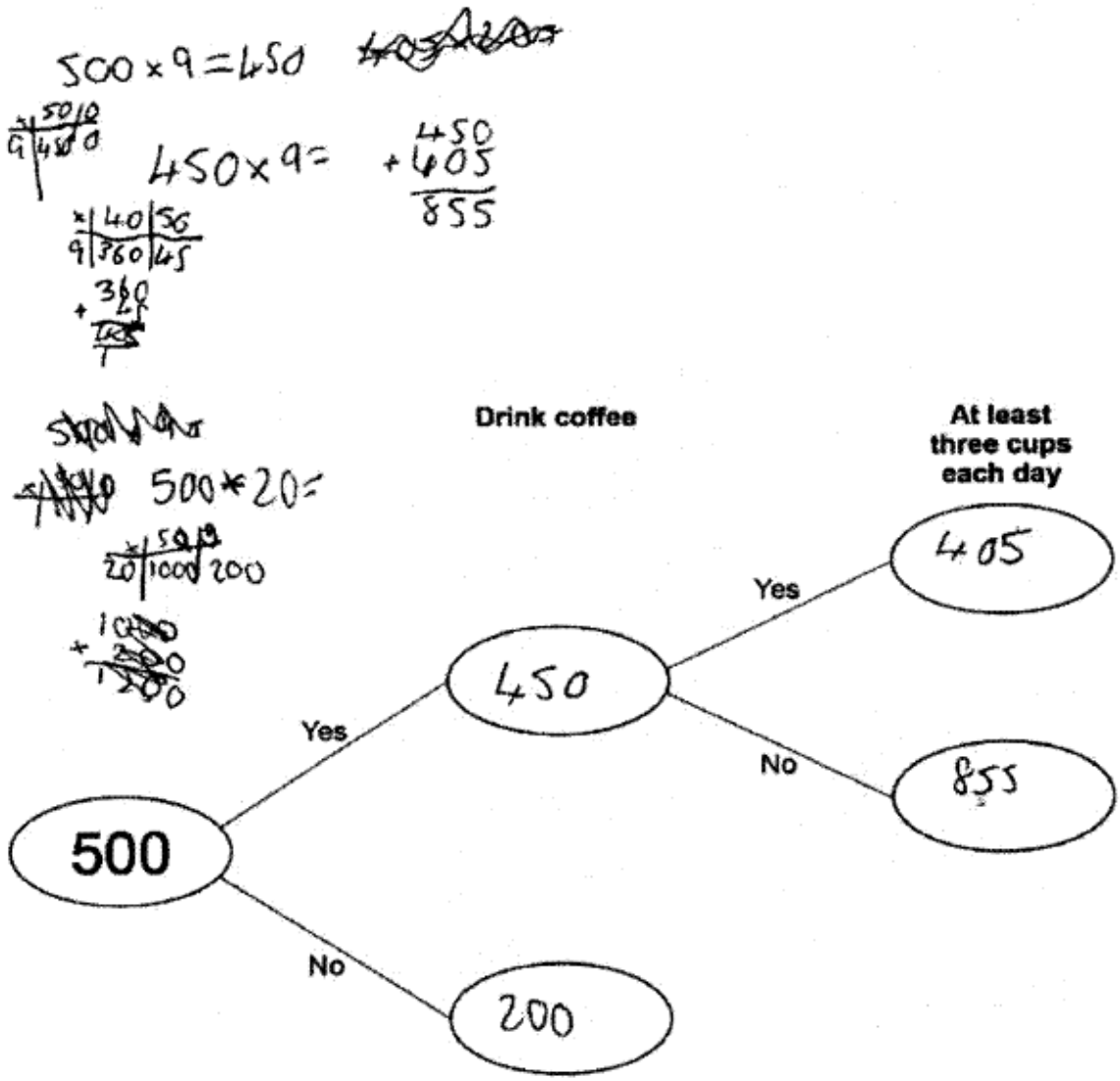
Student A

6 500 people are asked if they drink coffee.

$\frac{9}{10}$ say Yes.

20% of the people who say Yes drink at least three cups each day.

6 (a) Complete the frequency tree. **[4 marks]**



Commentary

The student gains the first mark for 450 in the correct position. The other three marks can follow through if their 450 is incorrect, but not in this case.

1 mark

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Question 6(b)

6 (b) What fraction of the 500 people drink at least three cups of coffee each day?

Give your answer in its simplest form.

[2 marks]

Answer _____

Student A

6 (b) What fraction of the 500 people drink at least three cups of coffee each day?

Give your answer in its simplest form.

[2 marks]

Answer 

Commentary

Even though the student has crossed out their answer, there is no other work so we would mark it. However, this student did not have 4 in their diagram. If they had, this response would have scored 1 mark for an unsimplified fraction that followed through.

Similarly, even though 4 did not follow through, had the student simplified their answer they would have been awarded the second mark.

0 marks

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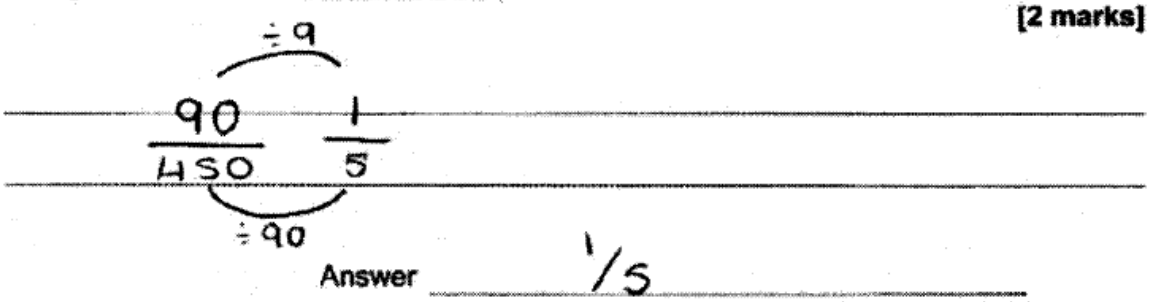
Student B

6 (b) What fraction of the 500 people drink at least three cups of coffee each day?

Give your answer in its simplest form.

[2 marks]



Commentary

The 500 is given in the question so there is no follow through on that value and the student does not gain the first mark. However, they have correctly simplified their fraction so score the second mark.

1 mark

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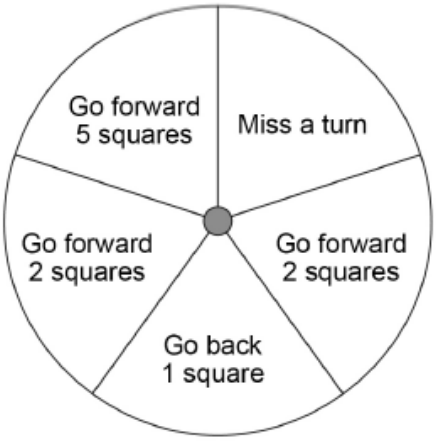
Question 10 (a)

10 In a game, a fair spinner has five equal sections as shown.



10 (a) Chloe spins the spinner.

Write down the probability that she gets 'Miss a turn'.

[1 mark]

Answer _____

Student A

10 (a) Chloe spins the spinner.

Write down the probability that she gets 'Miss a turn'.

[1 mark]

Answer 1 : 5 (6) B 0

Commentary

Probability answers given as a ratio always score 0.
0 marks

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Question 10 (b)

10 (b) The spinner lands on 'Go back 1 square' three times in a row.

Jamal is next to spin.

Write down the probability that he gets 'Go back 1 square'.

[1 mark]

Answer _____

Student A

10 (b) The spinner lands on 'Go back 1 square' three times in a row. $\frac{1}{5}, \frac{1}{5}, \frac{1}{5}$

Jamal is next to spin.

Write down the probability that he gets 'Go back 1 square'.

[1 mark]

Answer unlikely

B 0

Commentary

The three occurrences of one fifth relate to the spinner landing three times on that section rather than the fourth probability. However, 'unlikely' alongside an answer of one fifth would score the mark.

0 marks

Student B

10 (b) The spinner lands on 'Go back 1 square' three times in a row. $\frac{1}{5}$ $\frac{1}{5}$ $\frac{1}{5}$ $\frac{3}{5}$

Jamal is next to spin.

Write down the probability that he gets 'Go back 1 square'. $\frac{1}{5}+\frac{1}{5}+\frac{1}{5}=\frac{3}{15}$ **[1 mark]**

Answer $\frac{3}{15}$ 0

B 0

Commentary

In general, if an answer comes from incorrect work it is not credited and here the fraction clearly comes from an incorrect method for addition.

0 marks

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Question 10 (c)

10 (c) In one game there are 85 spins.

How many of these spins are expected to be 'Go forward 2 squares'?

[2 marks]

Answer _____

Student A

10 (c) In one game there are 85 spins.

How many of these spins are expected to be 'Go forward 2 squares'?

[2 marks]

$85 \div 5 = 17$

$17 \times 2 = 34$

2

Answer $\frac{34}{85}$

M 1

A 0

Commentary

The student has chosen to give the answer as a probability so loses the final mark.
1 mark

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Question 18

18 Here are five cards.

One of the cards is removed.

The mean of the numbers on the remaining four cards is 6

Which card was removed?

You **must** show your working.

[3 marks]

Answer _____

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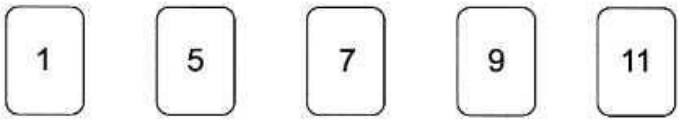
Student A

18 Here are five cards.



One of the cards is removed.

The mean of the numbers on the remaining four cards is 6

Which card was removed?

You **must** show your working.

[3 marks]

mean of all cards is =

1+5+7+9+11=33

33 ÷ 5 = 6 · 6.

Answer _____

Commentary

In Alternative method 1, the second mark is independent so the student can gain that mark without the first, as is the case here. The method for the total of all the cards or the value 33 scores 1 mark.

1 mark

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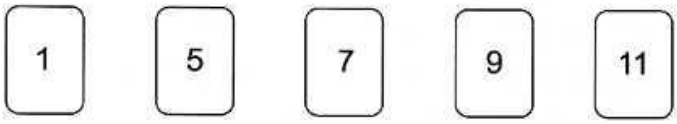
Student B

18 Here are five cards.



One of the cards is removed.

The mean of the numbers on the remaining four cards is 6

Which card was removed?

You **must** show your working.

[3 marks]

M ~~5+7+9+11~~ 5+7+9+11÷4=8

Mean = Add all numbers, Divide by how many numbers there are all together

Answer _____

Commentary

In Alternative method 2, the first mark is for showing the method for the mean of any four of the numbers and the second mark is for accurately evaluating it. Here the student's method is incorrect because the brackets around the addition are missing so if the student had stopped at that stage, they would have not gained any marks. However, they recover by giving the correct mean for their values, so the brackets are implied and they score the first two marks.

2 marks

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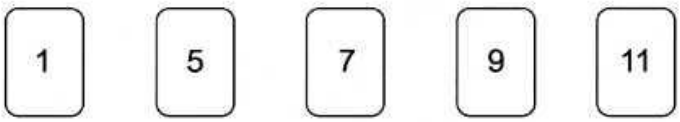
Student C

18 Here are five cards.



One of the cards is removed.

The mean of the numbers on the remaining four cards is 6

Which card was removed?

You **must** show your working.

[3 marks]

1+5+7+9+11 = 33 ÷ 5 = 6.6.

1+5+7+11 = 24 ÷ 4 = 6.

Answer 9.

Commentary

The student shows two methods but the second leads to the answer line and is fully correct.
3 marks

Question 9

No examples available

Question 23

Please see the mark scheme

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