OCR
Oxford Cambridge and RSA

GCSE (9–1)

Exemplar Candidate Work

MATHEMATICS

J560
For first teaching in 2015

J560/01

Summer 2017 examination series

Version 1

Contents

Introduction

These exemplar answers have been chosen from the summer 2017 examination series.

OCR is open to a wide variety of approaches and all answers are considered on their merits. These exemplars, therefore, should not be seen as the only way to answer questions but do illustrate how the mark scheme has been applied.

Please always refer to the specification (http://www.ocr.org.uk/Images/168982-specification-gcse-mathematics-j560.pdf) for full details of the assessment for this qualification. These exemplar answers should also be read in conjunction with the sample assessment materials and the June 2017 Examiners' Report to Centres available on the OCR website http://www.ocr.org.uk/qualifications/.

The question paper, mark scheme and any resource booklet(s) will be available on the OCR website from summer 2018. Until then, they are available on OCR Interchange (school exams officers will have a login for this).

It is important to note that approaches to question setting and marking will remain consistent. At the same time OCR reviews all its qualifications annually and may make small adjustments to improve the performance of its assessments. We will let you know of any substantive changes.

Question 3(c)

3 Here is a list of numbers.

| 11 | 27 | 81 | 21 | 41 | 42 | 23 | 39 | 45 |

From this list, write down

(c) all the prime numbers.

(c) .... [2]

Mark(s): 2

(c) all the prime numbers.

(c) 11, 23, 41 [2]

Examiner commentary

This question is fully correct so scores 2 marks .

B1 would be awarded to candidates who listed 2 values, or 3 correct values with no more than one incorrect.

Question 4

Karen made 40 cakes.

She gives $\frac{1}{5}$ of the cakes to Andrew.

She gives 10% of the 40 cakes to Chris.

What fraction of the 40 cakes does she have left?

.... [3]

Exemplar 1 – Mark(s): 3

$$\frac{1}{5} \times 40 = 8$$

$$40 - 8 = 82$$

$$10\% = \frac{1}{10} \times 40 = 4$$

$$8 + 4 = 12$$

$$\begin{array}{r} 40 \\ -12 \\ \hline 28 \end{array}$$

$\frac{28}{40}$ cakes.

$\frac{28}{40}$ .... [3]

Examiner commentary

The answer of $\frac{28}{40}$ is fully correct so scores 3 marks.

Exemplar 2 – Mark(s): 2

$40 \div 5 = 8$

$40 \div 10 = 4$

andrew
$\frac{1}{5} = 8$

Chris

$10\% \text{ of } 40 = 4$

$8 + 4 = 12$

$40 - 12 = 28$

28   [3]

Examiner commentary

The question asks for the answer to be given as a fraction, which this candidate has not done. They have correctly worked out $\frac{1}{5}$ of 40 and 10% of 40, either of which would have scored B1. They then correctly add these together and subtract the total from 40, so score the method mark as well. The final mark is not awarded as the answer is not given as a fraction.

Question 6

Work out 17% of 54.
Give your answer correct to 1 decimal place.

.... **[3]**

Exemplar 1 – Mark(s): 3

$$17\% \times 54 = 9.18$$
$$= 9.2 \ (1dp)$$

9.2

.... **[3]**

Examiner commentary

A fully correct answer scoring 3 marks.

Exemplar 2 – Mark(s): 2

10% $54 \div 10 = 5.4$

5% $5.4 \div 2 = 2.7$

1% $54 \div 100 = 0.54$

$5.4 + 2.7 + 0.54 + 0.54$
$= 9.18$ ✔
17% of 54

9.1

.... **[3]**

Examiner commentary

On a calculator paper candidates should be calculating percentages in a single step (e.g. 0.17×54), rather than using non-calculator style methods as seen here. The candidate has however correctly worked out 17% of 54 as 9.18 so scores the method and the accuracy mark. In order to gain the final mark they needed to correctly round this to one decimal place, which should be 9.2 rather than 9.1.

Question 7(a)

Simplify.

$$7t - 6u + 5t - 4u$$

(a) .... [2]

Mark(s): 1

Simplify.

$$7t - 6u + 5t - 4u$$

$$12t + 2u$$

(a) ....$12t + 2u$........ [2]

Examiner commentary

This response can be awarded one mark as the *t* terms have been correctly evaluated, however the *u* term is incorrect; giving '+ 2*u*' rather than '– 10*u*' in this question was the most common error. Candidates need to check the signs and it may help if they put in an extra line of working (e.g. $7t + 5t - 6u - 4u$) in order to avoid confusion with signs.

Question 8(c)

Apple crumble is made using these ingredients.

> Apple crumble
> Serves 6 people
>
> 550 g apple
> 200 g sugar
> 120 g flour
> 30 g butter

Abena has 1.3 kg of apples and plenty of the other ingredients.

Can she make apple crumble for 15 people?
Explain how you got your answer.

.... **[4]**

Mark(s): 4

Examiner commentary

This candidate has arrived at 1375g and correctly stated that Abena is 75g short, so is awarded 4 marks.

Candidates must ensure they respond to the question being asked, as this candidate has done. Some candidates simply stopped at 1375g without stating whether or not she could make the crumble for 15 people, only scoring 3 marks.

Question 10

The pass mark for a test is 86%.
Steve scores 52 out of 61 marks.

Does he pass the test?
Explain your answer.

....

.... **[2]**

Exemplar 1 – Mark(s): 2

$$\frac{52}{61} \times 100 = 85.2\%$$

~~Yes he does because he scored 85~~
No he does not pass the test because he scored below **[2]**
86%.

Examiner commentary

This is a fully correct answer awarded 2 marks. One mark is awarded for the method, and one for interpreting the answer in the context of the question.

Exemplar 2 – Mark(s): 1

86% of 61

Pass mark = 53

61 ÷ 100 × 86 ··   (52.46)

✗ Yes, 86% of 61 is 52.46 and he scored 52.

[2]

Examiner commentary

This candidate has correctly worked out the mark Steve scored, earning 1 mark. The second part of the question assesses the AO3 Assessment Objective element 'interpret results in the context of the given problem' and many candidates did not realise that applying the familiar mathematical concept of rounding down was not the correct thing to do for this real life situation.

Question 11

320 people go on a coach trip.
Each coach holds 53 people.

Gary says 6 coaches are needed.

Is Gary correct?
You must show your working.

....

.... [2]

Mark(s): 1

320 people go on a coach trip.
Each coach holds 53 people.

Gary says 6 coaches are needed.

Is Gary correct?
You must show your working.

yes ✗

$320 \div 53 = 6.037735...$

.... [2]

Examiner commentary

As with question 10, question 11 assesses candidates' ability to interpret a calculation result in a real life situation. Many were successful in calculating 6.03, but having done this some said that Gary was correct since 6.03 rounds to 6. A large number did however realise that in a practical situation this would not work and that 7 coaches would be needed. Some candidates who did $53 \times 6 = 318$ also had problems interpreting their result; although many correctly stated 2 people would be without seats and scored 2 marks, others said there would be 2 spare seats.

Question 12

Trish and Marc both cycled the same distance.
Trish completed the distance in 2 hours.
Her average speed was 16 miles per hour.
Marc completed the distance in 4 hours.

Find Marc's average speed for the journey.

.... mph **[2]**

Mark(s): 2

$$D = S \times T$$
$$= 16 \times 2 = 32 \text{ miles}$$
$$(M) \quad S = \frac{D}{T} = \frac{32}{4} = 8 \text{ mph}$$

8

.... mph **[2]**

Examiner commentary

The answer above is correct and scores 2 marks.

Question 15

Mr and Mrs Thomas buy tickets for themselves and their four children.
The cost of an adult ticket is £7 more than the cost of a child ticket.
The total cost of the **six** tickets is £86.

Work out the cost of an adult ticket.

£ .... **[5]**

Mark(s): 5

Examiner commentary

This is a fully correct answer awarded 5 marks. It was pleasing to see a variety of different valid approaches to answer this question, although few used algebra. The most common error was to simply divide 86 by 6. Many candidates did subtract 14 from 86 to get 72 and score 2 marks, but then came unstuck, for instance dividing 72 by 4.

Some candidates attempted trial and improvement, but this approach was rarely successful. Candidates should be encouraged to use algebra.

Question 16

The scale diagram shows the positions of town A and town B.

Scale: 1 cm represents 10 miles

B •

A •

Lucy's house is nearer to town A than to town B.
Her house is exactly 50 miles from town B.

On the scale diagram show all the possible positions of Lucy's house.
You must show all your construction lines. [5]

Mark(s): 1

Scale: 1 cm represents 10 miles
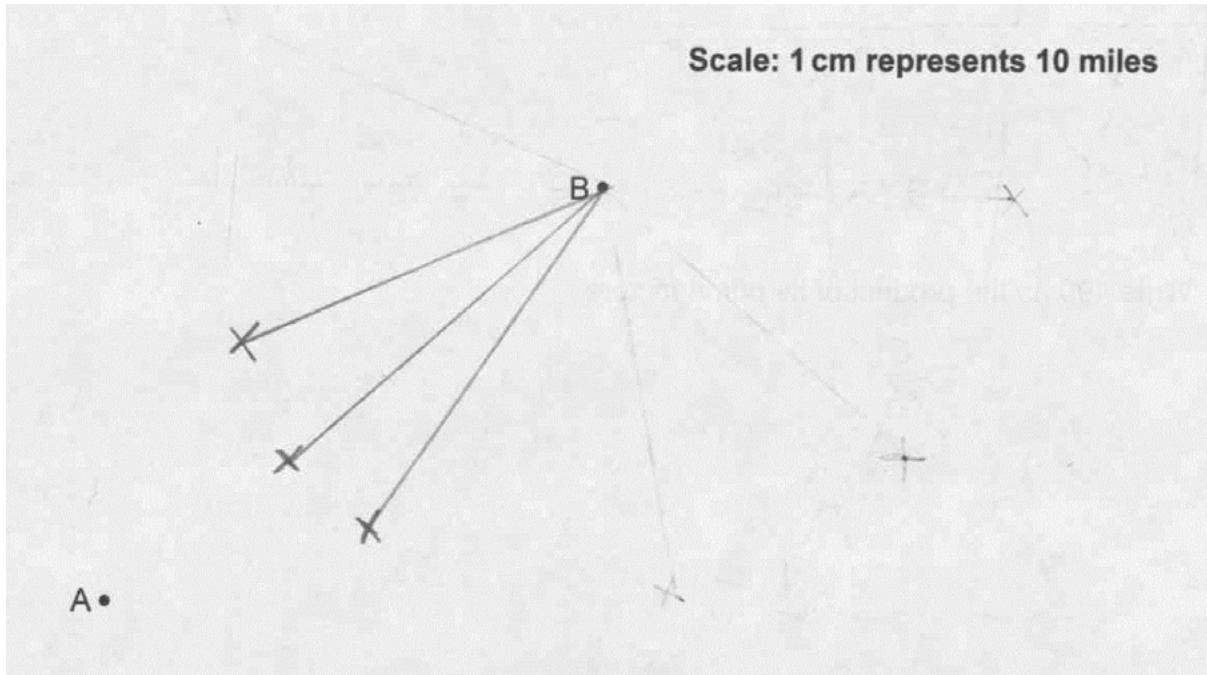
Examiner commentary

This answer scored B1 mark as the candidate has realised there should be points 5 cm from B. Identifying 3 points was the minimum allowed for the mark, but candidates drawing an arc 5 cm from B were awarded 2 marks for this.

Many candidates were not able to construct the perpendicular bisector of AB. More successful candidates drew a 5 cm arc from A, many of these scoring 4 marks. A large number had both arcs, but then shaded the region where the arcs overlapped. A small number put crosses on the correct part of the arc, but very few identified the whole complete arc.

A small number were not able to interpret the scale. Some appeared not to have or not to know how to use a pair of compasses.

Question 17

At the start of 2014 Priya's house was worth £240 000.
The value of her house increased by 5% every year.

Work out the value of her house at the start of 2017.

£ .... **[3]**

Mark(s): 3

$$240\,000 \times 1.05^3 = 277\,830$$

£ 277 830 .... **[3]**

Examiner commentary

This is a correct answer scoring 3 marks. A large number of candidates either did not understand or did not properly read the question; 276 000 was a very common incorrect answer from simply working out 5% of 240 000, multiplying it by 3 and adding it to 240 000.

Question 18(a)

Write 490 as the product of its prime factors.

(a) .... [2]

Mark(s): 2
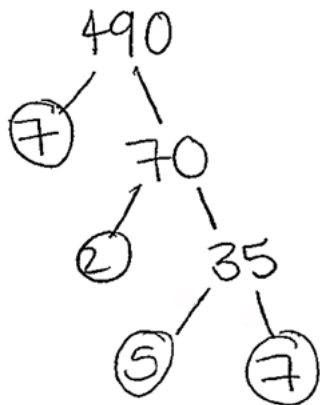
(a) $\underline{7^2 \times 2 \times 5}$ [2]

Examiner commentary

This is a correct response, awarded 2 marks. Simply listing the factors (e.g. '7, 7, 5, 2') was a common error that was awarded 1 mark. Others able to make a start by identifying a factor pair of 490 were awarded 1 method mark.

Question 18(b)

Buses to Ayton leave the station every 25 minutes.
Buses to Bleeford leave the station every 40 minutes.
Buses to both places leave at 9am.

What is the next time buses to Ayton and Bleeford leave the station together?

(b) .... [4]

Exemplar 1 – Mark(s): 4

Examiner commentary

This answer is fully correct for 4 marks. The mark scheme states 12 20 [pm]. The square brackets mean that if anything is added after 12 20 it must be pm, but it can just be 12 20.

Exemplar 2 – Mark(s): 3

9 AM.   9 AM
9:25 : 9:40
9:50 : 10:20
10:15 : 11:00
10:40 . 11:40
11:05 : 12:20
11:30 : 13:00
11:55 : 13:40
12:20   13:20
        14:00

(b) ....12:20 AM....... [4]

Examiner commentary

Although this candidate was able to work out the time intervals and arrive at 12:20, adding 'AM' made the answer incorrect, scoring 3 marks rather than 4. Listing times rather than working out the LCM was by far the most common approach to this question. When listing it should be clearly set out as above; some candidates had simply written the minutes, e.g. '25, 50, 15'. For the 40 minutes times 10:60 was quite often seen, rather than 11:00.

Exemplar 3 – Mark(s): 1

40 Mins) 9am = 9.25   9.50.   10.18   11.05   11.50   12.30
25 Mins) 9am = 9.40   10.20   11.45   12.05   12.30

(b) ....12.30....... [4]

Examiner commentary

This candidate has made an attempt at listing and has one list of times correct, so is awarded B1. Had 11:00 rather than 11:45 been in the second list then 2 marks would have been awarded, as 3 correct times in each list were required.
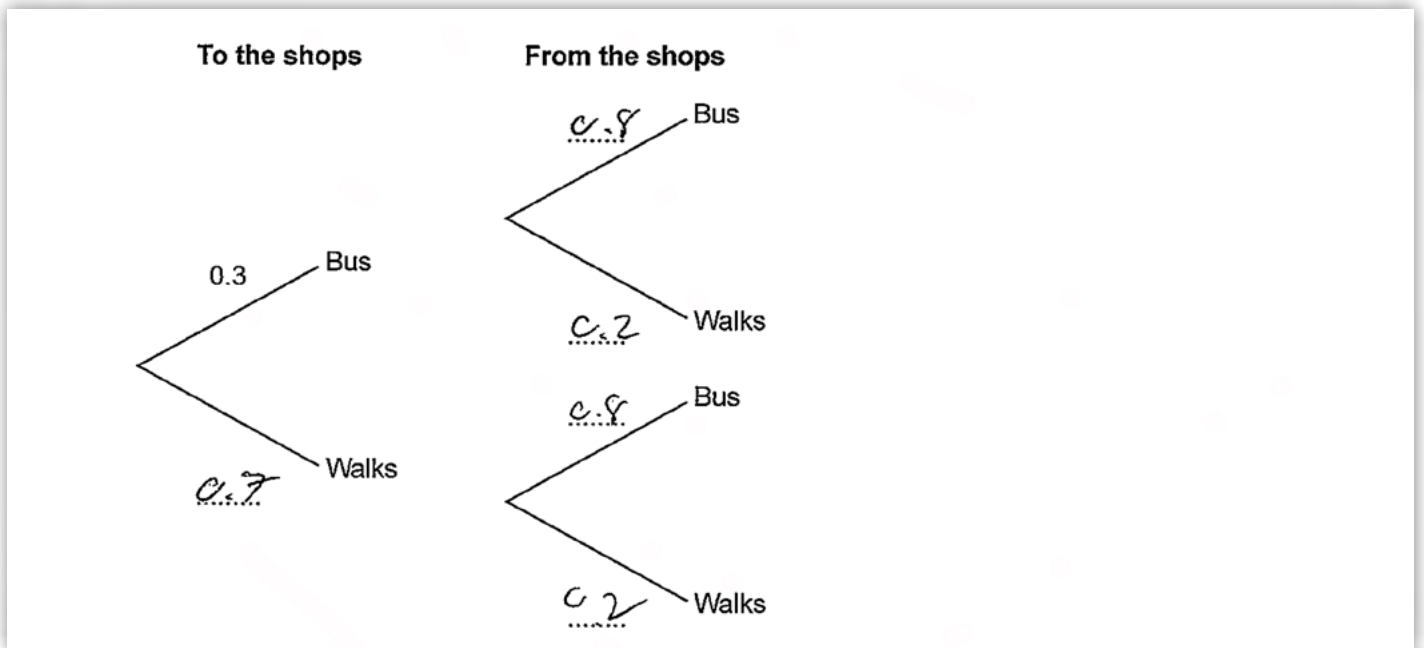
Question 19(a)

Kirsty either travels by bus or walks when she visits the shops.
The probability that she catches the bus **to** the shops is 0.3.
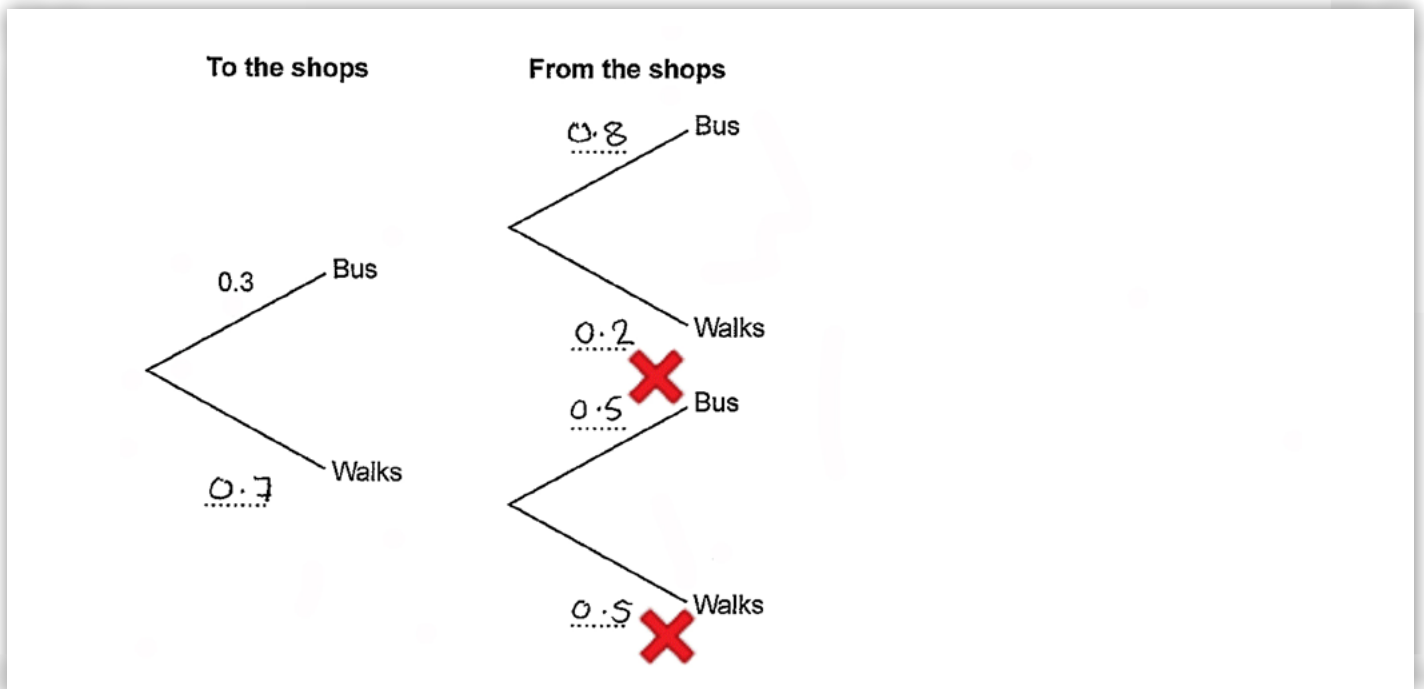The probability that she catches the bus **from** the shops is 0.8.

To the shops   **From the shops**

```
                                          ........  ___ Bus
0.3  ___ Bus
                                          ........  ``` Walks

                                          ........  ___ Bus
     ``` Walks
........
                                          ........  ``` Walks
```
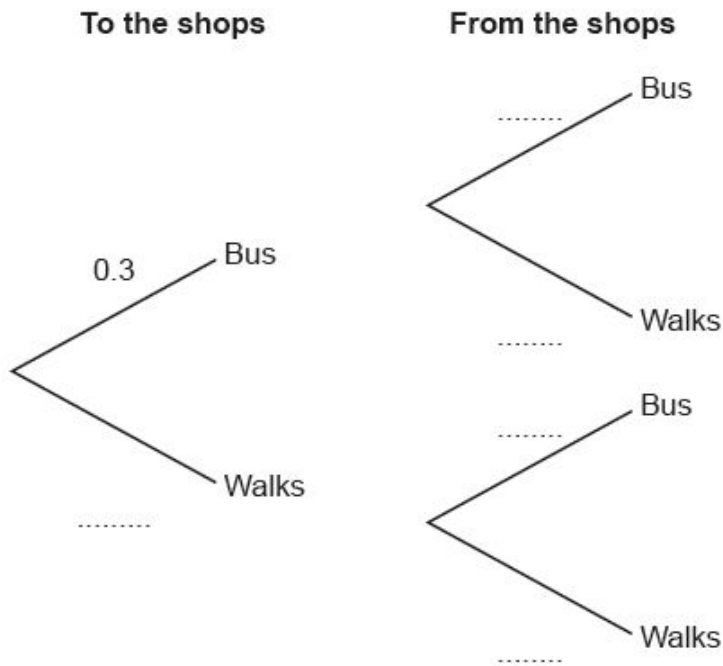
(a) Complete the tree diagram.   [2]

Exemplar 1 – Mark(s): 2

Examiner commentary

This tree diagram is fully correct and so scores 2 marks.

Exemplar 2 – Mark(s): 1

Examiner commentary

This was a common answer. The first pair of branches is correct so scores 1 mark. For the second mark all 4 gaps in the second set of branches needed to be correct; some wrote 0.8, 0.2 for the upper pair and then 0.2, 0.8 for the lower, while others repeated 0.3 and 0.7.

Question 19(b)

(b) Show that the probability that Kirsty walks at least one way is 0.76.

.... [2]

Exemplar 1 – Mark(s): 2

$0.3 \times 0.2 = 0.06$ $0.06 + 0.14 + 0.56 = 0.76$

$0.7 \times 0.2 = 0.14$

$0.7 \times 0.8 = 0.56$

All the propability that she will atleast walk [2] one way gives 0.76.

Examiner commentary

This candidate has clearly shown the probability that Kirsty walks is 0.76 and scores both marks. This was not achieved by many.

Exemplar 2 – Mark(s): 0

$0.7 + 0.2 + 0.2 = 0.11$

Examiner commentary

There is nothing that can be credited marks in this response; unfortunately addition rather than multiplication was a common error.

Question 20

Mo's tyre pressure gauge shows a reading which is 12% higher than the actual pressure.

What is the actual pressure when Mo's gauge shows 38.64?

.... [3]

Mark(s): 3

$$\div112 \quad \overset{112\% = 38.64}{\underset{\div112}{\overset{}{\Bigg(}}} \div 112$$

$$1\% = 0.345$$

$$\times100 \quad \Bigg(100\% = 34.5 \Bigg) \times100$$

.............34.5.................. [3]

Examiner commentary

This fully correct answer scored all 3 marks. Although many candidates produced attempts, most were not able to access this question, with few scoring the B1 (for giving 1.12 or 112%). Many had not understood the question; a very common answer was 34.0032 from finding 12% of 38.64 and subtracting it. There were also a significant number of candidates who did not attempt the question.

Question 21

The diagram shows a semi-circle inside a rectangle of length 120 m.
The semi-circle touches the rectangle at A, B and C.

Not to scale
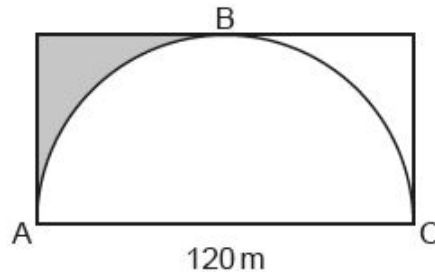
Calculate the **perimeter** of the shaded region.
Give your answer correct to 3 significant figures.

.... m **[5]**

Mark(s): 5

circumference = πd

120 ÷ π = $\frac{376.9911184}{4}$ = 94.24777961

120 ÷ 2 = 60 m
60 + 60 + 94.24777961 = 214 (3sf)

.............2.14.................. m **[5]**

Examiner commentary

This shows a fully correct answer, scoring 5 marks. Many candidates had not given their answer to 3 significant figures so could not be awarded full marks. B1 was awarded often for identifying 60 as either the width of the rectangle or the distance from B to the corner. Many candidates were able to make an attempt at the circumference (although some used the area formula), but then used the whole circumference or divided it by just 2 rather than by 4. Not including both of the straight sides of the shaded region was another common error.

It may help candidates if they break the question down in order to realise what is wanted.

Question 22(a)

A, B, C and D are four towns.

B is 25 kilometres due East of A.
C is 25 kilometres due North of A.
D is 45 kilometres due South of A.

North

Not to scale

C ×

A ×   ×
         B

D ×
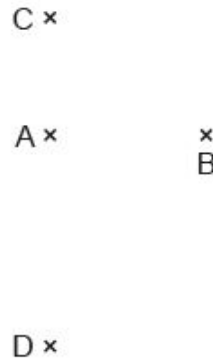
(a) Work out the bearing of B from C.

(a) ....° [2]

Mark(s): 0

A, B, C and D are four towns.

B is 25 kilometres due East of A.
C is 25 kilometres due North of A.
D is 45 kilometres due South of A.

North

Not to scale

C×

A×

B

D×
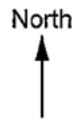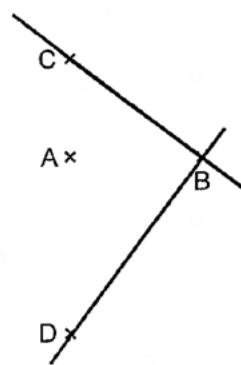
(a) Work out the bearing of B from C.

(a) ....053.........................° [2]

Examiner commentary

Very few candidates gained any marks on this question and many did not even make an attempt. Despite the fact that 'Not to scale' was stated, many just attempted to measure the diagram.

Question 22(b)

(b) Calculate the bearing of D from B.

(b) ....° [4]

Mark(s): 0

(b) ....213...............° [4]

Examiner commentary

As with part (a), very few candidates gained any marks on part (b) and many did not make an attempt. Many again attempted to measure the diagram.

Question 23(a)

The table shows the average number of customers per day entering a shop.

Months	2015				2016			
	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec
Average number of customers per day	119	264	368	172	130	304	381	192

(a) Complete the time series graph below.
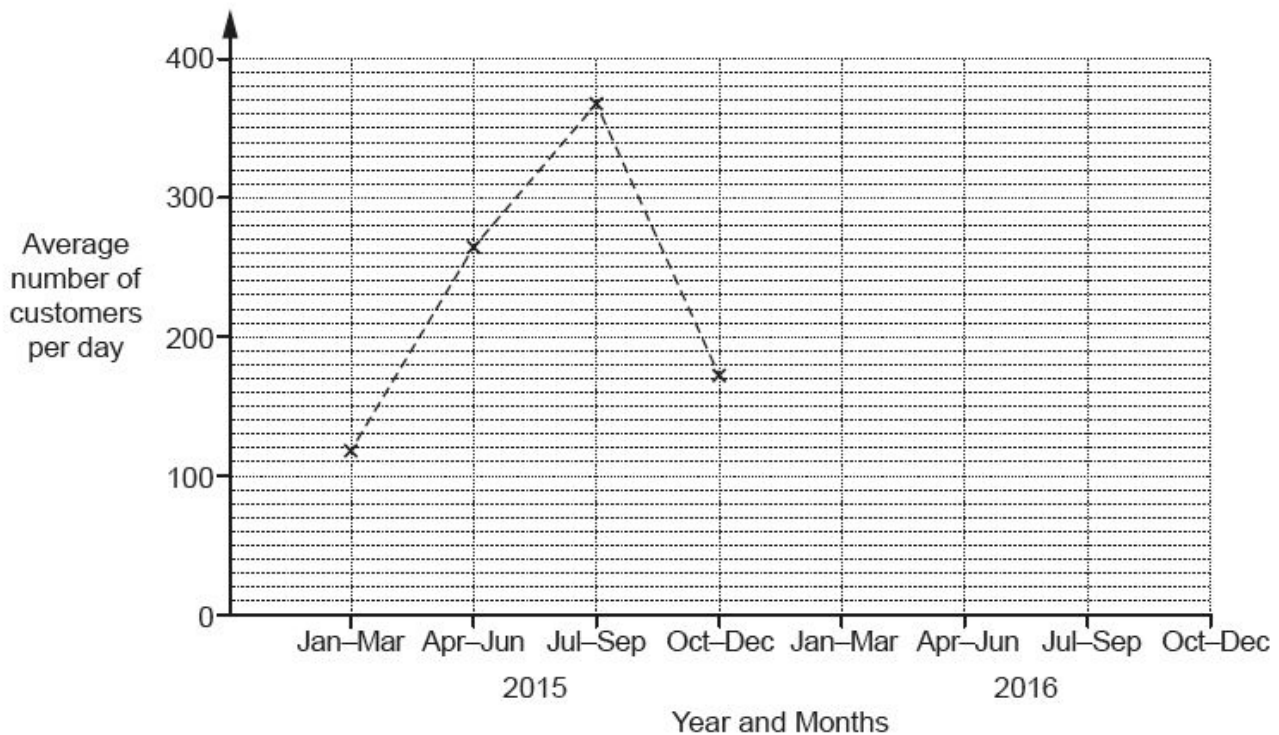
[2]

Mark(s): 1

(a) Complete the time series graph below.

[2]
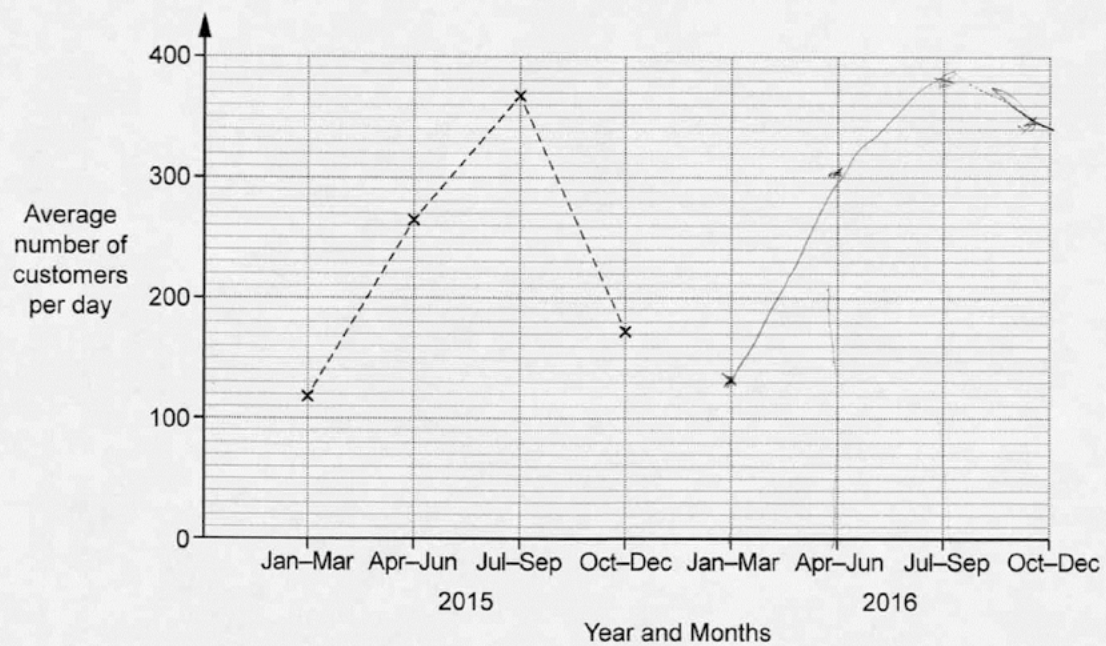
Examiner commentary

Many candidates scored both marks for correctly plotting all four points. B1 was awarded for correctly plotting 2 or 3 points, which this candidate was awarded as the last point is incorrectly plotted. Candidates should ensure they use a sharp pencil in order to ensure that plotted points are within tolerance.

Question 23(b)

(b) Make two different comments comparing the number of customers entering the shop in 2015 and 2016.

Comment 1 ....

....

....

Comment 2 ....

....

....

[2]

Exemplar 1 – Mark(s): 2

Comment 1 In Jan – Mar in 2015 and 2016 there were a similar average number of customers per day.

Comment 2 Overall there were more number of customer entering the shop in 2016.

[2]

Examiner commentary

Two different comments were required in this part. This candidate makes valid comparisons of the whole of the year 2015 to the whole of the year 2016 and then the same season (Jan – Mar) in both years, so both marks are awarded.

Exemplar 2 – Mark(s): 1

Comment 1 .....More......Customers......in......Summer......in......
2016.....than......2015

Comment 2 ...Ir...The....Shops.....dropped.....Customers......when...it...
Came......winter.

[2]

Examiner commentary

Although this candidate has made two statements, they are from the same category (seasons within a year) so only 1 mark is awarded. Many candidates had not made statements from different categories.

Question 24(a)

Each week Dan drives two routes, route X and route Y.

One week he drives route X three times and route Y twice.
He drives a total of 134 miles that week.

Another week he drives route X twice and route Y five times.
He drives a total of 203 miles that week.

(a) Find the length of each route.

(a) route X = ... miles

route Y = ... miles **[5]**

Exemplar 1 – Mark(s): 3

24 Each week Dan drives two routes, route X and route Y.

One week he drives route X three times and route Y twice.
He drives a total of 134 miles that week.

Another week he drives route X twice and route Y five times.
He drives a total of 203 miles that week.

(a) Find the length of each route.

$$3x + 2y = 134$$

$$\boxed{\text{M1}} \quad 3x + 2y = 134 \quad ①$$
$$\boxed{\text{M1}} \quad 2x + 5y = 203 \quad ②$$

×5

$$2x + 5y = 203$$
$$2 \times 13.75 + 5 \times 35.5 = 205$$

$$15x + 10y = 268 \quad ③$$
$$\boxed{\text{M1}} \quad 4x + 10y = 406 \quad ④$$

$$3 \times 35.5 + 2y = 134 \quad ④$$

$$19x = 674 \quad ⑤$$
$$x = 35.5$$

$$106.5 + 2y = 134$$

$$134 - 106.5 = 2y$$

$$2y = 27.5$$

$$y = 13.75$$

(a) route X = 35.5 miles

route Y = 13.75 miles **[5]**

Examiner commentary

This candidate has realised they can use simultaneous equations and scored the first 2 method marks for correctly writing an equation for each statement. They have scored the third method mark for attempting to equate the coefficients; they have made one arithmetic error (268), but this is allowed for the mark.
The final marks are not scored as they have added rather than subtracted their equations when attempting to eliminate a variable.

Exemplar 2 – Mark(s): 2

24   Each week Dan drives two routes, route X and route Y:

One week he drives route X three times and route Y twice.
He drives a total of 134 miles that week.

Another week he drives route X twice and route Y five times.
He drives a total of 203 miles that week.

(a)   Find the length of each route.

(a) route X = 5 miles

route Y = 7 miles [5]

Examiner commentary

This candidate has also realised the need to use algebra and has scored the first 2 method marks for writing two equations with both variables, however they have not been able to make any further progress. It is pleasing to see this candidate underlining the important information in the question to aid themselves.

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