OCR
Oxford Cambridge and RSA

Model Solutions

F

GCSE (9–1) Mathematics

J560/01 Paper 1 (Foundation Tier)

Thursday 25 May 2017 – Morning

Time allowed: 1 hour 30 minutes

You may use:
- A scientific or graphical calculator
- Geometrical instruments
- Tracing paper

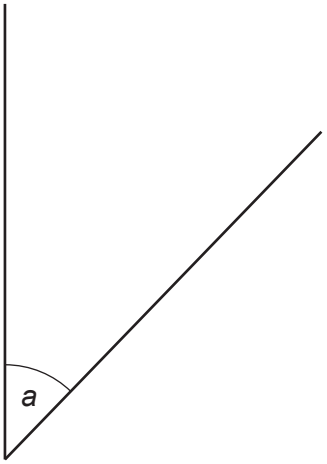
First name									
Last name									
Centre number						Candidate number				

INSTRUCTIONS
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Read each question carefully before you start to write your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided.
- Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the barcodes.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- This document consists of **20** pages.

Answer **all** the questions.

1 **(a)** **(i)** Measure angle *a*.



use a protractor

(a)(i) 44° ..... ° **[1]**

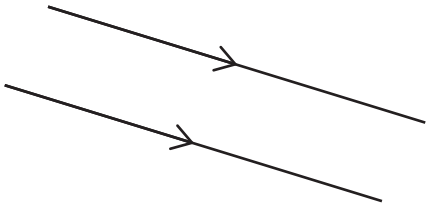
(ii) Write down the mathematical name of this type of angle.

less than 90°

(ii) Acute ..... **[1]**

(b) Choose one of these words to complete the following sentence.

perpendicular vertical parallel horizontal



These are parallel ..... lines. **[1]**

indicated by arrows.
↳ never touch

2 **(a)** Use one of these symbols $<$, $>$ or $=$ to make each statement true.

bigger

(i) 17.6 ..... > ..... 17.06 **[1]**

(ii) 0.9 ..... = ... $\frac{45}{50}$ 0.9 **[1]**

(b) Round 184 329 to the nearest hundred.

2 < 5
round down

(b) 184 300 **[1]**

(c) Write $\frac{5}{8}$ as a decimal.

$= 8\overline{)5.^{5}0^{2}0^{4}0}$ 0.625

(c) 0.625 **[1]**

3 Here is a list of numbers.

11 27 81 21 41 42 23 39 45

From this list, write down

(a) the even number,

ends in 0, 2, 4, 6, 8

(a) 42 **[1]**

(b) the square number,

9 x 9 =

(b) 81 **[1]**

(c) all the prime numbers.

only divisible by one and itself

(c) 11, 41, 23 **[2]**

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?

Cakes for Andrew: $\frac{1}{5}$ of 40 = 8 cakes

for Chris: 10% of 40 = 4 cakes +

12

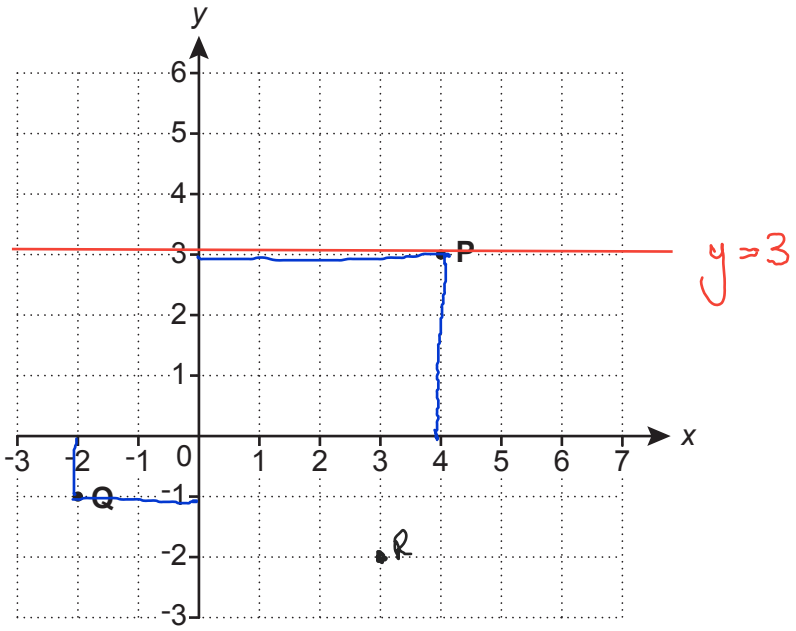
She gives away 12 cakes,

She has 40 − 12 = 28 cakes left.

She has $\frac{28}{40}$ left $\begin{matrix}\div 4\\ \div 4\end{matrix}$ = $\frac{7}{10}$

..... **[3]**

5 Points **P** and **Q** are shown on this grid.



(a) **(i)** Write down the coordinates of point **P**.

x y

(a)(i) (4 , 3) **[1]**

(ii) Write down the coordinates of point **Q**.

x y

(ii) (-2 , -1) **[1]**

(b) Plot point **R** at (3 , -2). **[1]**

(c) Draw the line $y = 3$ on the grid. **[1]**

All values of y is 3 along this line

0·17

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

OR 0·17 × 54 = 9.18

1% = 54 ÷ 100 = 0·54

17% = 0·54 × 17

$$\begin{array}{r} {}^{3}\,{}^{2} \\ 0.54 \\ \times \quad 17 \\ \hline 3.78 \\ +\,5.40 \\ \hline \end{array} \quad = 9.18$$

9.2 (1dp) ..... **[3]**

7 **(a)** Simplify.

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

7+5 −4−6

= 12t − 10u

(a) 12t − 10u ..... **[2]**

(b) Factorise.

$5v + 20w$

5v÷5 20w÷5

5 is factor

(b) 5(v + 4w) ..... **[1]**

(c) Solve by factorising.

$x^2 + 10x + 21 = 0$

2 number that × to 21 and + to 10

= 7, 3

(x + 7)(x + 3) = 0

If one bracket = 0 then equation also = 0

(c) $x =$ −7 or $x =$ −3 ..... **[3]**

8 Apple crumble is made using these ingredients.

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

(a) Susumu makes apple crumble to serve ~~12 people.~~ scale = ×2

How much flour should he use?

120 × 2 =

(a) 240 g **[1]**

(b) Natalie makes apple crumble for 2 people. scale = ÷ 3

How much butter should she use?

30 ÷ 3

(b) 10 g **[1]**

(c) Abena has 1.3 kg (×1000 = 1300 g) of apples and plenty of the other ingredients.

Can she make apple crumble for 15 people? scale = $\frac{15}{6} = \frac{5}{2}$

Explain how you got your answer.

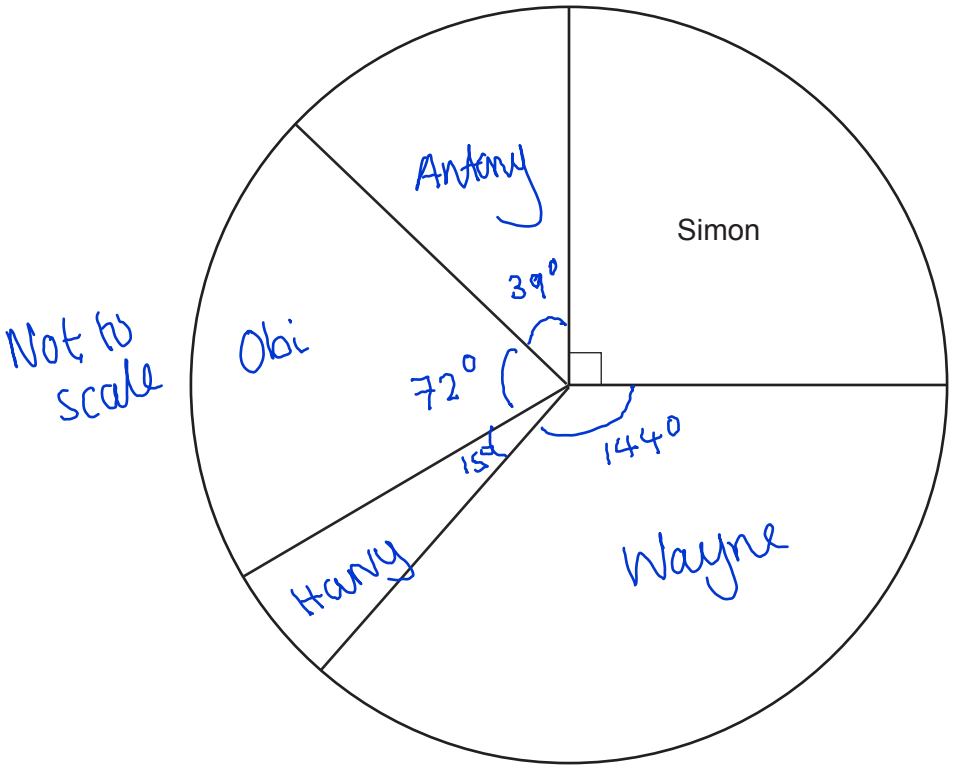
For 15 ppl, she needs $550 \times \frac{5}{2}$ g of apples.

$$\begin{array}{r} 550 \\ \times\ 2\ \ 5 \\ \hline 2750 \end{array} \qquad 2\overline{)2\,7\,5\,0} = 1375$$

$550 \times \frac{5}{2} = 1375$g

No, for 15 people she needs 1375g of apples but she only has 1300g **[4]**

9 Jorge recorded the scorers of 120 goals.
He started to draw a pie chart to show the results.



Not to scale

Use protractor to measure angles

(a) How many goals did Simon score?

$120 \times \frac{90}{360} = 120 \times \frac{1}{4}$

120 − 30 = 90

(a) 30 ..... **[1]**

(b) The table shows the **other** players who scored goals.

Name of scorer	Number of goals	Angle of sector
Wayne	48	144°
Harry	5	15
Obi	24	72°
Antony	13	39

(i) Complete the table. **[3]**

(ii) Complete the pie chart. **[2]**

90 − (48 + 24 + 5)
= 90 − 77
= 13

48 + 29 = 77

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

Does he pass the test?
Explain your answer.

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

$85.2 < 86\%$.

No, he didn't pass as he only score 85.2%.

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

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.

$320 \div 53 = 6$ remainder 2.

No, 6 full coaches will be needed and another with 2 people, therefore 7 coaches are needed

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

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.

Speed = $\frac{\text{dist}}{\text{time}}$

Find Marc's average speed for the journey.

Trish : Distance travelled = $16 \times 2 = 32$ miles

Marc : speed = $\frac{32}{4}$ =

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

13 **(a)** The ratio 20 minutes to 1 hour can be written in the form 1 : *n*.

Find the value of *n*.

20min : 60min
÷20 ↓ ↓ ÷20
1 : 3

(a) *n* = 3 **[1]**

(b) The scale on a map is 1 : 25 000.

How many kilometres on the ground is represented by 6 cm on the map?

6 x 25,000 = 150,000 cm

cm ÷100 → m ÷1000 → km
cm ÷100000 → km

150,000 ÷ 100,000
=

(b) 1.5 km **[3]**

(c) Kiri and Peter share some sweets in the ratio 6 : 7.

What fraction of the sweets does Kiri receive?

6 + 7 = 13 parts
Kiri gets 6 parts

(c) 6/13 **[1]**

14 **(a)** Write 543 000 in standard form.

5

(a) 5.43×10^5 **[1]**

(b) Write 6.3×10^{-2} as an ordinary number.

6.3×0.01

(b) 0.063 **[1]**

(c) Pierre is given this question.

> Work out.
> 61000 × 4000
> Give your answer in standard form.

Pierre's answer is 24.4×10^7.

Is Pierre correct?
Explain your answer.

8 jumps

$61000 \times 4000 = 244,000,000$

$= 2.44 \times 10^8$

Pierre's value is correct, but it is not correct in standard form as the number should be between 1 and 10, 24.4 is not **[1]**

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.

Child ticket : x

Adult : $x+7$

Total ticket price : $\underbrace{x+x+x+x}_{\text{4 children}} + \underbrace{x+7+x+7}_{\text{2 adults}}$

$86 = 6x + 14$ ← collect like terms

-14

$72 = 6x$

$\div 6$

$12 = x$

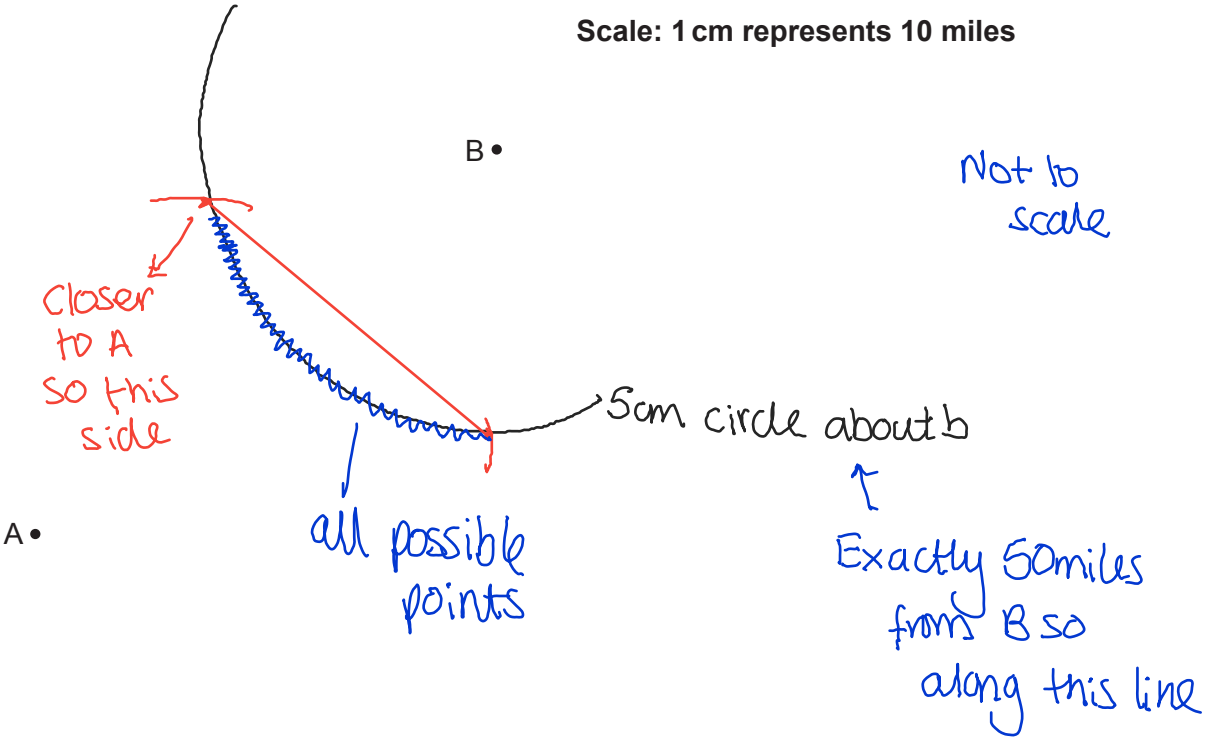
Adult $= x+7$

$= 12+7$

$= 19$

£ 19 **[5]**

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



perpendicular bisector

Lucy's house is nearer to town A than to town B.
Her house is exactly 50 miles from town B. – 50miles = 5cm

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

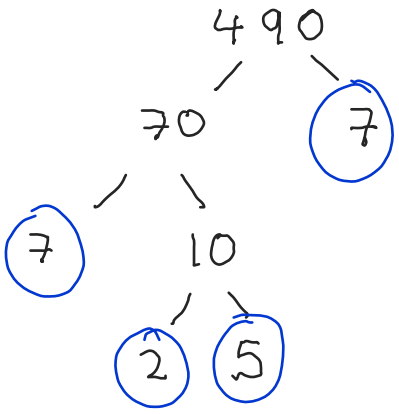
17 At the start of 2014 Priya's house was worth £240 000.
The value of her house increased by 5% every year. $-100\% + 5\% = 105\% = \times 1.05$

Work out the value of her house at the start of 2017. - 3 years

$240000 \times 1.05^3 =$

£ 277830 **[3]**

18 **(a)** Write 490 as the product of its prime factors.



$2 \times 5 \times 7 \times 7$

(a) $2 \times 5 \times 7^2$ **[2]**

(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?

LCM of 25 and 40 min
25, 50, 75, 100, 125, 150, 175, 200
40, 80, 120, 160, 200
The next time is 200 min after 9am

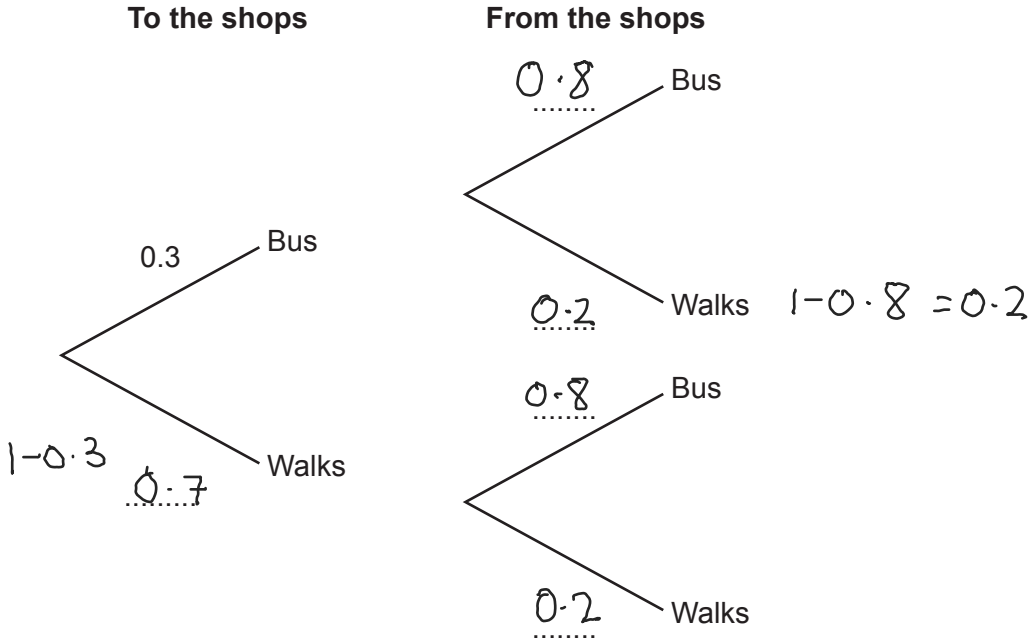
200 min = 3h 20 min

9am + 3h = 12pm

12pm + 20 min =

(b) 12:20 pm **[4]**

19 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.



(a) Complete the tree diagram. **[2]**

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

P(W and W) = 0.7 × 0.2 = 0.14

P(W and Bus) = 0.7 × 0.8 = 0.56 +

P(Bus and Walk) = 0.3 × 0.2 = 0.06

0.76

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

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?

12% higher = 100% + 12% = 112%

112% = 38.64 ÷112

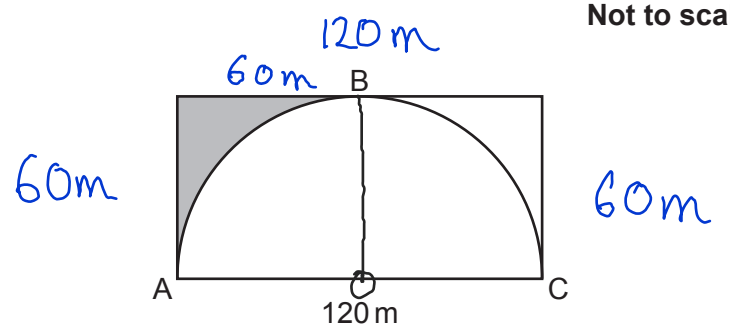
1% = 0.345 ×100

100% = 34.5

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

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.

OB = radius = 120m ÷ 2 = 60m

Circumference of AB: $\pi \times 120 \times \frac{1}{4}$ ← a quarter of a circle

$= 30\pi$

Perimeter = $60 + 60 + 30\pi$

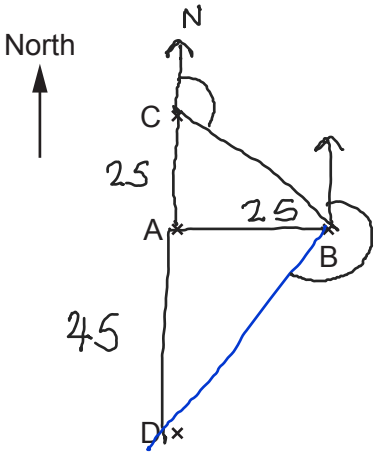
$= 214.2477...$

round down

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

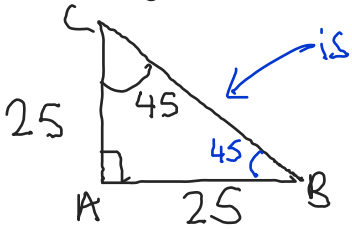
22 A, B, C and D are four towns.

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



Not to scale

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

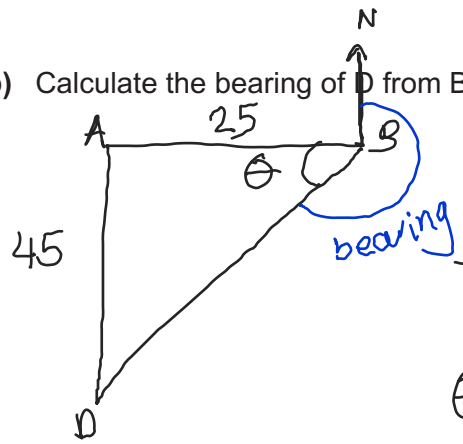


isosceles triangle

Bearing = 180 − 45

(a) 135 ° **[2]**

(b) Calculate the bearing of D from B.



$\tan\theta = \frac{opp}{adj}$

$\tan\theta = \frac{45}{25}$

$\theta = \tan^{-1}\left(\frac{45}{25}\right) = 60.9°$

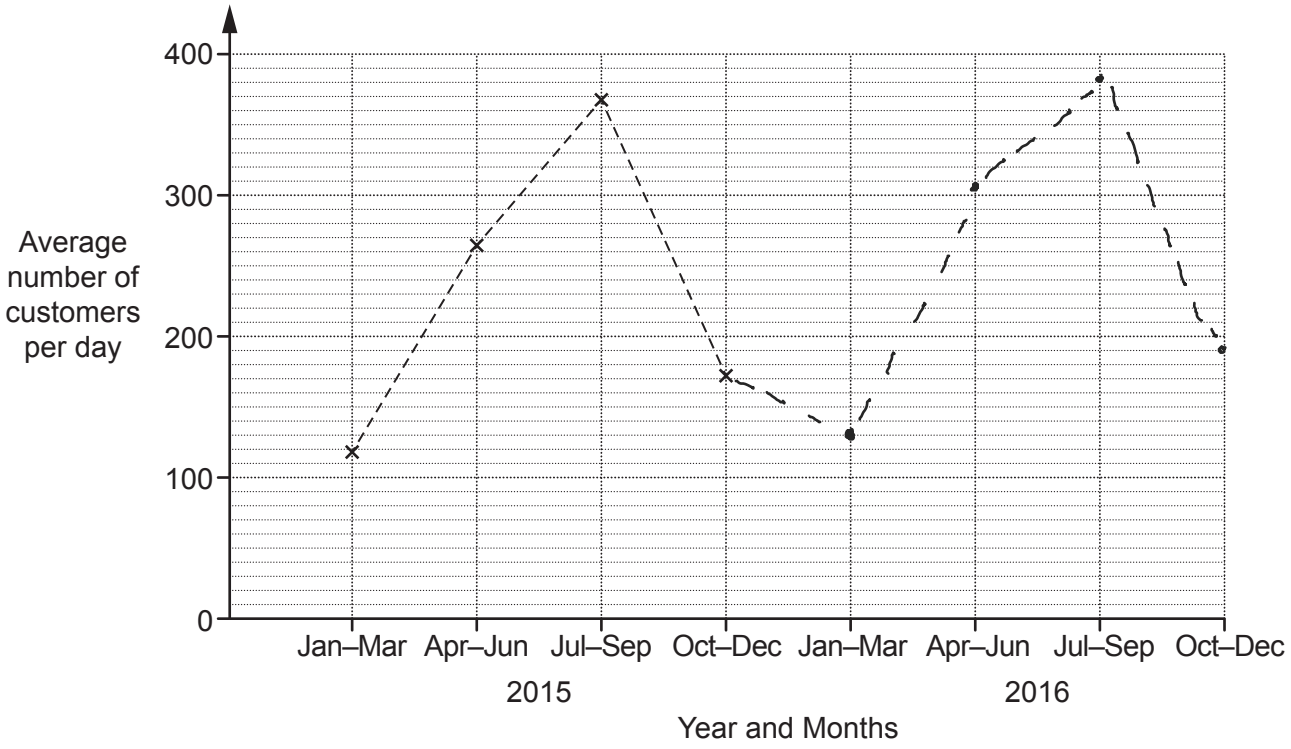
$270 - 60.9 = 209.1$

(b) 209 ° **[4]**

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

	2015				2016			
Months	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]

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

Comment 1 Overall more people entered shop in 2016 than 2015

Comment 2 In both 2015 and 2016, June to September had the most amount of customers

[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. (1)
He drives a total of 134 miles that week.

Another week he drives route X twice and route Y five times. (2)
He drives a total of 203 miles that week.

(a) Find the length of each route.

(1) $3x + 2y = 134$ $\times 2$

(2) $2x + 5y = 203$ $\times 3$

(2)$\times 3$: $6x + 15y = 609$

(1)$\times 2$ $6x + 4y = 268$ $-$

$11y = 341$

$\div 11$

$y = 31$

Sub into (1)

$3x + 2(31) = 134$

-62

$3x = 72$

$\div 3$

$x = 24$

(a) route X = 24 miles

route Y = 31 miles **[5]**

(b) State an assumption that has been made in answering part **(a)**.

There is no additional driving but Route X and Y driving **[1]**

END OF QUESTION PAPER