Surname

Other Names

Candidate Signature

AQA

General Certificate of Secondary Education
Foundation Tier
June 2013

Methods in Mathematics (Linked Pair Pilot) 93652F

F

Unit 2   **Geometry and Algebra**

Friday 21 June 2013   9.00 am to 10.30 am

For this paper you must have:
● a calculator
● mathematical instruments.

Time allowed
● 1 hour 30 minutes

Instructions
● Use black ink or black ball-point pen. Draw diagrams in pencil.
● Fill in the boxes at the top of this page.
● Answer **all** questions.
● You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
● Do all rough work in this book. Cross through any work that you do not want to be marked.
● If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

Information
● The marks for questions are shown in brackets.
● The maximum mark for this paper is 80.
● The quality of your written communication is specifically assessed in Questions 2, 17 and 20.
  These questions are indicated with an asterisk (*).
● You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.
● You are expected to use a calculator where appropriate.
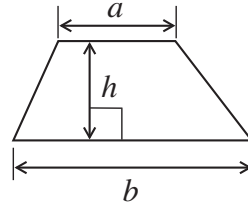
Advice
● In all calculations, show clearly how you work out your answer.

93652F

Formulae Sheet: Foundation Tier

Area of trapezium = $\frac{1}{2}(a+b)h$

Volume of prism = area of cross-section × length
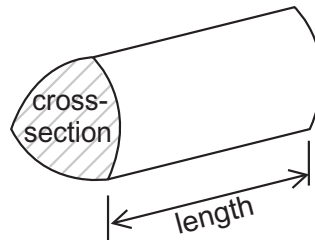
Answer **all** questions in the spaces provided.

1
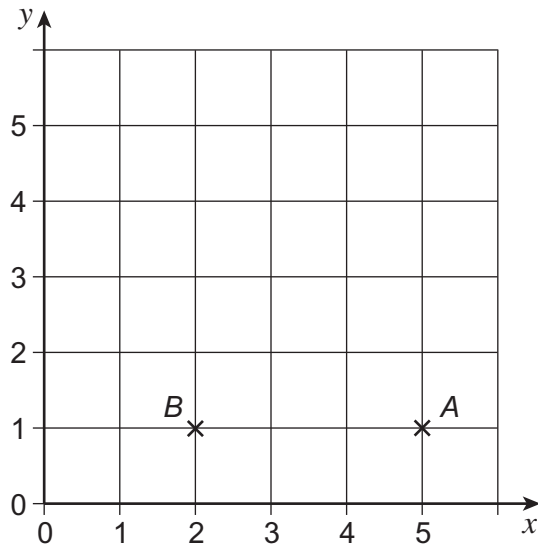
1 (a)   Write down the coordinates of *A*.

Answer (.......... , ...)   *(1 mark)*

1 (b)   Write down the coordinates of the midpoint of *AB*.

Answer (.......... , ...)   *(1 mark)*

1 (c)   Plot *C* (2, 5) on the grid.   *(1 mark)*

1 (d)   The points are joined to make a triangle *ABC*.

What is the name of this type of triangle?

Answer ....   *(1 mark)*

Turn over ▶

4

2   20p and 50p coins each have seven sides.

*2 (a)   Liam has only 20p and 50p coins.
He says his coins have a total of 44 sides.

Why is he wrong?

....

....

(1 mark)

2 (b)   Jane has coins with a value of £ 1.60

She has two 50p coins.
The rest are 20p coins.

Work out the **total** number of sides on her coins.

....

....

....

....

Answer ....   *(3 marks)*

2 (c)   Tom has only 20p and 50p coins.
His coins have a total of 77 sides.
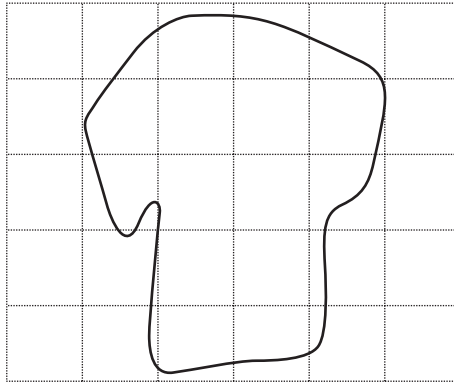
He has three more 20p coins than 50p coins.

How much money does he have?

....

....

....

....

£ ....   *(3 marks)*

3   The shape below is drawn on a centimetre grid.

Estimate the area of the shape.

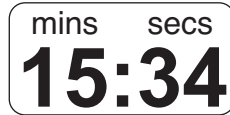Answer .... cm^2 *(2 marks)*

9

Turn over ▶

4   A timer is set to 20 minutes and **counts down.**

mins	secs
20:00	

4 (a)   How long is it until the timer shows this time?

mins	secs
15:34	

Answer .... mins .... secs   *(1 mark)*

4 (b)   A palindromic number reads the same backwards as forwards.

For example
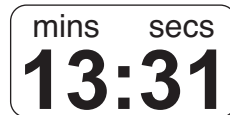
mins	secs
13:31	

How long will the timer have to **count down** until it shows the next palindromic number after 13:31?

....

....

....

....

Answer .... mins .... secs   *(3 marks)*

5   Here are five number cards.

$\boxed{1}$ $\boxed{2}$ $\boxed{3}$ $\boxed{4}$ $\boxed{5}$

5 (a)   Use **three** of the cards to complete the following.

$\boxed{} \; + \; \boxed{} \; \times \; \boxed{} \; = \; 9$

(1 mark)

5 (b)   Use **four** of the cards to complete the following.
Card 3 has already been placed to help you.

$\boxed{} \; \times \; \boxed{3} \; - \; \boxed{} \; \times \; \boxed{} \; = \; 7$

(2 marks)

5 (c)   Use all five cards to complete the following.

$\boxed{} \; + \; \boxed{} \; + \; \boxed{} \; = \; \boxed{}\boxed{}$
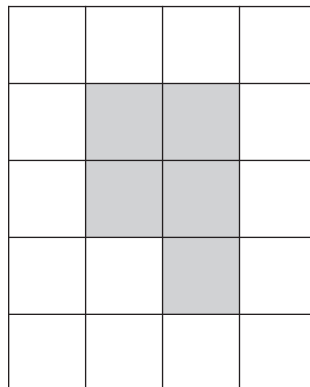
(2 marks)

9

Turn over ▶

6 (a)   Shade **one more** square so that the shaded shape has

one line of symmetry

no rotational symmetry.
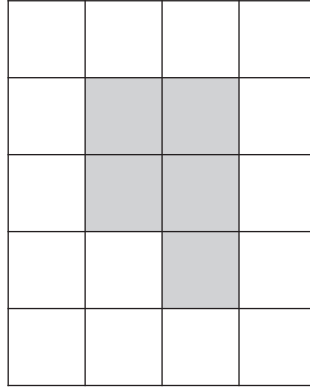
(2 marks)

6 (b)   Shade **one more** square so that the shaded shape has
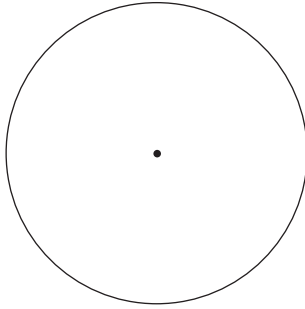
no lines of symmetry
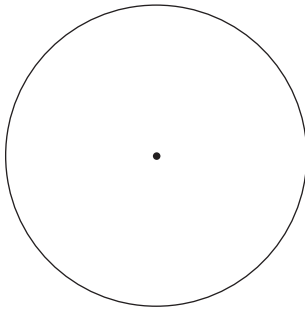
rotational symmetry of order 2.

(2 marks)

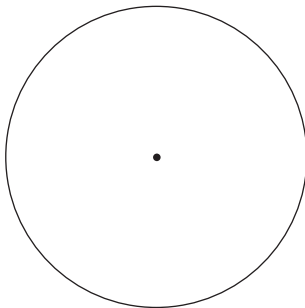**7** Draw the following on the circles below.

7 (a) Radius.

(1 mark)

7 (b) Chord.

(1 mark)

7 (c) Tangent.

(1 mark)

7

Turn over ▶

8   Work out the next term for the following sequences.

8 (a)   5   9.5   14   18.5   .....

Answer .... *(1 mark)*

8 (b)   22   18   14   10   .....

Answer .... *(1 mark)*

8 (c) $\dfrac{3}{8}$ $\dfrac{5}{11}$ $\dfrac{7}{14}$ $\dfrac{9}{17}$ $\dfrac{11}{20}$ .....

Answer .... *(2 marks)*

9   Lucy thinks of a number.

It is a multiple of 10.

She adds 31 to this number.

The result is a square number less than 100.

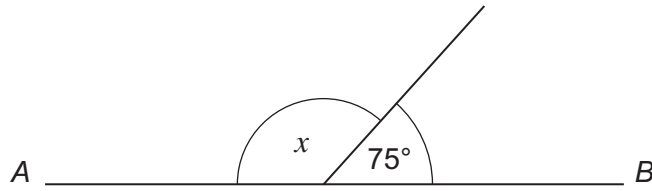What number was Lucy thinking of?

....

Answer .... *(2 marks)*

10 (a)   *AB* is a straight line.

Work out the size of angle x.

Not drawn
accurately

A ——————————————————— *B*

x   75°

Answer .... degrees   *(1 mark)*

10 (b)   Work out the size of angle y.

Not drawn
accurately

y   100°

150°
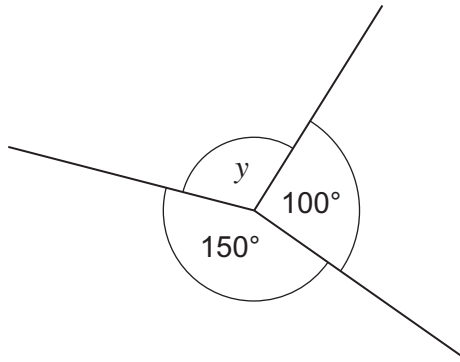
Answer .... degrees   *(2 marks)*

Turn over ▶

9

11 (a)   Solve $x - 11 = 10$

....

x = ...   *(1 mark)*

11 (b)   Solve $3y - 6 = y + 4$

....

....

....

....

y = ...   *(3 marks)*
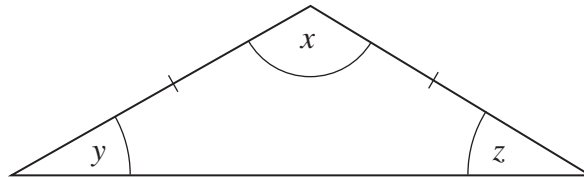
12   In this isosceles triangle, angle x is obtuse.

Not drawn accurately

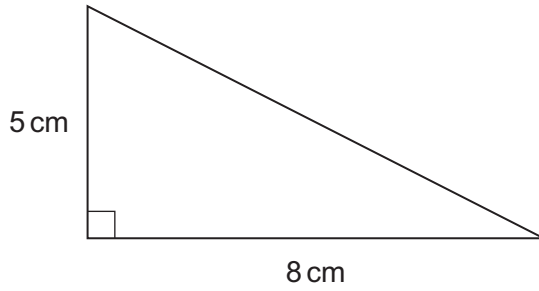Write down a set of possible values for the angles x, y and z.

x = ... degrees

y = ... degrees

z = ... degrees   *(3 marks)*

13 Calculate the area of the triangle.

5 cm

8 cm

Not drawn accurately

Answer .... cm^2 *(2 marks)*

14 Calculate   21% of 56

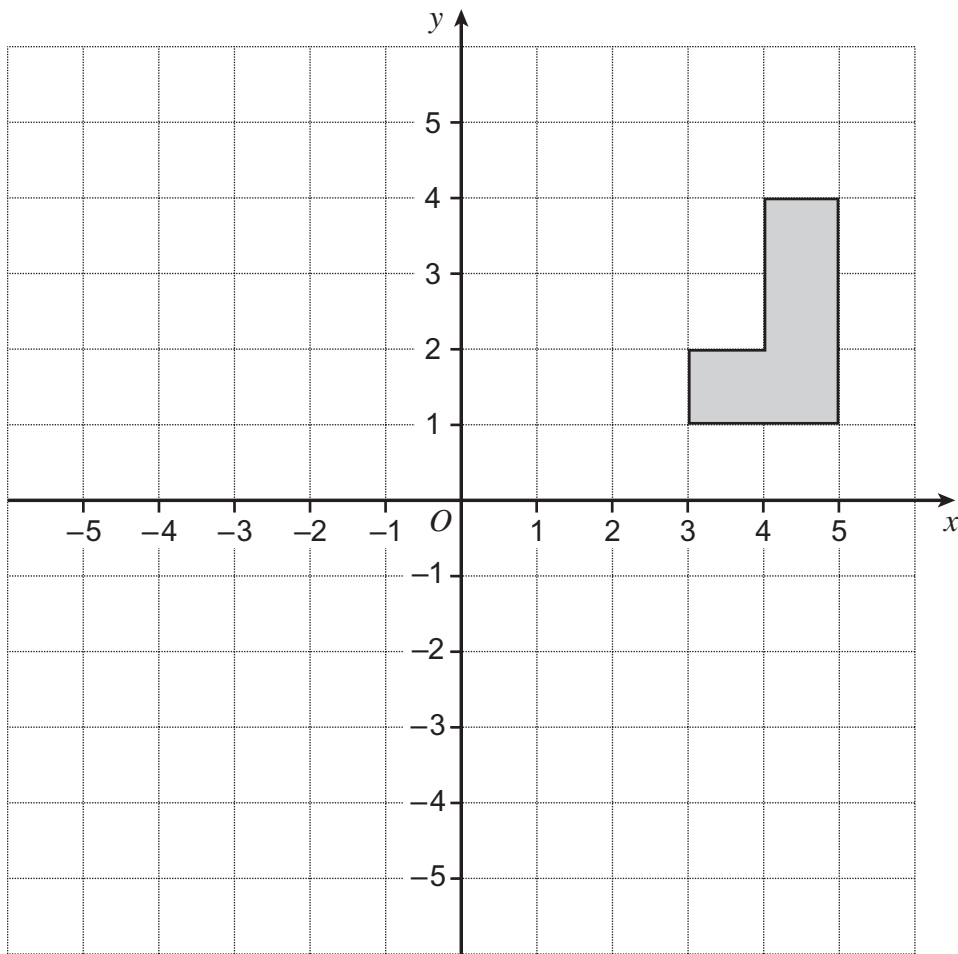Answer ....   *(2 marks)*

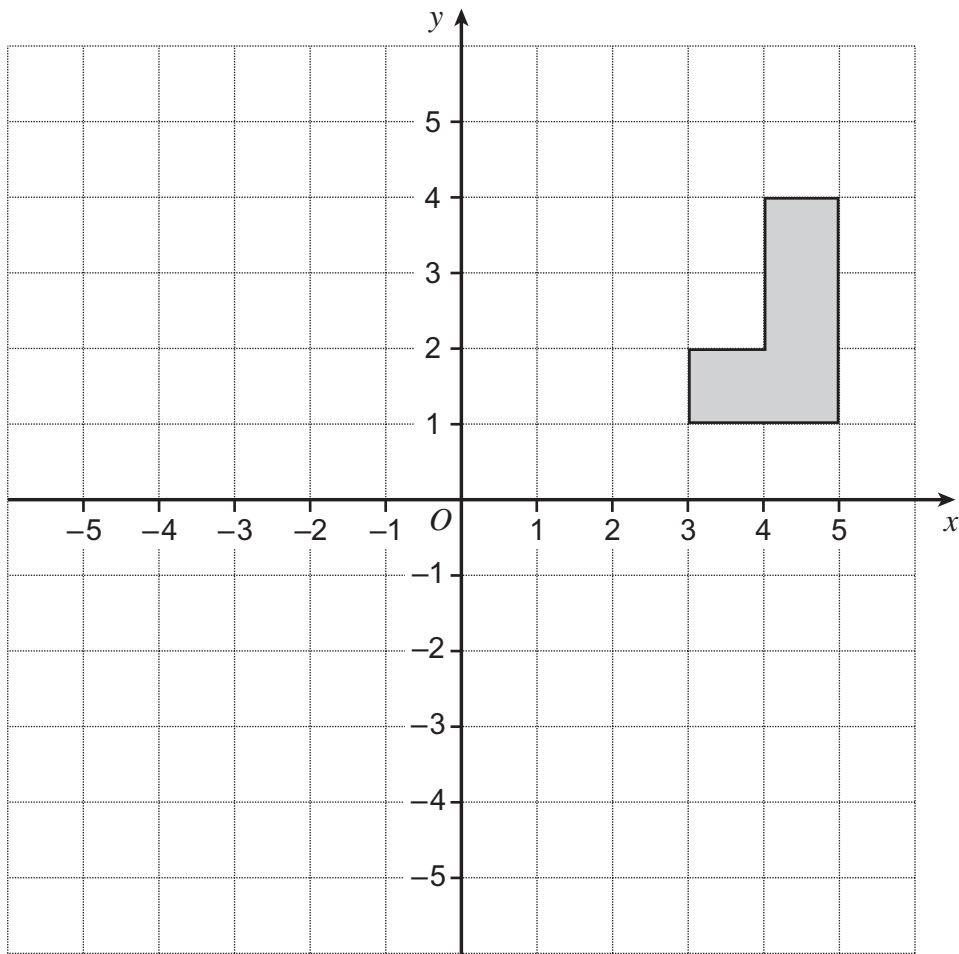**Turn over for the next question**

11

15 (a) Reflect the shape in the *y*-axis.

(2 marks)

15 (b)   Translate the shape   4 left and 2 down.

(2 marks)

Turn over for the next question

16 (a) Here is a number machine.
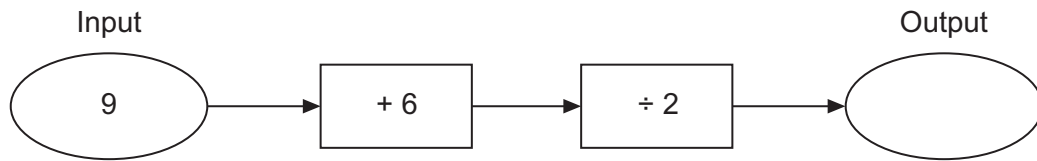
Input

Output

Work out the output when the input is 9.

Answer .... *(1 mark)*

16 (b) Here is the same number machine.
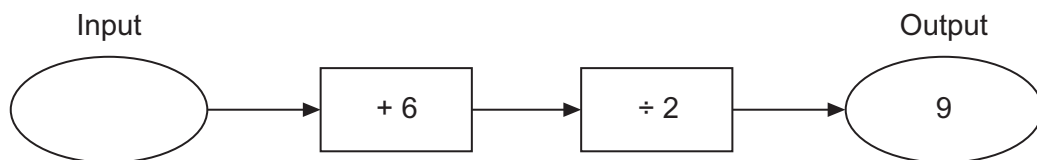
Input

Output

Work out the input when the output is 9.

Answer .... *(1 mark)*

*17   This rectangle has an area of $48\,cm^2$.

The perimeter is 32 cm.

Not drawn
accurately

Two of the rectangles are put together.

Not drawn
accurately

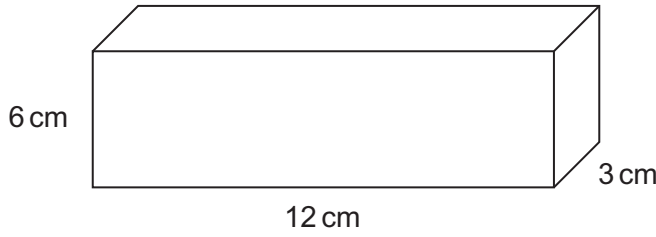Work out the perimeter of the new shape.

....

....

....

....

....

....

....

....

Answer .... cm   *(4 marks)*

6

Turn over ▶

18

6 cm
3 cm
12 cm

18 (a)   Calculate the volume of the cuboid.

State the units of your answer.

....

....

Answer ....   *(3 marks)*

18 (b)   A cube has a surface area of $54\,\text{cm}^2$.

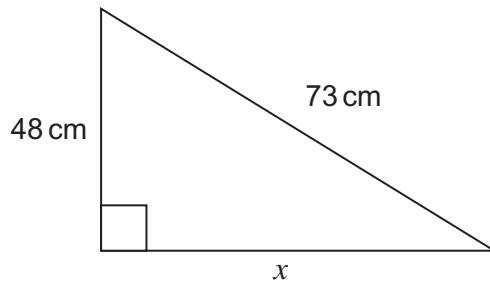How many of these cubes will fit inside the cuboid?

....

....

....

....

....

Answer ....   *(4 marks)*

19 Expand and simplify $5(x - 3) - 3(x - 1)$

....

....

....

Answer .... *(3 marks)*
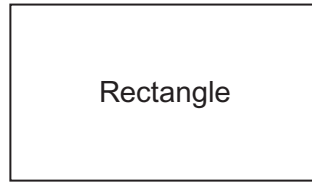
*20 Calculate the length x.

You **must** show your working.

48 cm

73 cm

Not drawn accurately

x

....

....

....

Answer .... cm *(3 marks)*

Turn over ▶

21 Here are six quadrilaterals.

Square

Rectangle

Parallelogram

Kite

Rhombus

Trapezium
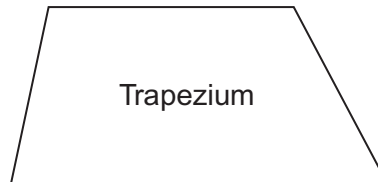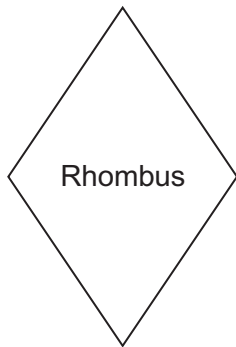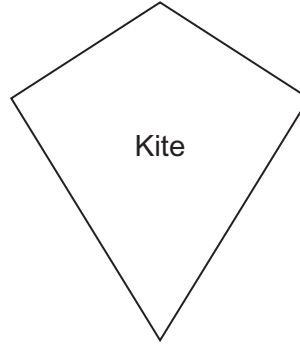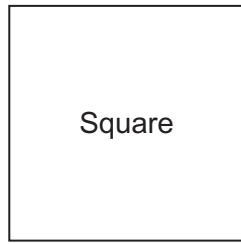
21 (a) Dana is describing a quadrilateral.
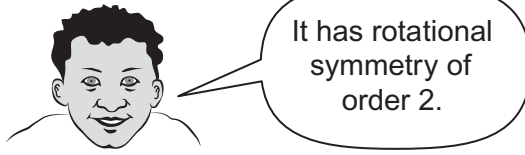
The diagonals always cross at right angles.
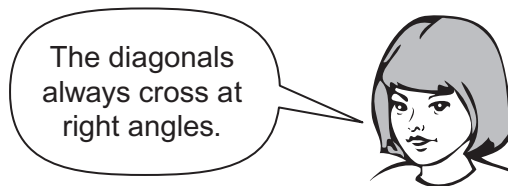
The rhombus is one possible quadrilateral she could be describing.

Write down the names of the other **two** quadrilaterals she could be describing.

Answer .... and .... *(2 marks)*

21 (b) Amir is describing a quadrilateral.

It has rotational symmetry of order 2.

The rhombus is one possible quadrilateral he could be describing.

Write down the names of the other **two** quadrilaterals he could be describing.

Answer .... and .... *(2 marks)*

21 (c) Ed is describing a rhombus.

It has rotational symmetry of order 2.

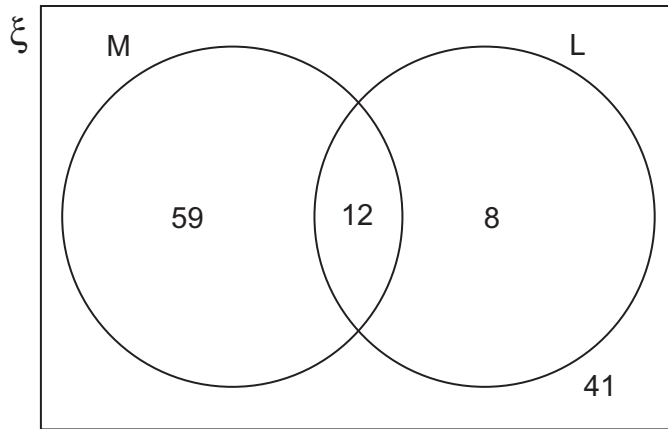The diagonals always cross at right angles.

All quadrilaterals have 4 sides and 4 angles.

Fill in the empty speech bubble with **another** property of a rhombus.

(1 mark)

Turn over for the next question

Turn over ▶

5

22 The Venn diagram shows information about members of a club.
The number of men is shown in set M.
The number of left-handed members is shown in set L.

ξ | M ... L
59   12   8
41

22 (a) How many members are in the club altogether?

....

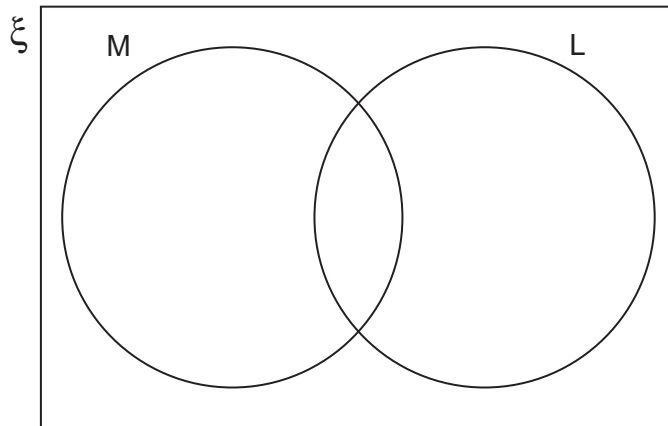Answer .... *(1 mark)*

22 (b) 3 right-handed men leave.
1 left-handed man joins.

2 left-handed women leave.
5 right-handed women join.

Complete this Venn Diagram to show the members of the club now.

ξ | M ... L

(2 marks)

END OF QUESTIONS

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DO NOT WRITE ON THIS PAGE
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