

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
16 – 17	
18 – 19	
20 – 21	
22 – 23	
24 – 25	
26	
TOTAL	



General Certificate of Secondary Education  
Foundation Tier  
November 2013

# Methods in Mathematics (Linked Pair Pilot)

93652F

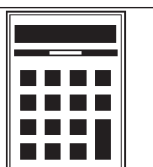
F

## Unit 2 Geometry and Algebra

Monday 11 November 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  $\pi$  button, take the value of  $\pi$  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 11 and 16. 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.



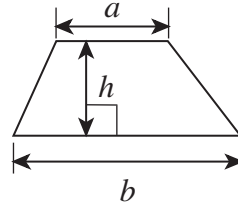
N 0 V 1 3 9 3 6 5 2 F 0 1

WMP/Nov13/93652F/E3

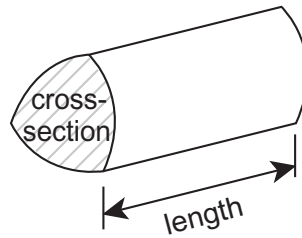
93652F

**Formulae Sheet: Foundation Tier**

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

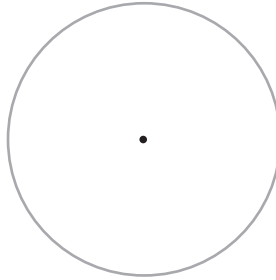


**Volume of prism** = area of cross-section  $\times$  length



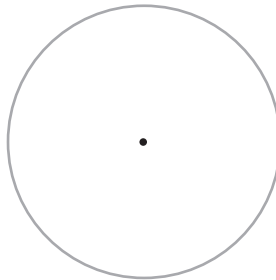
Answer **all** questions in the spaces provided.

**1 (a)** Draw a radius on this circle.



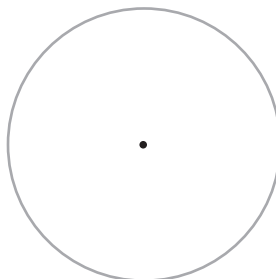
(1 mark)

**1 (b)** Draw a sector on this circle.



(1 mark)

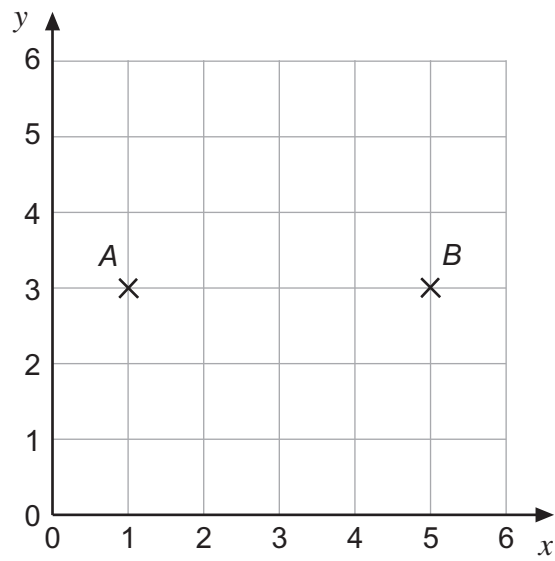
**1 (c)** Draw an arc on this circle.



(1 mark)



2



2 (a) Write down the coordinates of A.

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

2 (b) Mark the midpoint of AB on your diagram.

(1 mark)

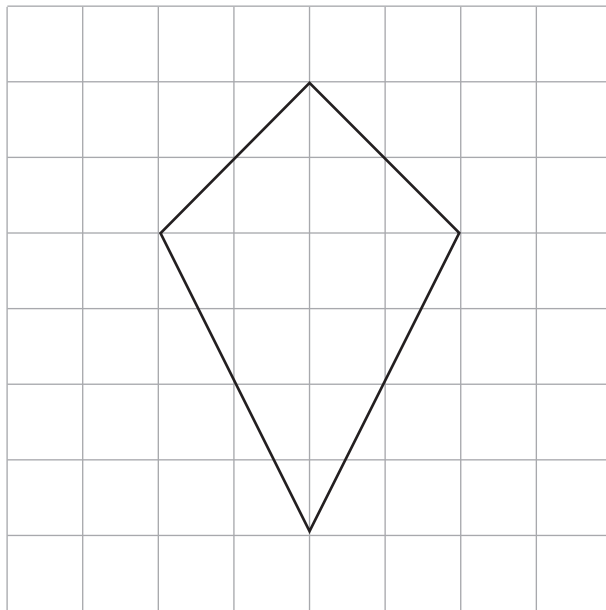
2 (c) C has coordinates (1, 5).

Plot C on the grid.

(1 mark)



- 3** A special quadrilateral is shown on the centimetre grid.



- 3 (a)** Name the special quadrilateral.

Answer ..... (1 mark)

- 3 (b)** By counting squares, find the area of the quadrilateral.  
State the units of your answer.

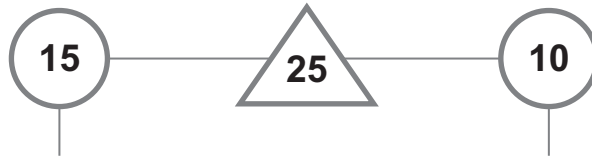
.....  
.....

Answer ..... (3 marks)

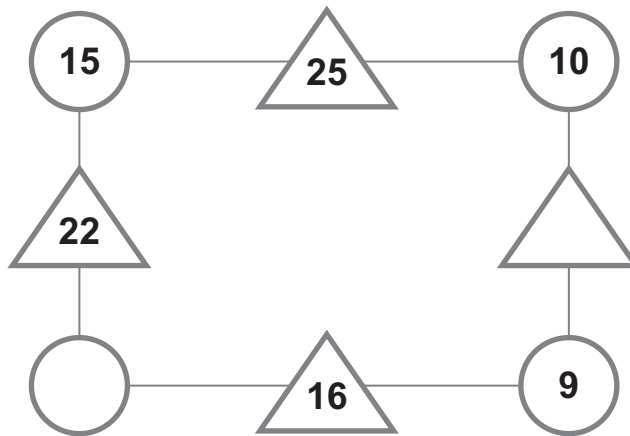


- 4 In the puzzles below, the number in each triangle is the sum of the numbers in the circles either side of it.

For example, in (a)

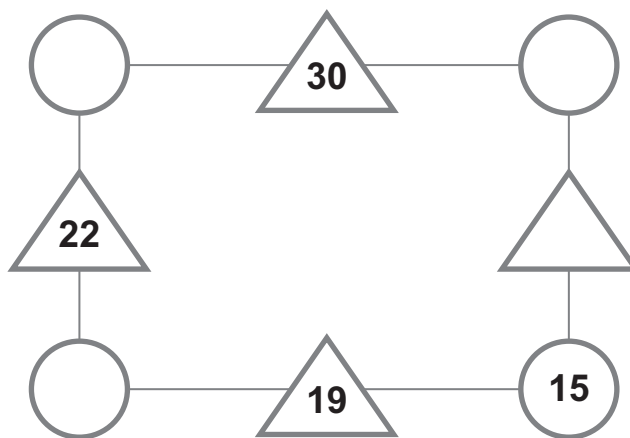


- 4 (a) Complete this puzzle.



(2 marks)

- 4 (b) Complete this puzzle.



(3 marks)



5 Read the statements below.

Decide if each one is true or false and tick the appropriate box.  
The first one has been done for you.

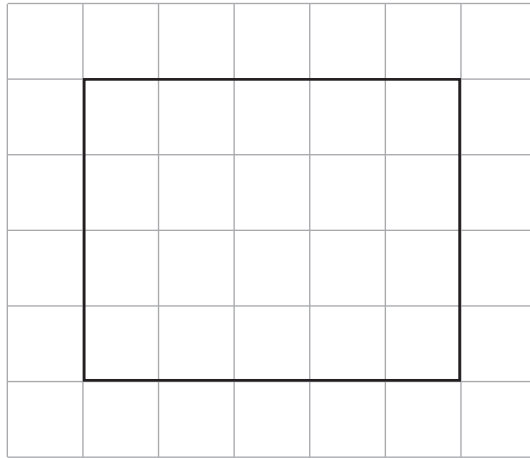
Statement	True	False
10 is an even number.	✓	
20 and 30 are multiples of 10.		
2 and 5 are the only factors of 10.		
10 is a square number.		
$10^3 = 1000$		
$\sqrt{100} = 10$		

(3 marks)

Turn over for the next question



**6** A rectangle is drawn on a centimetre grid.



**6 (a)** How many lines of symmetry does the rectangle have?

Answer ..... (1 mark)

**6 (b)** What is the order of rotational symmetry of the rectangle?

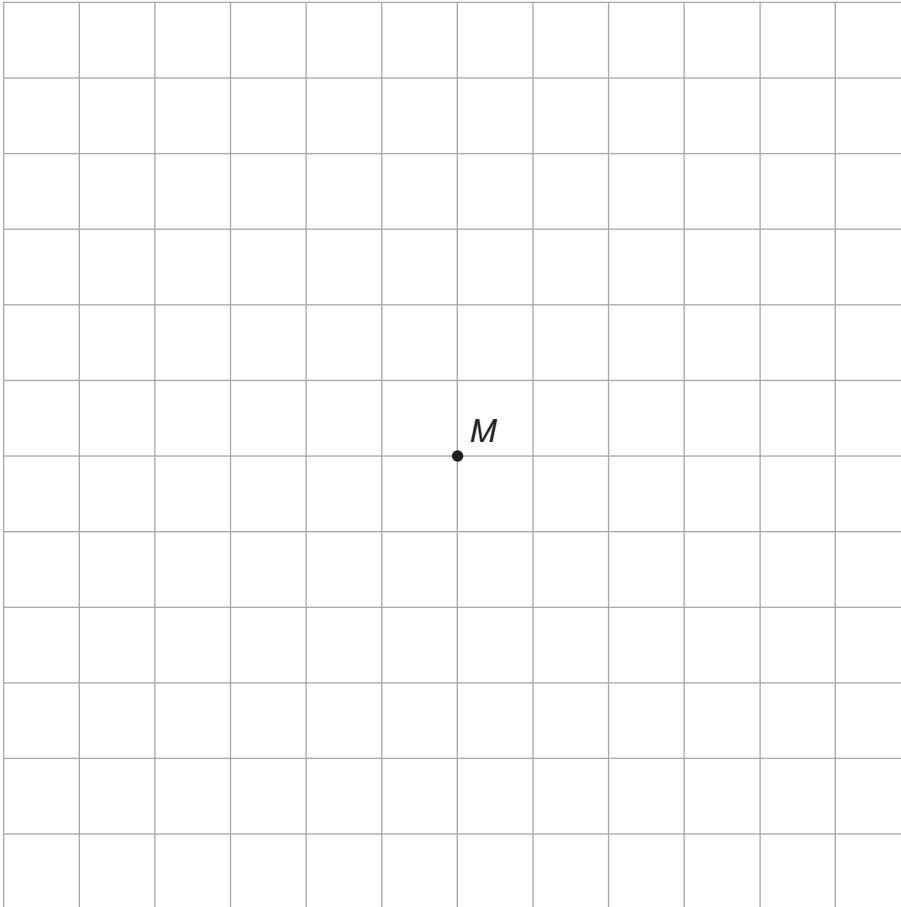
Answer ..... (1 mark)





**6 (c)**  $M$  is the centre of a rectangle with an area of  $12 \text{ cm}^2$

Draw a possible rectangle on the grid.



(2 marks)

**Turn over for the next question**

4

**Turn over** ►



7 (a) What is the next term in this sequence?

4                      7                      10                      13                      16                      ....

Answer ..... (1 mark)

7 (b) Describe the rule for continuing this sequence.

1                      5                      9                      13                      17                      ....

Answer ..... (1 mark)

7 (c) The  $n$ th term of a sequence is  $4n + 2$

Work out the first 3 terms in the sequence.

.....  
.....  
.....

Answer ..... , ..... , ..... (2 marks)



**8** Lee thinks of a **whole** number.

When Lee rounds his number to the nearest 10, the answer is 150

When Lee rounds his number to the nearest 100, the answer is 100

What is the **smallest** number Lee could be thinking of?

.....

.....

.....

.....

Answer ..... (3 marks)

**Turn over for the next question**

7

**Turn over ►**



9 (a) Work out

$$3^2 + 4 \times 2 = \dots$$

.....  
.....

Answer ..... (1 mark)

9 (b) Put in mathematical symbols to make this calculation correct.

Use **two** of the following.

+, −, ×, ÷

$$(3 \dots 2) \dots 4 = 20$$

.....  
..... (1 mark)

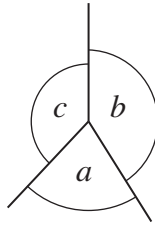
9 (c) Use **one** pair of brackets to make this calculation correct.

$$3 + 2 \times 4 + 1 = 13$$

..... (1 mark)



10 Three **different** angles  $a$ ,  $b$  and  $c$  join together at a point.



Not drawn  
accurately

Two of the angles are **obtuse**.

Give a possible set of values for  $a$ ,  $b$  and  $c$ .

.....

.....

.....

.....

$a =$  ..... degrees

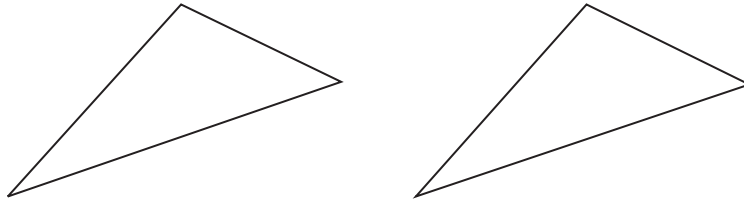
$b =$  ..... degrees

$c =$  ..... degrees

(2 marks)



**\*11 (a)** These two triangles are **exactly** the same.



Circle the word that means exactly the same.

Congruent

Equilateral

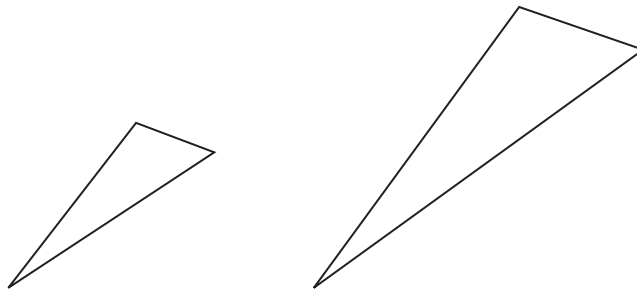
Isosceles

Scalene

Similar

(1 mark)

**\*11 (b)** These two triangles are the same shape but not the same size.



Circle the word that means the same shape but not the same size.

Congruent

Equilateral

Isosceles

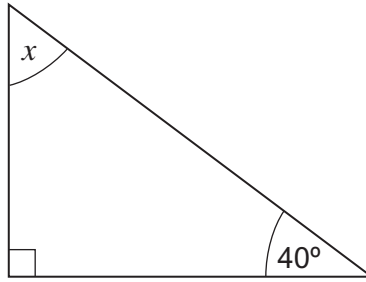
Scalene

Similar

(1 mark)



11 (c) This triangle is right-angled.



Not drawn  
accurately

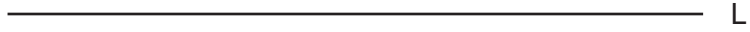
Work out the size of angle  $x$ .

Answer ..... degrees (1 mark)

Turn over for the next question



**12 (a)** Draw a line parallel to line L.



*(1 mark)*

**12 (b)** Draw a line perpendicular to line M.



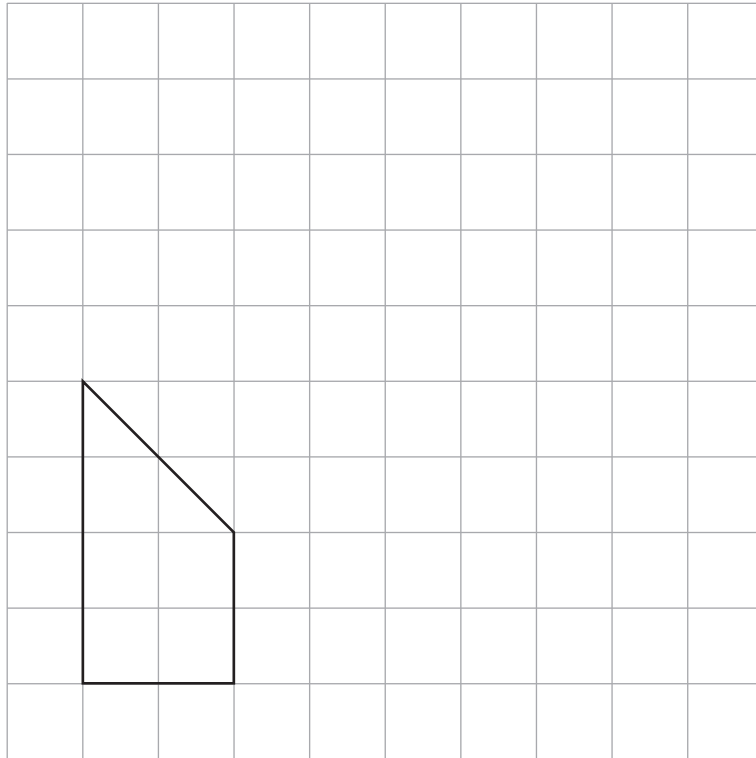
*(1 mark)*





13 (a) Shape A is shown on a centimetre grid.

On the grid, draw an enlargement of A with scale factor 2



(2 marks)

13 (b) The area of shape A is  $6 \text{ cm}^2$

Work out the area of the enlarged shape.

.....

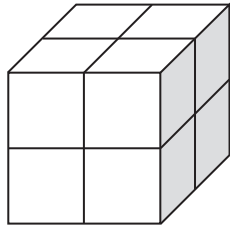
.....

Answer .....  $\text{cm}^2$  (2 marks)



**14 (a)** A large cube is made from centimetre cubes.

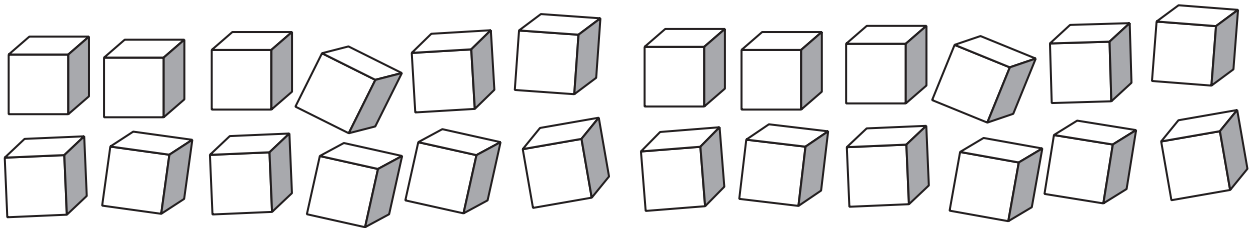
Work out the volume of the large cube.



.....

Answer ..... cm<sup>3</sup> (1 mark)

**14 (b)** 24 centimetre cubes are to be made into a cuboid.



Work out a possible length, width and height of the cuboid.

.....

.....

length ..... cm

width ..... cm

height ..... cm

(2 marks)



15 Tom thinks of a number.

He doubles it and then adds on 3

His answer is 31

What number did he think of?

.....  
.....  
.....  
.....

Answer ..... (3 marks)

\*16 Which is larger

40% of 55 or  $\frac{3}{5}$  of 40?

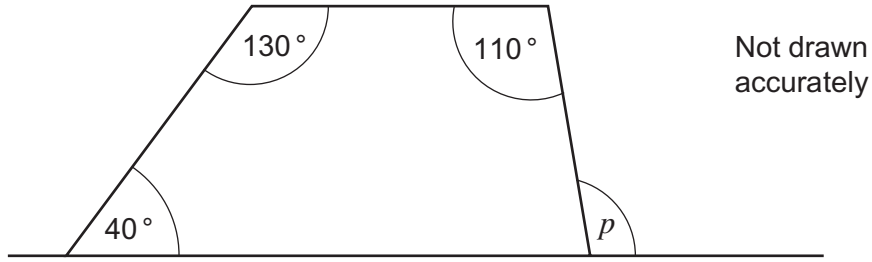
You **must** show your working.

.....  
.....  
.....  
.....

(3 marks)



17 (a) A quadrilateral has one side extended as shown.



Calculate the size of the angle  $p$ .

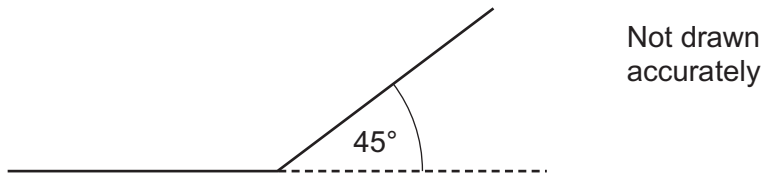
.....

.....

.....

Answer ..... degrees (3 marks)

17 (b) A regular polygon has an exterior angle of  $45^\circ$   
Part of the polygon is sketched below.



How many sides does this polygon have?

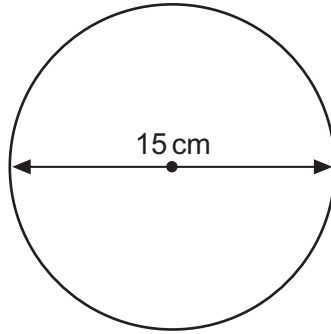
.....

.....

Answer ..... (2 marks)



18 A circle has a diameter of 15 cm



Not drawn accurately.

Work out the circumference of the circle.

.....

.....

Answer ..... cm (2 marks)

19 (a) Use your calculator to work out  $\frac{27.4 \times 12.2}{16.3 - 4.8}$

Give your answer as a decimal.  
Write down all the figures in your calculator display.

.....

.....

Answer ..... (1 mark)

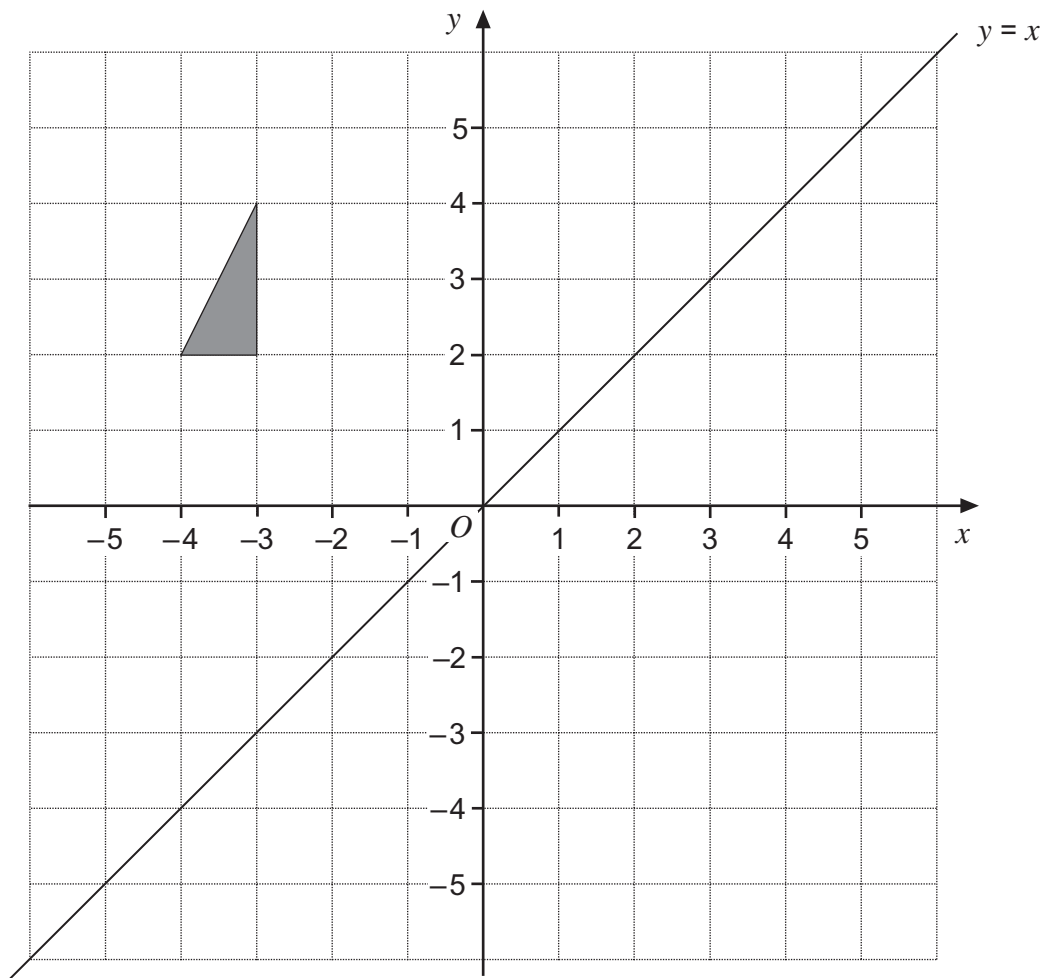
19 (b) Give your answer to 1 significant figure.

.....

Answer ..... (1 mark)



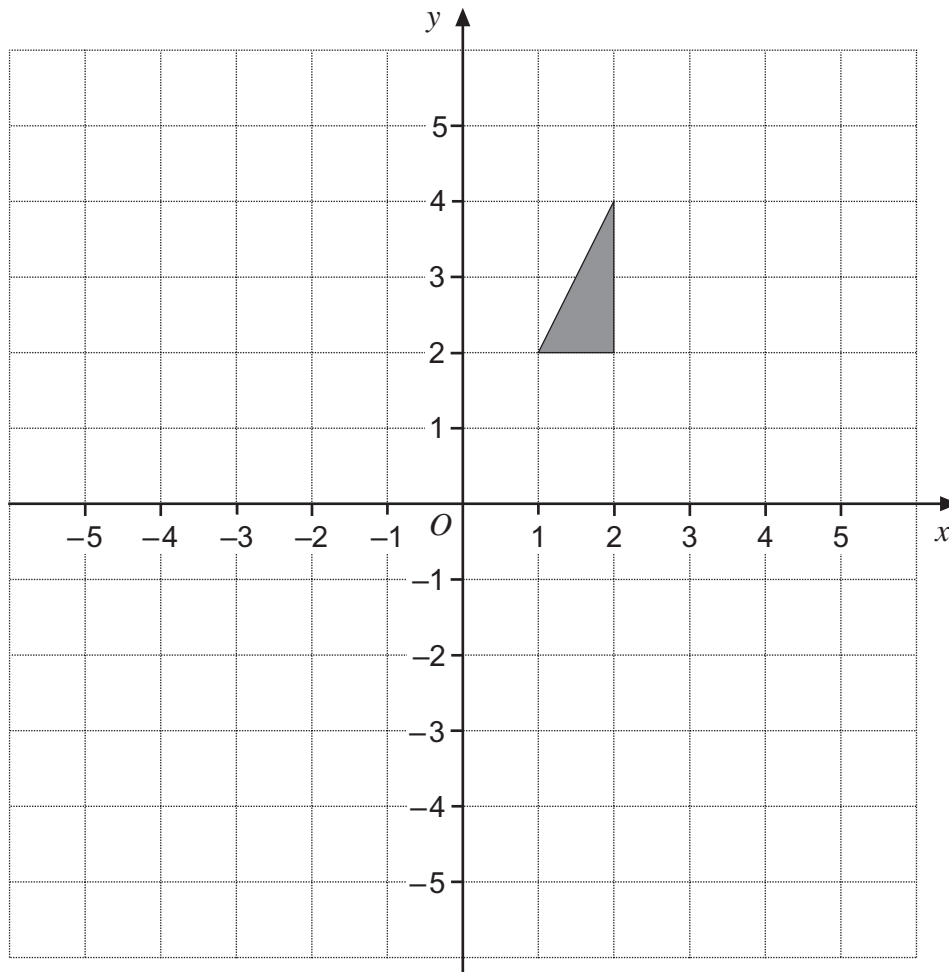
20 (a)

Reflect the shaded triangle in the line  $y = x$ 

(2 marks)



20 (b)



Rotate the shaded triangle  $90^\circ$  anticlockwise about  $(0, 2)$ .

(2 marks)

Turn over for the next question

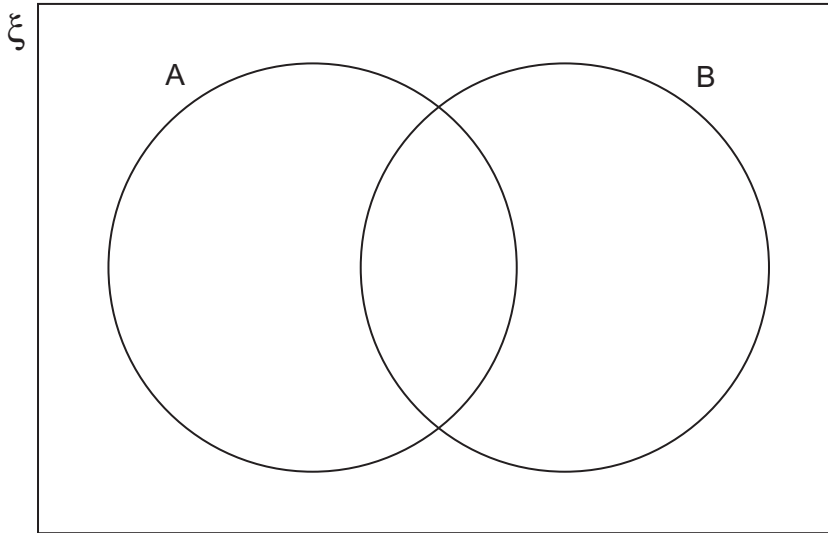


**21 (a)** Write the numbers from 1 to 12 inclusive in the correct position in this Venn Diagram.

$$\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$$

Set A = Factors of 12

Set B = Multiples of 3



(2 marks)

**21 (b)** Work out the Least Common Multiple (LCM) of the numbers in Set B.

.....

.....

.....

Answer ..... (2 marks)





22 (a) Solve  $4a = 22$

.....

$a =$  ..... (1 mark)

22 (b) John has spilt coffee on his work.

Work out the missing number.

$$2c - \text{[blot]} = -7$$

$$c = -1$$

.....  
.....  
.....

Answer ..... (2 marks)

22 (c) Solve  $4(3y - 1) = 28$

.....  
.....  
.....

$y =$  ..... (3 marks)

Turn over for the next question



23 Bob adds together two **different** prime numbers.

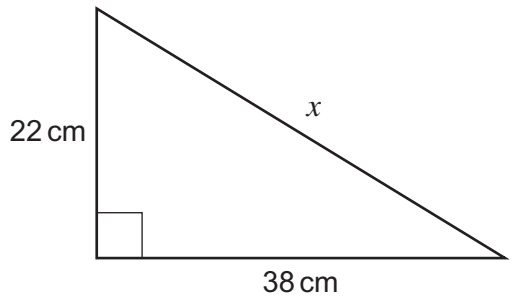
The total is **between** 24 and 30

Which two prime numbers could Bob have added?

.....  
.....

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

24 Work out the length  $x$  in the right-angled triangle.



Not drawn  
accurately

.....  
.....  
.....  
.....

Answer ..... cm (3 marks)

**END OF QUESTIONS**



**There are no questions printed on this page**

**DO NOT WRITE ON THIS PAGE  
ANSWER IN THE SPACES PROVIDED**



**There are no questions printed on this page**

**DO NOT WRITE ON THIS PAGE  
ANSWER IN THE SPACES PROVIDED**

