Name _____

Examination Number _____

Room Number _____

WITHINGTON GIRLS' SCHOOL

ENTRANCE EXAMINATION 2015

MATHEMATICS

PAPER 2

TIME: 40 MINUTES

- Some questions in this paper involve new ideas, but there are examples to guide you and help you understand these new ideas.
- Look at the examples carefully and try to answer all the questions.
- If you cannot answer a question, leave it and go on to the next one.
- Use any time you have left to check your answers and go back to any questions you have left out.

CALCULATORS MUST NOT BE USED

PAPER 2 TOTAL		
Marker's Initials		
Checker's Initials		

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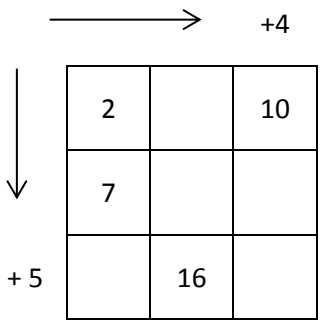
1. (a) Write $\frac{4}{5}$ of a minute in seconds.

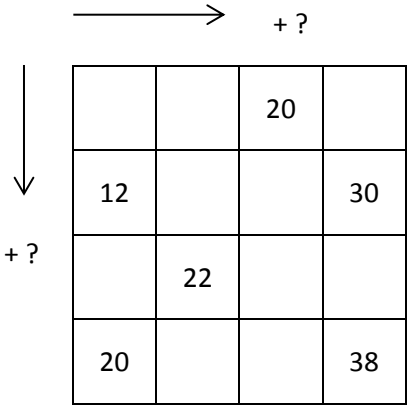
_____seconds 1

(b) What is $\frac{5}{6}$ of a day in hours? 1

_____hours

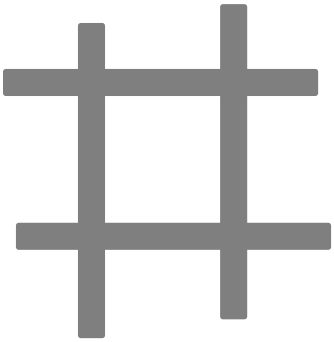
2. Complete the following number squares





1

2

3. 

Four rectangular strips, each measuring 12cm by 1cm are placed as shown in the diagram. Each strip is at right angles to two of the other strip. What is the total of the grey area? 1

1

1

_____cm^2

4. Andrew and Gill together have 62 pencils. Gill has 18 more than Andrew.
How many pencils does Gill have? 1

1

_____pencils

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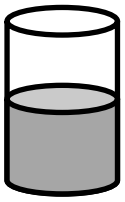
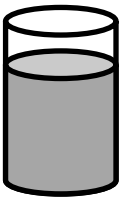
5. A cylinder is $\frac{1}{2}$ full of water.



After 90 ml of water is added the cylinder is $\frac{3}{5}$ full of water.



How much water can the cylinder hold when it is completely full? 1

_____ml 1

6. The six symbols below represent the numbers 1, 2, 3, 4, 5 and 6 but not in that order.

◆ ✸ ✪ ☺ ✧ ☼

Use the clues below to work out the value of each symbol.

☺ × ☺ = ◆ 1

◆ ÷ ✪ = ◆ 1

✸ + ✪ = ✧ 1

✧ ÷ ☺ = ☼ 1

◆=_____ ✸=_____ ✪=_____ ☺ = _____ ✧ =_____ ☼= _____

7. In a game, a number of people stand evenly spaced in a circle. Each person is given a number 1, 2, 3,……
Number 6 stands directly opposite number 19. How many people are playing the game?

1

1

_____people

8. A 385 cm length of string is cut into 15 cm lengths.
If the maximum number of lengths are made, how much string is left over?

1

1

Length left over_____cm

PLEASE TURN OVER

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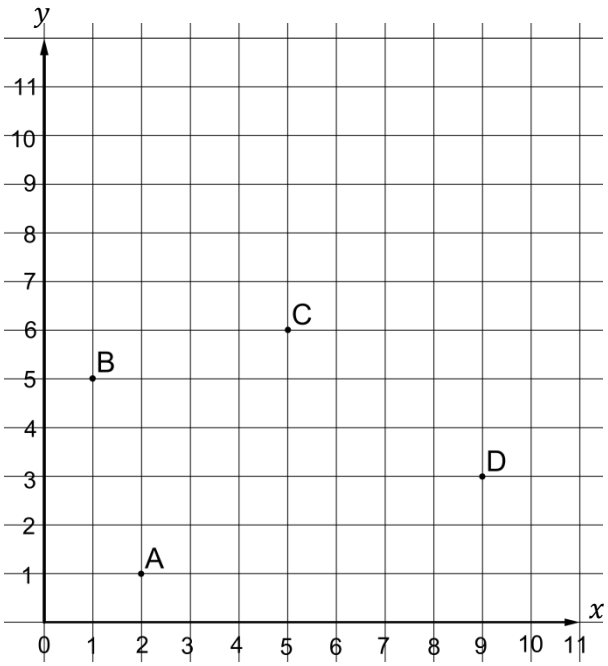
9. The diagram show the position of the points $A(2, 1), B(1, 5), C(5, 6)$ and $D(9, 3)$.
When A, B, C and D are joined together in order they make a quadrilateral.
In this question one of the points A, B, C or D is going to be moved to make a new shape.
Write down the new coordinate of the corner which has been moved.



(a) D to make ABCD a square.

(,) 1

(b) A to make ABCD a parallelogram.

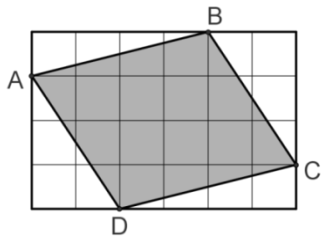
(,) 1

(c) C to make ABCD a rectangle.

(,) 1

10. ABCD is a parallelogram drawn on a square grid.
The squares are all 1cm by 1cm.
Find the area of ABCD.

Diagram not to scale



1

Area = _____cm^2 1

11. ☺ means square the first number and then add on the first number multiplied by the second number.

For example $4 ☺ 3 = 4^2 + 4 \times 3 = 4 \times 4 + 4 \times 3 = 16 + 12 = 28$

Work out values for ◆, ■ and ✸.

(a) $2 ☺ 5 = ◆$

◆ = _____ 1

(b) $5 ☺ ■ = 45$

1

■ = _____ 1

(c) $✸ ☺ ✸ = 18$

1

✸ = _____ 1

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12. This is the bus timetable for the X57 which runs from Woodford to Manchester City Centre.

Mondays to Fridays

	X57	X57	X57	X57	X57	X57	X57	X57 SD	X57	X57	X57
Woodford, Church Lane				0705	0729				0900	0925	0955
Woodford, Garden Centre										0926	
Woodford, Jenny Lane				0706	0730				0901		0956
Bramhall, Moss Lane	0558	0628	0651	0710	0734		0825		0907	0931	1001
Grove Lane, Pointing Dog	0602	0632	0656	0716	0742	0815	0832	0848	0912	0936	1006
Cheadle Hulme, Train Station	0607	0637	0703	0725	0753	0831	0848	0901	0922	0942	1012
Cheadle and Marple College	0610	0640	0707	0731	0801	0838	0855	0906	0927	0947	1017
Cheadle, Post Office	0614	0644	0712	0738	0808	0845	0901	0912	0931	0951	1021
East Didsbury, Parrs Wood	0618	0648	0717	0745	0815	0852	0907	0918	0937	0957	1027
Didsbury, Co-op	0621	0651	0721	0750	0820	0857	0912	0923	0942	1002	1032
Fallowfield, Friendship Inn	0626	0656	0726	0755	0825	0902	0917	0928	0949	1009	1039
Rusholme, Job Centre	0631	0701	0731	0801	0831	0908	0923	0934	0955	1015	1045
University of Manchester, Phoenix	0638	0708	0738	0810	0840	0917	0932	0943	1003	1023	1053
Manchester, Piccadilly Gardens	0645	0715	0745	0820	0850	0927	0942	0953	1013	1033	1103

(a) Vanessa catches the 0703 at the Train Station in Cheadle Hulme and gets off at the Friendship Inn in Fallowfield. How long does the journey take? 1

_____minutes

(b) Zoe travelled from Parrs Wood in East Didsbury to the University of Manchester. She arrived at 1003, what time did she set off? 1

_____

(c) Shreya lives near Cheadle Post Office and needs to be in Rusholme for a meeting at 0920. What is the last bus she can catch and still be in time for her meeting.? 1

_____

(d) Zoya catches the 0942 at the Train Station in Cheadle Hulme and gets off at the Co-op in Didsbury. The journey is 7 km. What is the speed of the bus in km/h (km/h means the distance you travel every hour)? 1

_____km/h 1

13 Any sequence which **increases** by the **same amount** each time is called **linear**.
For example

5, 7, 9, 11, 13,.... is a linear sequence which increases by 2

20, 25, 30, 35, ... is a linear sequence which increases by 5

(a) The third term of a linear sequence is 18 and the fourth term is 23. What is the first term? 1

_____

(b) The fifth term of a linear sequence is 17 and the seventh term is 21. What is the first term? 1

_____ 1

(c) The third term of a linear sequence is 8 and the nineth term is 26. What is the 11^{th} term? 1

_____ 1

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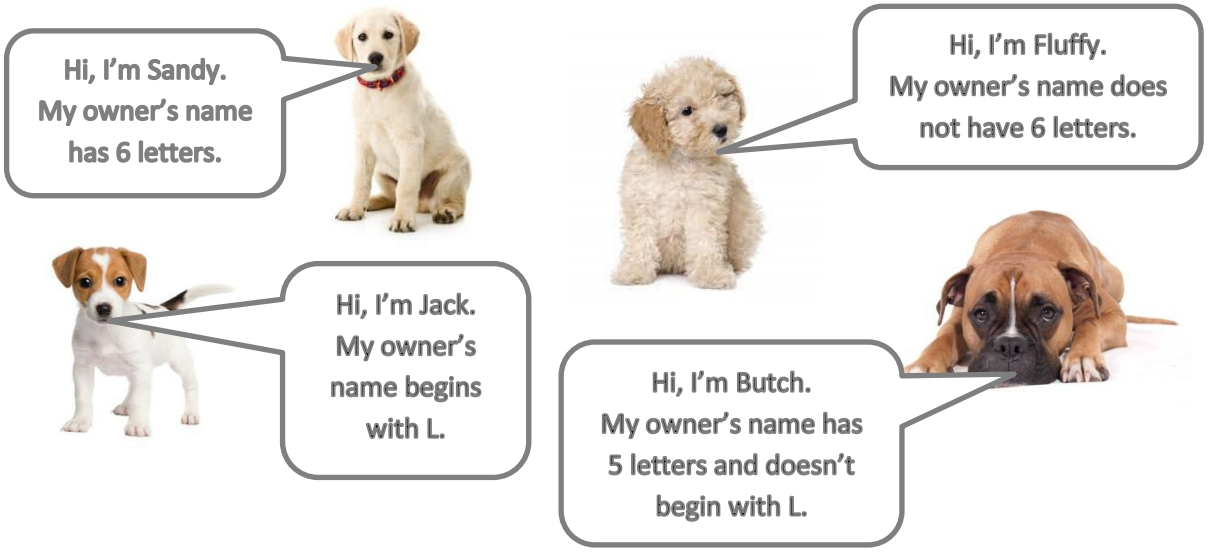
14. Jack, Sandy, Fluffy and Butch are dogs. **Laura, Louise, Sadaf** and **Nazgol** are their owners.
Use the information below to match each dog to their owner.



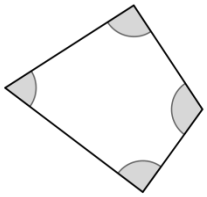
Laura's dog is _____ 1

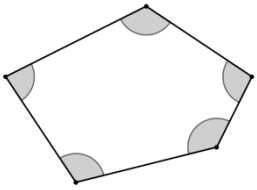
Louise's dog is _____ 1

Sadaf's dog is _____ 1

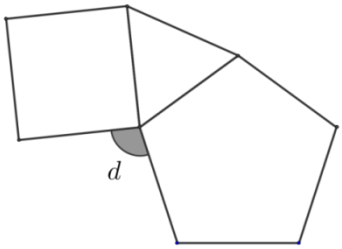
Nazgol's dog is _____ 1

15. Here are some facts about shapes and their angles:
Angles inside a quadrilateral add to 360^o Angles inside a pentagon add to 540^o





The diagram shows a regular quadrilateral, a regular triangle and a regular pentagon.
Regular means all the angles are the same size.
Find the value of d.



1

1

1

1

d=_____ ^{o}

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16. Each of the nine small squares in the diagram are to be filled so that each row and each column contains one 4, one 5 and one 6 in some order. Circle the value of X + Y.

X		
Y	5	
		4

1

1

Circle one number

8 9 10 11 12

17. (a) Thirty 10p coins are lined up side by side. Every second 10p coin is then replaced by a 20p coin. Then every third coin is replaced by a 50p coin. What is the total value of all the coins in the line?

1

1

1

£_____

(b) Forty coins are now lined up in the same way. What is the total value of all the coins in this line?

1

1

£_____

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18. $*$ is an operator which does the following:

$$\begin{bmatrix}5\\3\\4\end{bmatrix} * \begin{bmatrix}2\\6\\7\end{bmatrix} = \begin{bmatrix}3\times 7+4\times 6\\5\times 7+4\times 2\\5\times 6+3\times 2\end{bmatrix} = \begin{bmatrix}21+24\\35+8\\30+6\end{bmatrix} = \begin{bmatrix}45\\43\\36\end{bmatrix}$$

In letters this can be written

$$\begin{bmatrix}a\\b\\c\end{bmatrix} * \begin{bmatrix}d\\e\\f\end{bmatrix} = \begin{bmatrix}b\times f+c\times e\\a\times f+c\times d\\a\times e+b\times d\end{bmatrix}$$

(a) Work out $\begin{bmatrix}2\\4\\3\end{bmatrix} * \begin{bmatrix}1\\3\\2\end{bmatrix}$ 1

$\begin{bmatrix}\quad\\\quad\\\quad\end{bmatrix}$ 1

(b) Work out the value of a if, $\begin{bmatrix}5\\a\\4\end{bmatrix} * \begin{bmatrix}2\\3\\1\end{bmatrix} = \begin{bmatrix}14\\13\\19\end{bmatrix}$ 1

$a =$ _____ 1

(c) Work out positive values for b, c and d if , $\begin{bmatrix}3\\b\\2\end{bmatrix} * \begin{bmatrix}b\\4\\5\end{bmatrix} = \begin{bmatrix}d\\c\\21\end{bmatrix}$

$b =$_____ 1

$c =$_____ 1

$d =$_____ 1

END OF TEST – NOW CHECK YOUR ANSWERS