City of London School for Girls

The North London Independent Girls' School Consortium

Entrance Examination – Group 2

Friday 8th January 2010

MATHEMATICS

Time: 1 hour 15 minutes

Name: _____

Instructions:

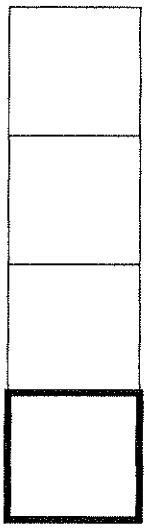
Work through the paper without rushing.

Do your rough work clearly in the space near each question.

Don't rub out your working: you may get marks for it.

If you cannot answer a question, go to the next one.

NO CALCULATORS OR RULERS ARE ALLOWED



1. 3974
$+\ 258$

2. 732
$-\ 357$

3. Write in numbers thirty-two thousand and twenty-seven.

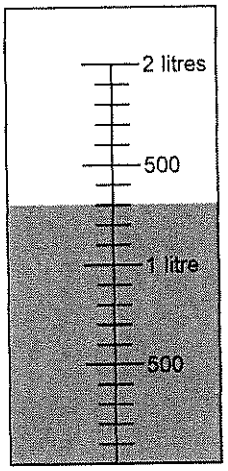
.....

4. 729
$\times\ 7$

5. $8\overline{)34024}$



6. There is some coloured water in the jar.



How much **more** water is needed to make **2 litres**?

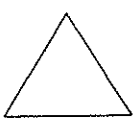
.....

7. Fill in the gaps in these number patterns:

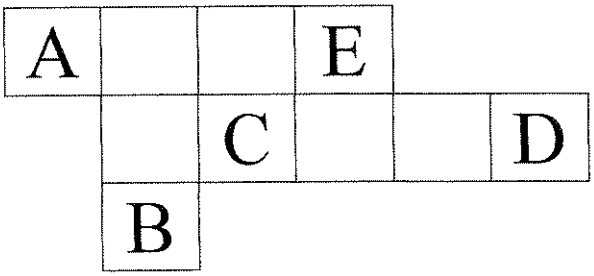
a) 37 34 31 ....

b) 0.8 0.4 0.2 ....

c) 1 3 9 27 ....



8. The shape below is made up of square tiles. Which of tiles A, B, C, D or E could be removed so that the perimeter remained the same? Circle your answer.



9. Five bags of apples cost £3.25

How much would seven bags of apples cost?

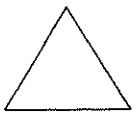
.....

10. Circle the numbers which are larger than 1/3

0.25 2/9 0.039 4/5 3/8

11. Write down the number which is 21 less than 2000.

.....



12. These are the start and finish times on a DVD recorder:

START 14:48

FINISH 17:25

For how long was the video recording?

..... hours ..... mins

13. There were 500 cats in a survey about two new cat foods, Moggy Nosh and Feline Fodder.
220 were Persians and the rest were Siamese.
80 cats preferred Moggy Nosh.
Of these, 42 were Persians.

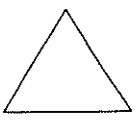
Use this information to complete this table.

	Persian	Siamese
Prefer Feline Fodder		
Prefer Moggy Nosh		

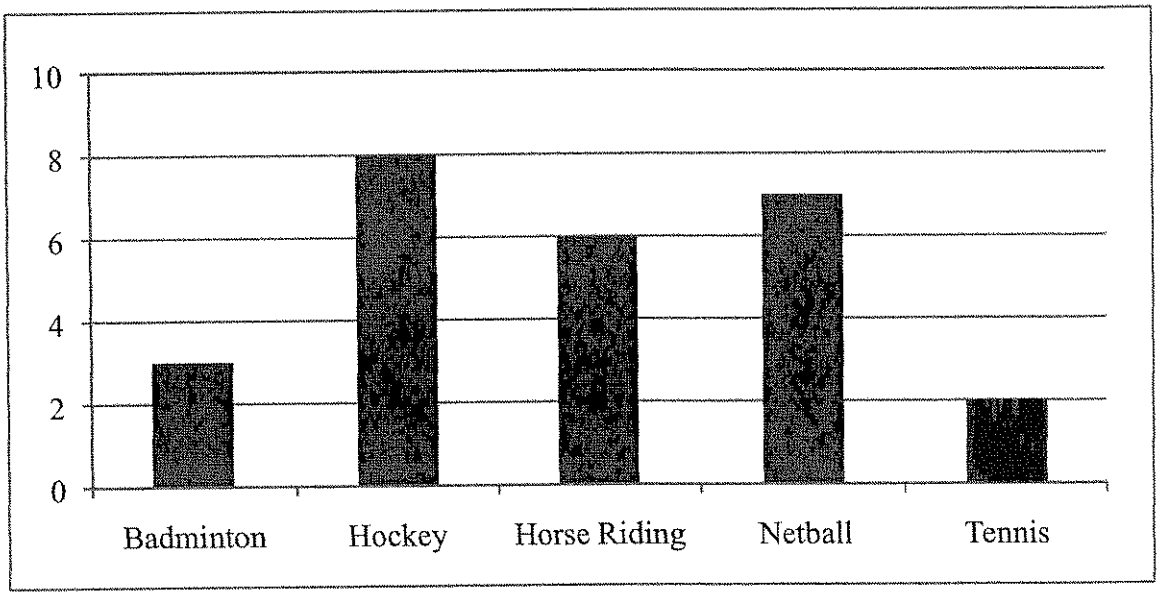
14. Find the missing digit to make the calculation correct:

$$\begin{array}{rcc} & 4 & A \\ \times & & A \\ \hline 3 & 2 & 9 \end{array}$$

A= .....



15. The pupils in a Mathematics class were asked which sport they enjoyed the most. The answers given are shown in the bar graph below:



a) How many more pupils answered Netball than Badminton?

.....

b) Two pupils in the class were away the day the question was asked. How many pupils in total are in the class?

.....

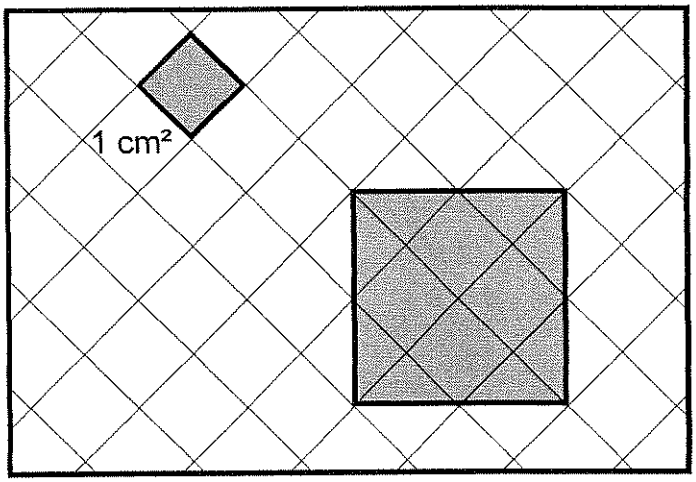
16. Jenn's fish tank was filled half way. She added 9 gallons of water to the tank and found that it was then 7/8 full. How much water can the tank hold altogether?

.....gallons

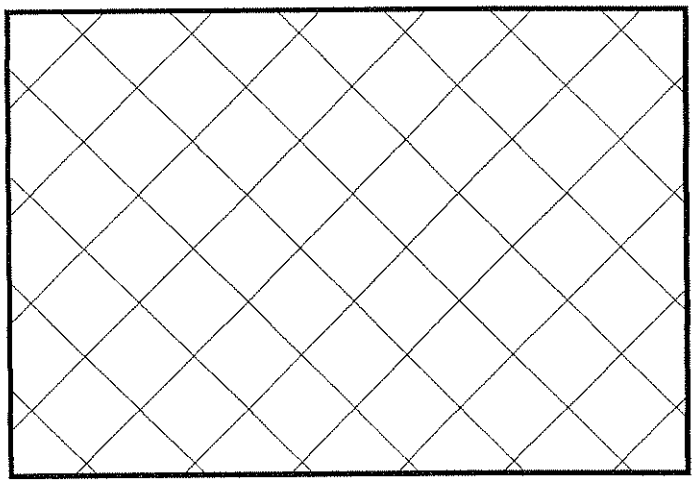
17. The **area** of the **small** shaded square is **1 square centimetre.**

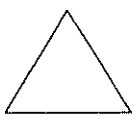
What is the **area** of the **larger** shaded square?

.....

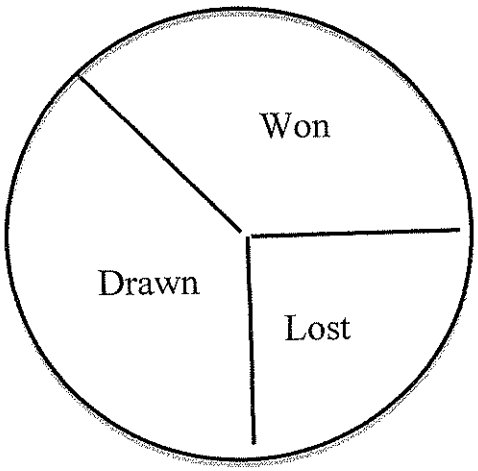


In the grid below, draw a **square** with an **area** of **2 cm²**.





18. The pie chart shows the results of the 96 games played by a school football team. They lost 25% of their games and won and drew an equal number of games.



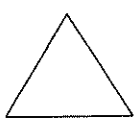
How many games were:

a) lost .....

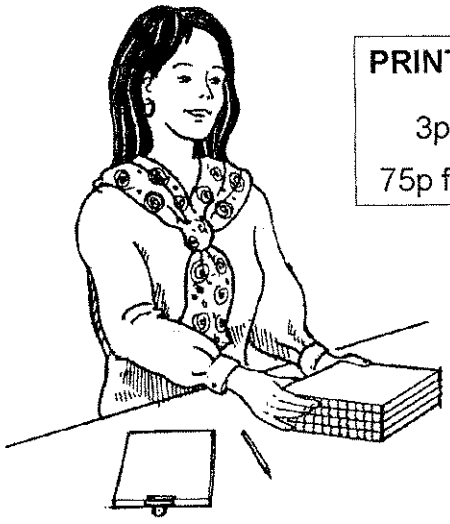
b) won .....

19. Two girls were on a sponsored walk from Pangbourne to Goring.
One of them gave up 5km after she had passed the half-way check-point.
She was then 10km from Goring.
How far apart are the towns?

.....



20. Mrs Jones prints books.



PRINT CHARGES

3p per page

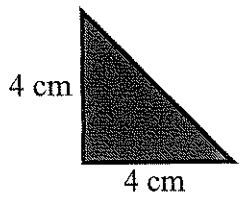
75p for the cover

Jon pays **£4.35** for his book, **including the cover.**

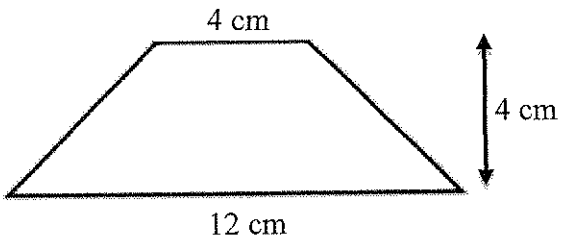
How many **pages** are in his book?

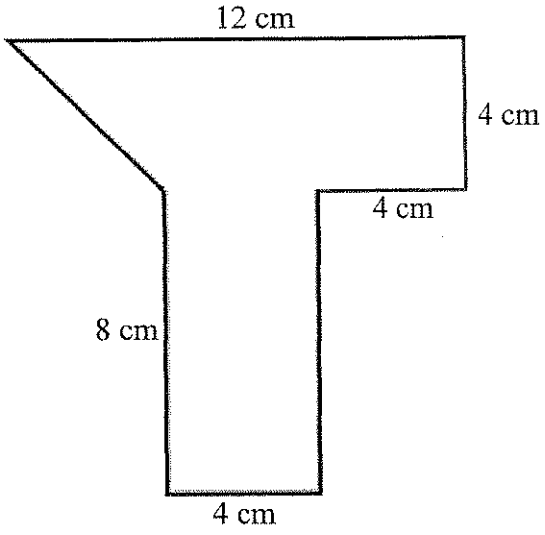
.....

21. This is a right angled triangular tile:



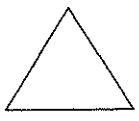
Write how many of these tiles you can fit into each of the following shapes.



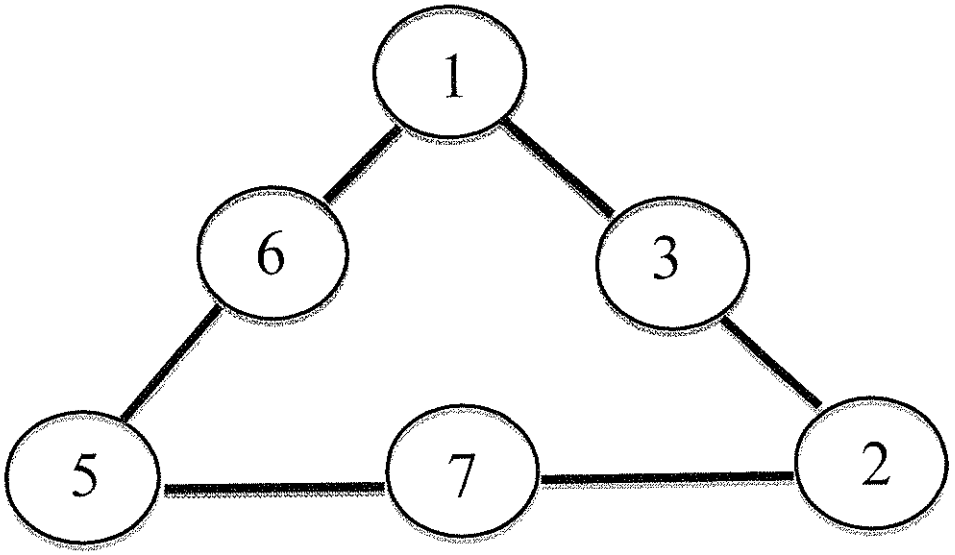


Number of tiles: .....

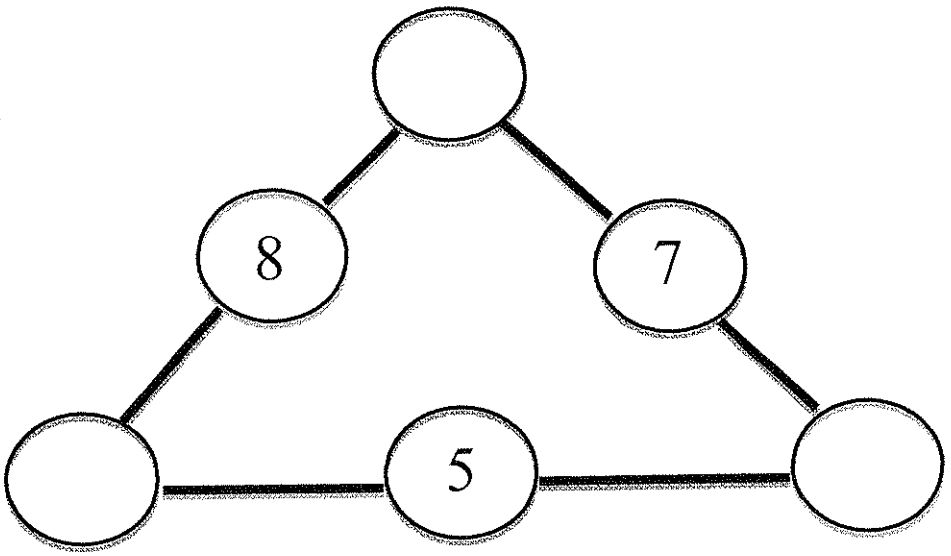
Number of tiles: .....

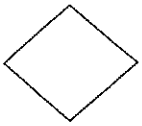


22. Numbers are placed in a triangle.
The numbers in the middle of the sides are the sum of the numbers at the ends.



Fill in the missing numbers for this triangle:





23. a) Find the angle between the hands of a clock at 11am.

.....

b) How many degrees has the minute hand moved between 3.55pm and 5.15pm.

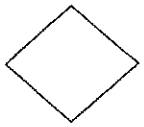
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24. A piece of wire 36cm long is bent into the shape of a rectangle. If the rectangle is twice as long as it is wide, what is the area?

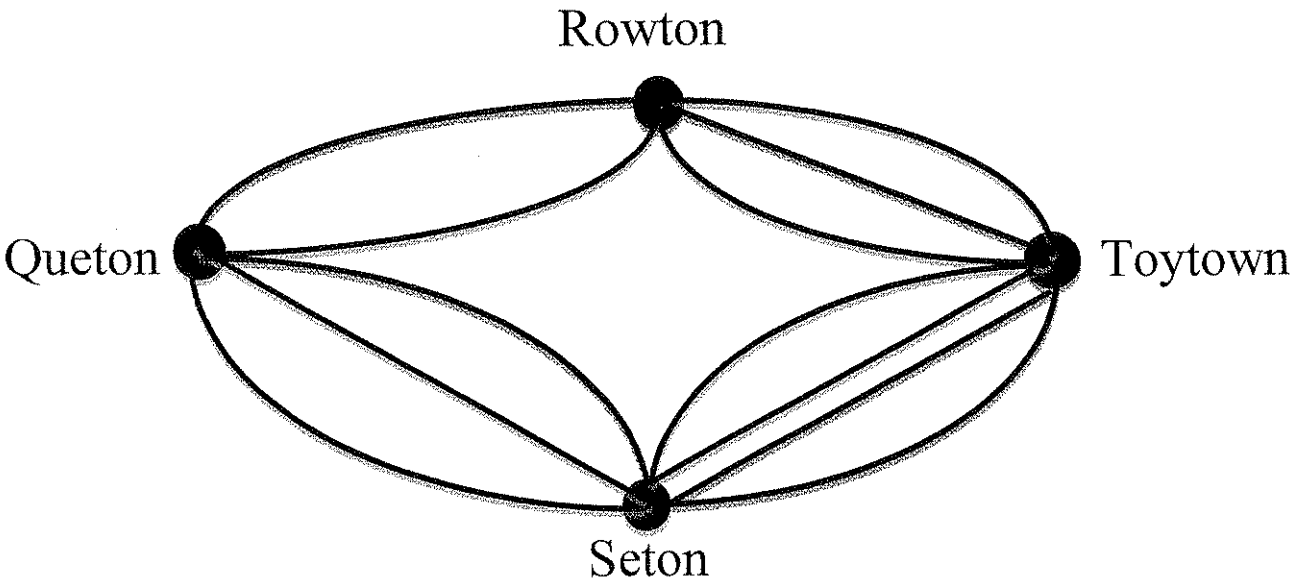
.....

25. A boy ate 100 cookies in five days. Each day he ate 6 more than the day before. How many cookies did he eat on the first day?

.....



26. The diagram shows the number of paths from Queton to Toytown through Rowton or Seton.



How many different ways are there of getting from Queton to Toytown if you can only go from left to right?

.....

27. Here is a number pattern:

A	B	C	D
	1	2	3
6	5	4	
	7	8	9
12	11	10	

a) Complete the next two rows of the table.

b) If the pattern continued, write down the correct column letter for each of these numbers:

(i) 29

.....

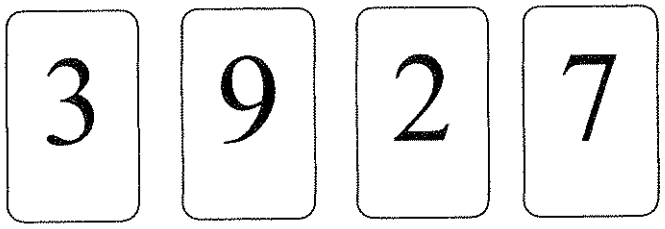
(ii) 54

.....

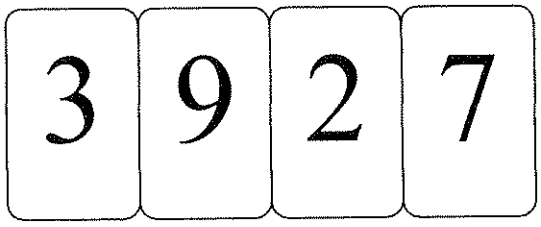
(iii) 141

.....

28. Here are some number cards:



You can use each card once to make the number 3927, like this:



Use the four number cards to make numbers that are as close as possible to the numbers written below.
Example

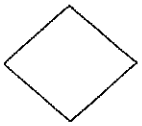
8000 → 7932

You must **not** use the same card more than once in each answer.

3000 →

7000 →

3800 →

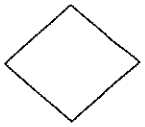


29. Jemima has five cards which are numbered from 1 to 5 on one side, and have either a square, a circle, a triangle or a star drawn on the other side.
She knows that there is at least one card with each shape and that the odd numbered cards do not have squares on them. Card number 4 has a circle on it, and two cards that have a sum of 6 both have stars on them.
What shape is on card 3?

.....

30. A number of children are standing in a circle. They are evenly spaced and the 7^{th} child is directly opposite the 18^{th} child. How many children are there altogether?

.....

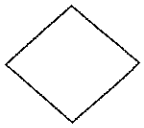


31. Four years ago the combined age of 3 dogs was 24 years.
What will the combined age be in 2 years' time?

.....

32. A Year 6 class has 30 pupils. There are 21 who are right-handed. There are 16 girls in the class.
Not all the girls are right-handed.
What is the smallest number of girls who are right-handed?

.....



33. A wheel has 3 different colours painted on its rim, red (R), green (G) and yellow (Y).
As it turns, a pattern is left on the ground.



The first mark is yellow, and the second mark is red, so the pattern left on the ground will be:

Y R G Y R ...

a) What is the colour of the 20^{th} mark?

.....

Another wheel makes the pattern

G Y Y R G Y Y R G .....

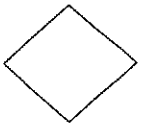
b) What is the colour of the 38^{th} mark?

.....

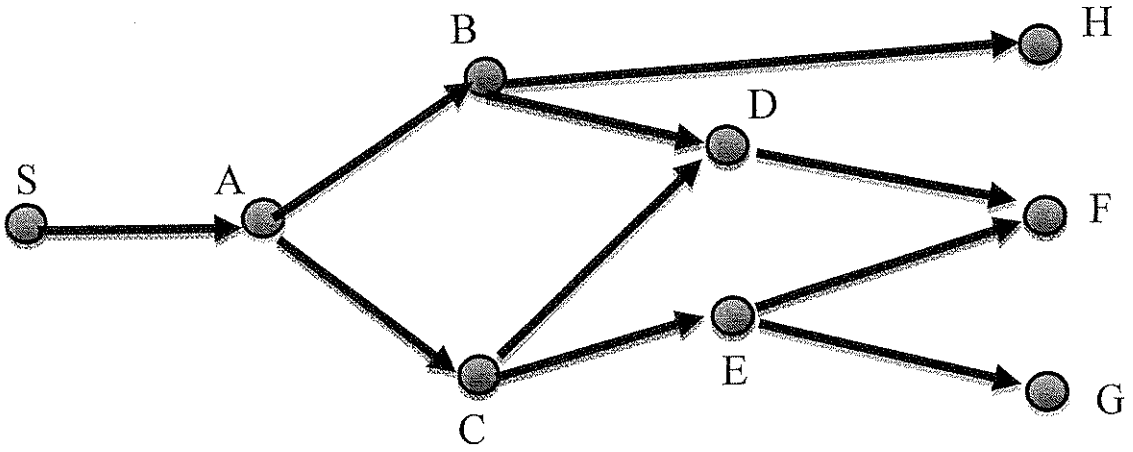
Another wheel has 6 **different** colours. No colour is repeated.

c) If red is the 83^{rd} colour in the pattern, how many colours are at the start of the pattern before red occurs?

.....



34. Some marbles are released through this network from S. At each of the junctions, half of the marbles flow in each direction.



a) What fraction of the marbles go through E?

.....

b) If 120 marbles are released through the network, how many do not reach F?

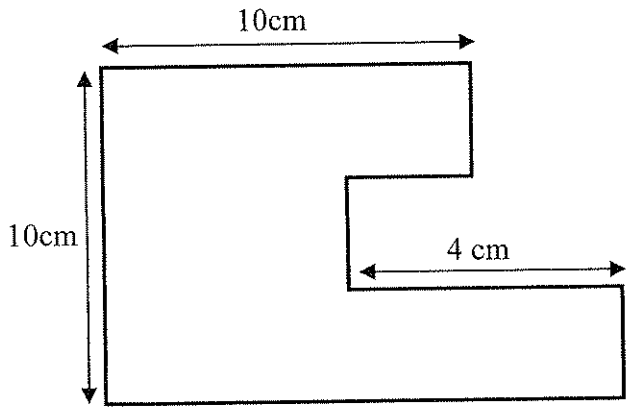
.....

35. It takes two decorators 8 days to paint a house.
One is lazy and one is energetic.
The energetic one could paint the house in 12 days on his own.
How many days would it take the lazy one to paint the house on his own?

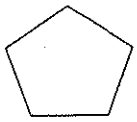
.....

36. Work out the perimeter of the following shape.

All the interior angles are right angles.
The shape is **not** drawn accurately.



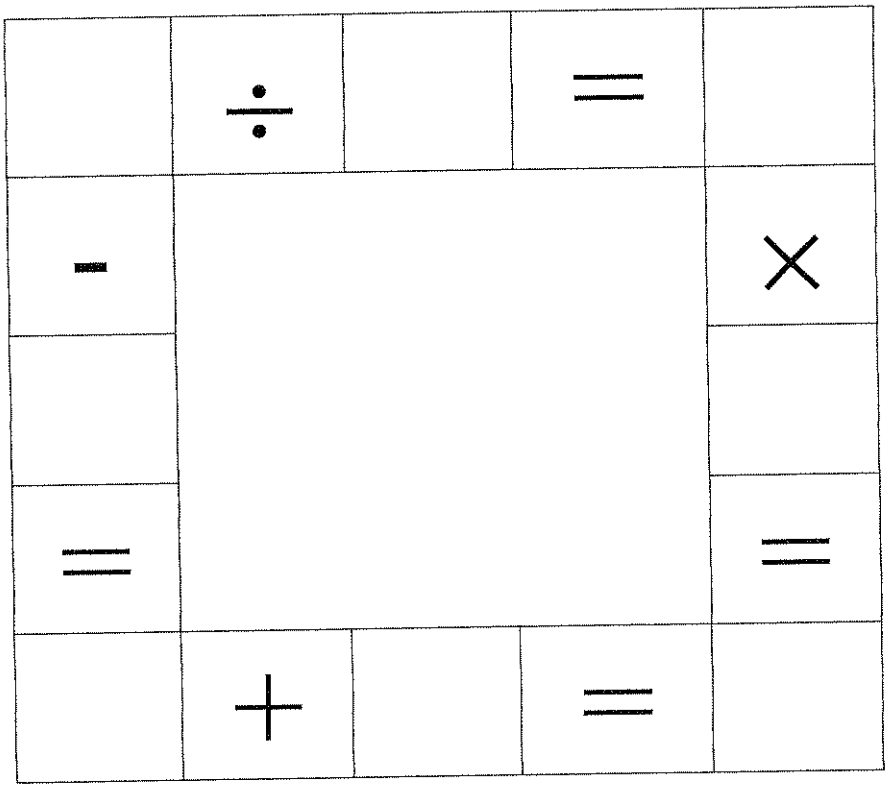
.....



37. Three ducks and two ducklings weigh 32kg. Four ducks and three ducklings weigh 44kg. All ducks weigh the same as each other and all ducklings weigh the same as each other.
What is the weight of two ducks and one duckling?

.....

38. Use each number from 1 to 8 once in the boxes to make all the calculations correct:



39. In a game two discs are tossed and the numbers landing uppermost are added together.
The red disc has the number 3 on one side and 5 on the other side; whereas the blue disc has 4 on one side and 7 on the other.
If they land so that 3 and 7 are showing, the score is 10.
Write down the other possible scores for this game.

....

In a new game a green disc has 6 on one side and 4 on the other. A yellow disc has 1 on one side and 3 on the other. The rules are the same. Find the score which you are **most likely** to get.

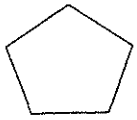
.....

In another game a pink disc has 8 on one side, but on the other side is a mystery number, and a purple disc has 4 on one side with a different mystery number on the back. The four possible total scores are 12, 13, 14, 15. Find two possible pairs of values for the mystery numbers.

pink ..... pink .....

OR

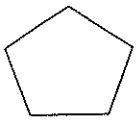
purple ..... purple .....



40. Each of the symbols has a different value associated with it. When you add up the value of all the symbols you get the total value for that row or column. Find the value of each symbol.

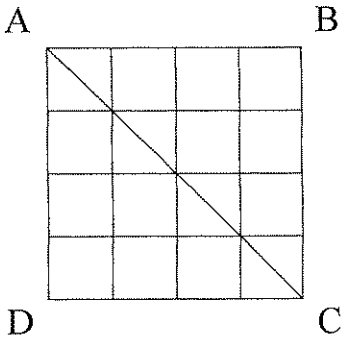
♥	▲	☻	▲	99
☻	▲	▲	♥	99
♥	☻	♥	☻	154
▲	♥	☻	▲	99
142	99	?	99	

♥ = ▲ = ☻ = ? =



41. A square grid is separated into 16 small squares.

How many ways can two squares be shaded so that the grid has symmetry about the diagonal line AC if



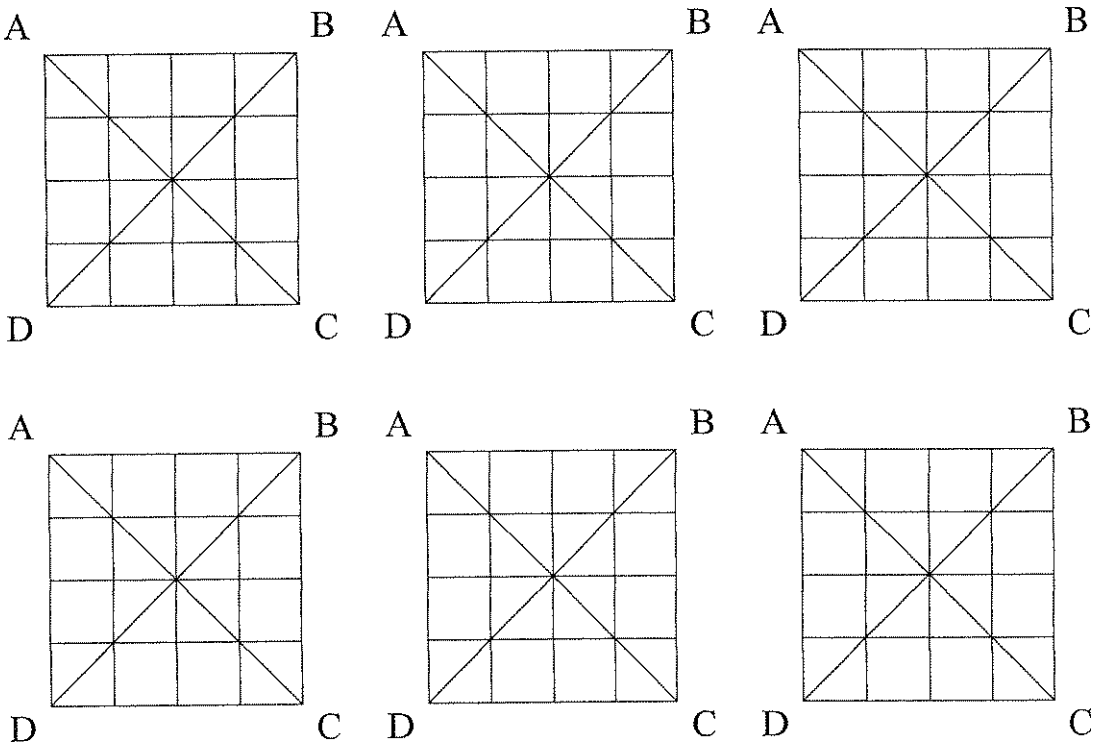
a) the two squares must <u>not</u> include the diagonal line?

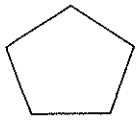
.....

b) the two squares must include the diagonal line?

.....

On the grids below, show all the ways exactly two squares can be shaded so that the grid has symmetry about the two diagonal lines, AC and BD.
(You may not need to use all the grids.)





42. On the planet Arithmetica, the natives have a special sort of arithmetic using the symbol ♉.

For example, $5 \text{ ♉ } 3$ means double 5 then subtract 3.

So $5 \text{ ♉ } 3 = 2 \times 5 - 3$
$= 10 - 3$
$= 7$

(i) Work out $8 \text{ ♉ } 6$

.....

They also use this symbol twice:

For example $(5 \text{ ♉ } 3) \text{ ♉ } 2 = (2 \times 5 - 3) \text{ ♉ } 2$
$= 7 \text{ ♉ } 2$
$= 2 \times 7 - 2$
$= 14 - 2$
$= 12$

(ii) Work out $(9 \text{ ♉ } 4) \text{ ♉ } 3$

.....

(iii) If $(6 \text{ ♉ } \mathbf{n}) \text{ ♉ } 10 = 8$, what is the number **n** ?

.....

