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Godolphin & Latymer

Entrance Examination – Group 2

Friday 16th January 2009

MATHEMATICS

Time: 1 hour 15 minutes

Name: _____

Instructions:

Work through the paper without rushing.

Do your 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.
$$\begin{array}{r} 484 \\ +\ 365 \\ \hline 849 \end{array}$$

2.
$$\begin{array}{r} 7\overset{5}{\cancel{8}}\overset{1}{0}8 \\ -\ 495 \\ \hline 7{,}113 \end{array}$$

3.
$$\begin{array}{r} 297 \\ \times\ 8 \\ \hline 2\overset{7}{,}3\overset{5}{7}6 \end{array}$$

4.
$$9\overline{)2017^{2}6^{3}} \quad 224$$

5. Write the number thirty thousand, two hundred and ninety seven in figures.

Answer: 30,297

6. On Monday it was -12°C. The temperature rose by 1 °C each day for the next week. What was the temperature on Friday?

M T W T F
-12 -11 -10 -9 -8

Answer: $-8\,^{\circ}C$

7. Which of these letters do not look the same when reflected in the mirror line shown below?

X A E D Z

---------- mirror line

X (A) E D (Z)

Answer: A and Z

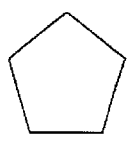
8. Write down the next two terms in each sequence:

15, 24, 33, 42, 51, 60 (+9 +9 +9 +9 +9)

2.2, 2.5, 2.8, 3.1, 3.4, 3.7 (+0.3)

$\frac{1}{3}$, 1, 3, 9, 27, 81 (×3 ×3 ×3)

$27 \times 3 = 81$



9. a) May is 14 years old and her father is 39 years older than her. May's mother is 8 years younger than her father. How old is May's mother?

$$\begin{array}{r} 14 \\ +\ 39 \\ \hline 53 \end{array} \qquad \begin{array}{r} {}^{4}\cancel{5}^{1}3 \\ -\ \ 8 \\ \hline 45 \end{array}$$

Answer: 45

b) Five glass marbles cost a total of £7.50. How many marbles could I buy with £24?

$$5\overline{)750} = 150 \qquad £1.50 \text{ per marble}$$

$$15\overline{)240} = 16 \qquad 16 \text{ marbles}$$

Answer: 16 marbles

10. Add the smallest of the following numbers to the largest:

1, 0.13, 0.8, 0.012, 1.238, 0.028

$$\begin{array}{r} 1{\cdot}238 \\ +\ 0{\cdot}012 \\ \hline 1{\cdot}250 \end{array}$$

Answer: 1·25

11. I arrived at the station at 7.47 a.m. My train was due at five past eight but was 13 minutes late.

How long did I have to wait for my train?

8:05 + 13 = 8:18

7:47 → 8:00 = 13 mins
8:00 → 8:18 = 18 mins

18 + 13 = 31

Answer: 31 mins

12. You multiply a number by itself. You then multiply the new number by three. The answer is 192.

reverse order, reverse the signs.

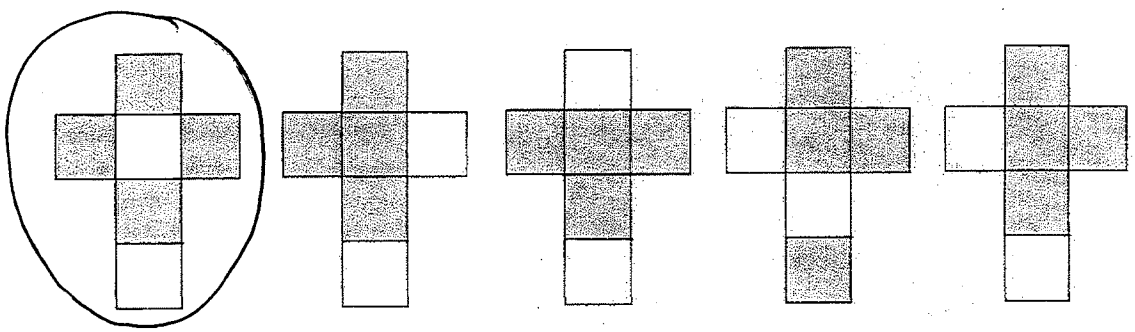
What is your starting number?

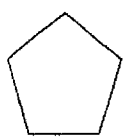
$$3\overline{)192} \quad 64$$

192 ÷ 3 = 64
64 = 8 × 8

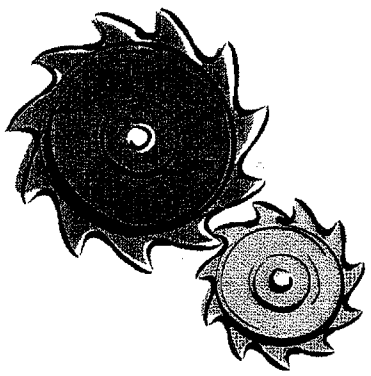
Answer: 8

13. Circle the net which can be folded into a cube that looks different from the others.





14. Disc B turns twice when A turns 5 times. If disc A turns 45 times, how many times does disc B turn?



$45 \div 5 = 9$
$9 \times 2 = 18$

Answer: 18 turns

15. A box contains 48 pieces of fruit. Five eighths of them are apples and the rest of them are pears. How many pears are there?

$48 \div 8 = 6$ (1/8 total)
$6 \times 5 = 30$ (5/8 = number of apples)
$48 - 30 = 18$ = number of pears

Answer: 18 pears

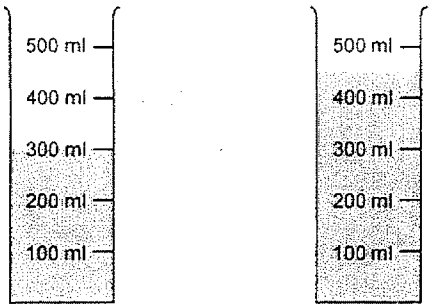
16. Use the symbols +, -, ÷, or x to make each calculation correct.

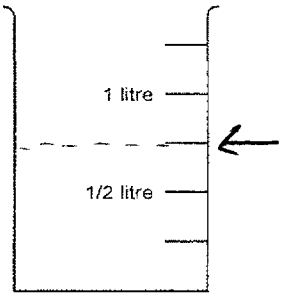
i. $5 \boxed{+} 3 = 12 \boxed{-} 4$

ii. $2 \boxed{\times} 3 = 12 \boxed{\div} 2$

iii. $5 \boxed{\div} 5 = 4 \boxed{\div} 4$

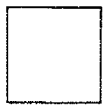
17. All the water from these two beakers is poured into the empty beaker. Draw a line to show the level of the water in the new beaker.

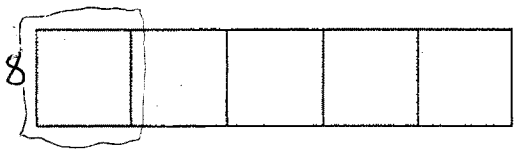




300 + 450 = 750

18. A square has a perimeter of 8cm. Five of these squares are put together in a line to make a rectangle.
What is the area of the rectangle?





8 ÷ 4 = 2 (side of 1 square)
2 x 2 = 4 cm² (area of 1 square)
4 x 5 = 20 cm² (area of ~~rectangle~~)

Answer: 20 cm²

19.

For Sale	
Tomatoes	**£1.50 per pound**
Green Peppers	**40p each**
Cucumbers	**30p each**

Brendan and Sophie got £0.20 change when they paid with £5 for some tomatoes, green peppers and cucumbers which they bought at a farm stand.

- They bought 5 tomatoes, which weighed 2 pounds altogether.
- They bought two more tomatoes than green peppers.

How many cucumbers did they buy?

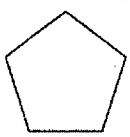
2 x 150 = 300 (tomatoes)
3 x 40 = 120 (green peppers)

Answer: 2 cucumbers

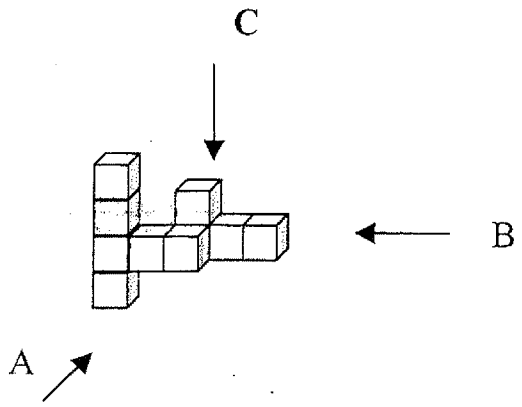
300
+ 120
420

480
- 420
060p (60p of cucumbers)

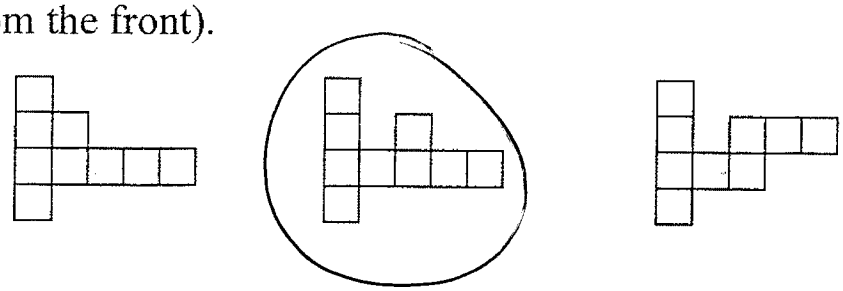
60 ÷ 30 = 2



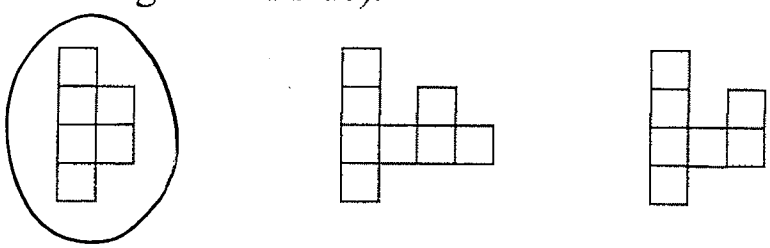
20. The following is a representation of a 3-dimensional shape, made up of cubes.



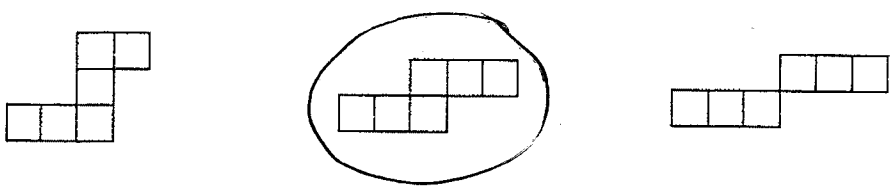
a) Circle the shape that you would see if you were looking at it from A (from the front).



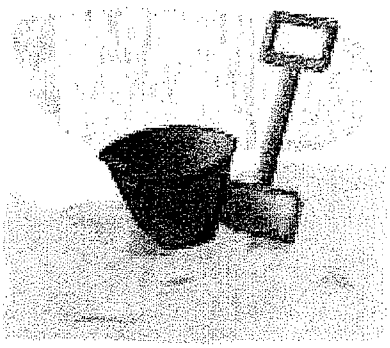
b) Circle the shape that you would see if you were looking at it from B (from the right hand side).



b) Circle the shape that you would see if you were looking at it from C, (from above).



21. Three neighbouring families chose different holidays abroad this year.



Use the clues below to work out their house numbers, their chosen destinations and the months during which they were away.

The families: Brown, Green, Smith
The house numbers: 6, 8, 10
The destinations: Cyprus, Portugal, Spain
The months: May, June, July

Clues:

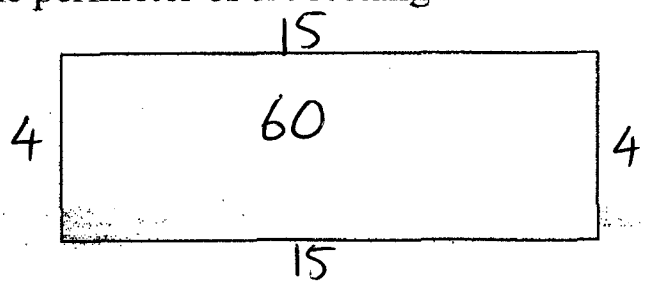
1. The Browns, who don't live at No. 8, went to Spain.
2. The Smiths took their holiday in June.
3. One family went to Portugal in July.
4. The Greens live at No. 6.

Name	House No.	Destination	Month
Brown	10	Spain	May
Green	6	Portugal	July
Smith	8	Cyprus	June

① Fill in info in question
② If Brown's don't live at 8, they must live at 10.
∴ Smith's live at 8
③ If Portugal in July - must be the Green's
∴ Brown's went in May
④ That leaves Cyprus for the Smith's

22. A rectangle has an area of 60 cm^2. Its length is 11cm more than its width.

What is the perimeter of the rectangle?

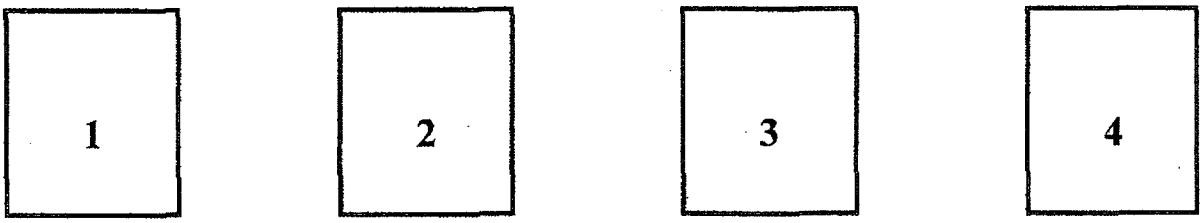


60
/ \
5 12 ×
4 15 ✓

4 + 4 + 15 + 15

Answer: 38cm

23. Here are four cards which you can use to make numbers:



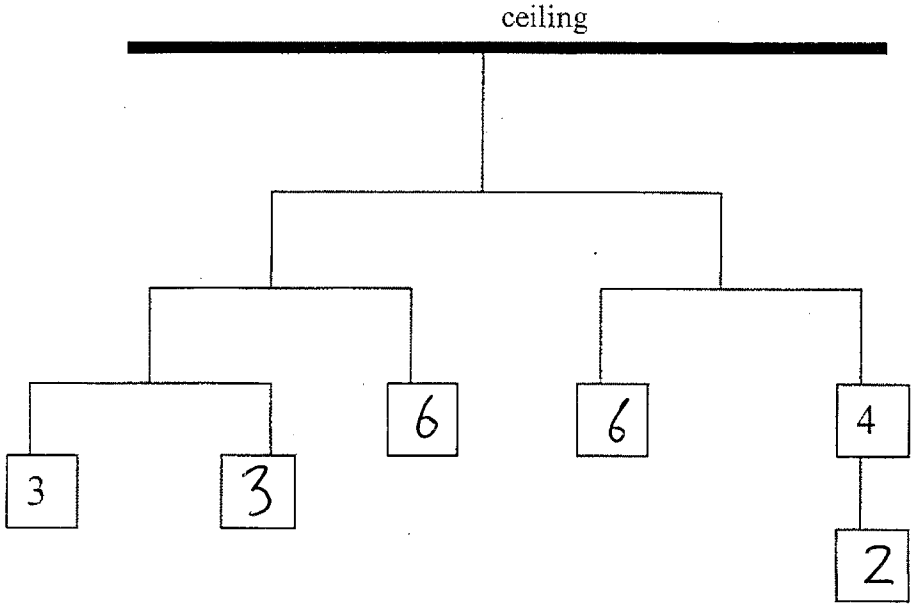
Write down all the possible 4-digit even numbers you can make which are greater than 3000. Write your answers from smallest to biggest.

3124
3142
3214
3412
4132
4312

3124, 3142, 3214, 3412, 4132, 4312

24. A child's mobile (not phone!) is suspended from a ceiling and has some weights suspended so that each bar is balanced as shown.

Fill in the weights that are missing.



25. A bus started off from a bus station with 24 people.

At the first stop 4 people got off and some people got on.
At the second stop, no one got off but 3 people got on.
There were then 34 people.

How many people got on at the first stop?

reverse (for example if they get off, add. then to total)

34 − 3 = 31 (at the second stop)

31 + 4 = 35 (at the first stop before people got off)

35 − 24 = 11

Answer: 11 people

26. Hayfield School girls' football team played Greentops School at home last week. The final score was 3:1. (The home team is listed first.)

Below is a list of possible half time scores, but one has been missed out. Can you find it?

2:1 0:0 2:0 1:1

3:0 3:1 1:0

0:1

Answer: 0:1

27. The Jones children take their dogs for a walk.
There are 3 times as many dogs as children.
The total number of legs is 56. How many Jones children are there?

Dogs have 4 legs! (Humans have 2)

3 times as many dogs, so $3 \times 4 = 12$

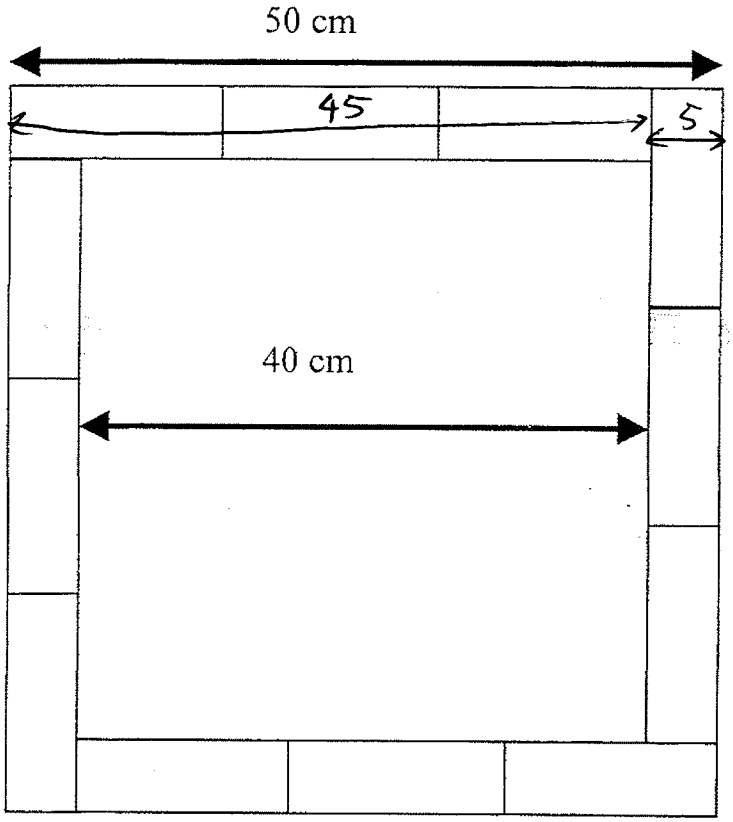
every 12 legs (dogs), there are 2 human legs

$14\overline{)56} = 4$

so $12 \times 4 = 48$ dog legs
12×4 8 human legs

Answer: 4 children

28.



50 − 40 = 10
10 ÷ 2 = 5 (width)

50 − 5 = 45
(= length of 3 lengths

45 ÷ 3 = 15
(length)

15
× 5
75 cm²

Twelve rectangles, all the same size, are arranged to make a square, as shown in the diagram above.

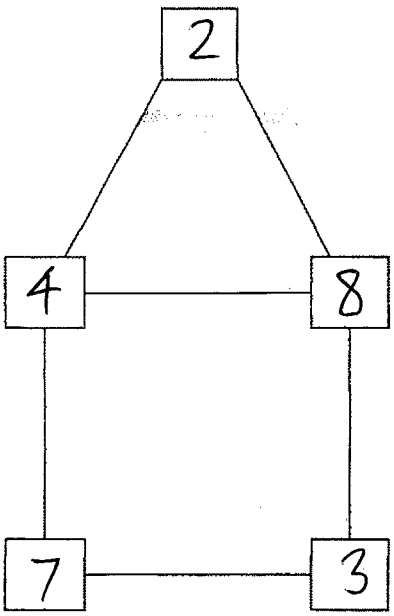
Calculate the area of one of the rectangles.

Answer: 75 cm²

29. Fill in the missing digits in this multiplication:

	3	3	8
		X	7
2	3	6	6

30. Enter the numbers 2, 3, 4, 7, 8 into the boxes on the shape according to the following rules:



a) All 3 numbers in the triangle are even

b) The total of the 4 numbers on the square is 22.

c) The total of numbers on the left hand edge of the square is equal to the total of numbers on the right hand edge.

d) The number in the bottom left hand corner of the square is greater than the number in the bottom right hand corner.

31. Use the fact that 742 x 36 = 26712 to work out these sums:

742 x 360 = 267120

26712 ÷ 36 = 742

742 x 72 = 53424

743 x 36 = 26748

$$\begin{array}{r} 26712 \\ \times \quad 2 \\ \hline 53424 \end{array}$$

$$\begin{array}{r} 26712 \\ + \quad 743 \\ \hline 27455 \end{array}$$

$$\begin{array}{r} 26712 \\ + \quad 36 \\ \hline 26748 \end{array}$$

32. Bernard thinks of a number.

① When the number is divided by 2, the remainder is 1.
② When the number is divided by 3, the remainder is 2.
③ When the number is divided by 4, the remainder is 3.
④ When the number is divided by 5, the remainder is 4.

It is less than 80. What is the number?

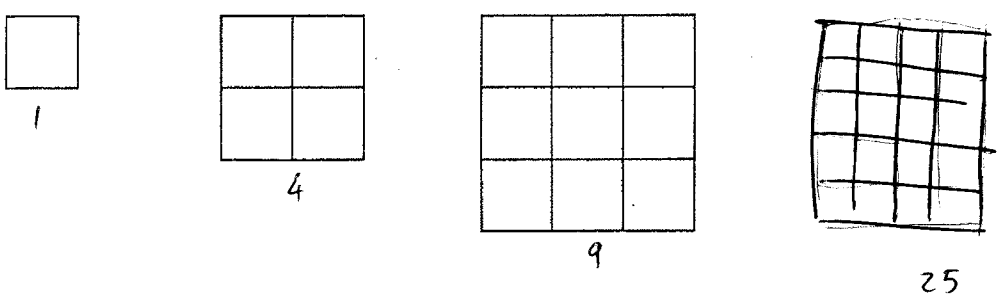
Not divisible by 2 (odd), 3, 4, 5

79 X ÷3 rem = 1
77 X ÷5 rem = 2
71 X ÷5 rem = 1
67 X ÷3 rem = 1
61 X ÷3 rem = 1
59 ✓

Answer: 59

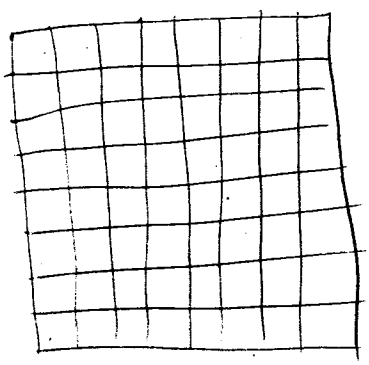
33. The second pattern has four small squares and is made from six lines. How many lines are needed to draw 64 small squares?

4 6 8 10 12 14 16

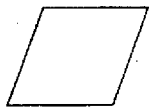


36 49 64

= 8th pattern → 8×8 = 64



Answer: 18



34. On the planet Nodnol, the natives have a special sort of arithmetic using the symbol ✪.

3 ✪ 4 means add 3 and 4 and then add on the product of 3 and 4,
so 3 ✪ 4 = 3 + 4 + (3 x 4) = 19

(a) Find the value of 5 ✪ 7

5 + 7 = 12
5 × 7 = 35 12 + 35 = 47

Answer: 47

(b) Find the value of 2 ✪ $\frac{1}{2}$

2 + ½ = 2½
2 × ½ = 1 2·5 + 1 = 3.5

Answer: 3½

(c) If x ✪ 2 = 23, what number is x ?

(x + 2)
(x + 2) + 2x = 23 x = 7
3x + 2 = 23
3x = 21

Answer: 7

(d) If n ✪ n = 99, what number is n?

(n + n)
(n + n) + (n × n) = 99
= 2n + n^2 = 99

Answer: 9

35. A bat ate 1,050 mosquitoes in four nights.
Each night she ate 25 more than the night before.
How many did she eat on the first night?

25
50
75
100
} extras
250

1050 − 250
= 800

800 ÷ 4 = 200

200 + 25

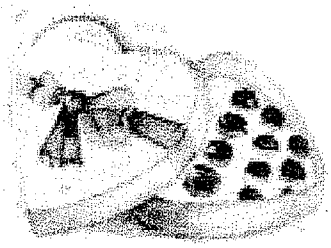
Answer: 225

so

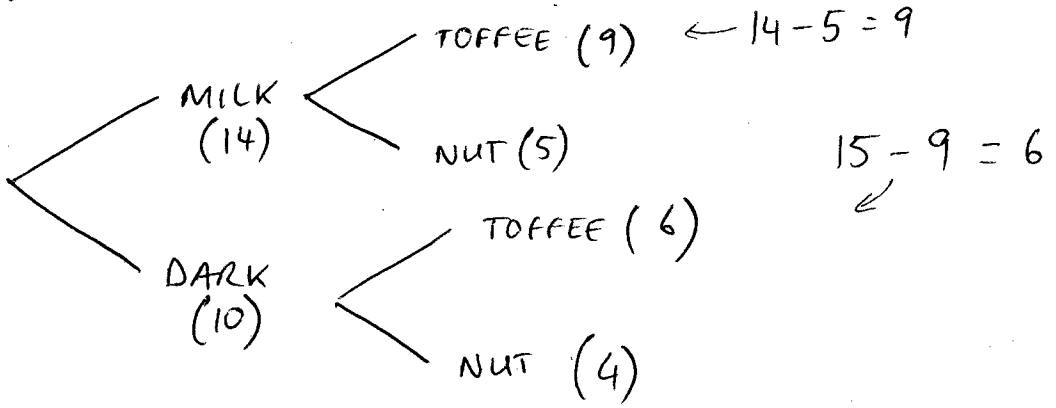
night	mosquitos	
1	200	+ 25
2	225	+ 25
3	250	+ 25
4	275	+ 25

36. A box of chocolates contains 24 chocolates. Each chocolate is either milk chocolate or dark chocolate. All the chocolates have centres, which are either toffee or nut (not both).

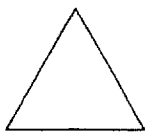
There are 5 milk chocolates with a nut centre. There are 10 dark chocolates altogether, and 15 toffees altogether.



How many dark chocolate toffees are there?



Answer: 6



37. Ten girls live in ten different houses.

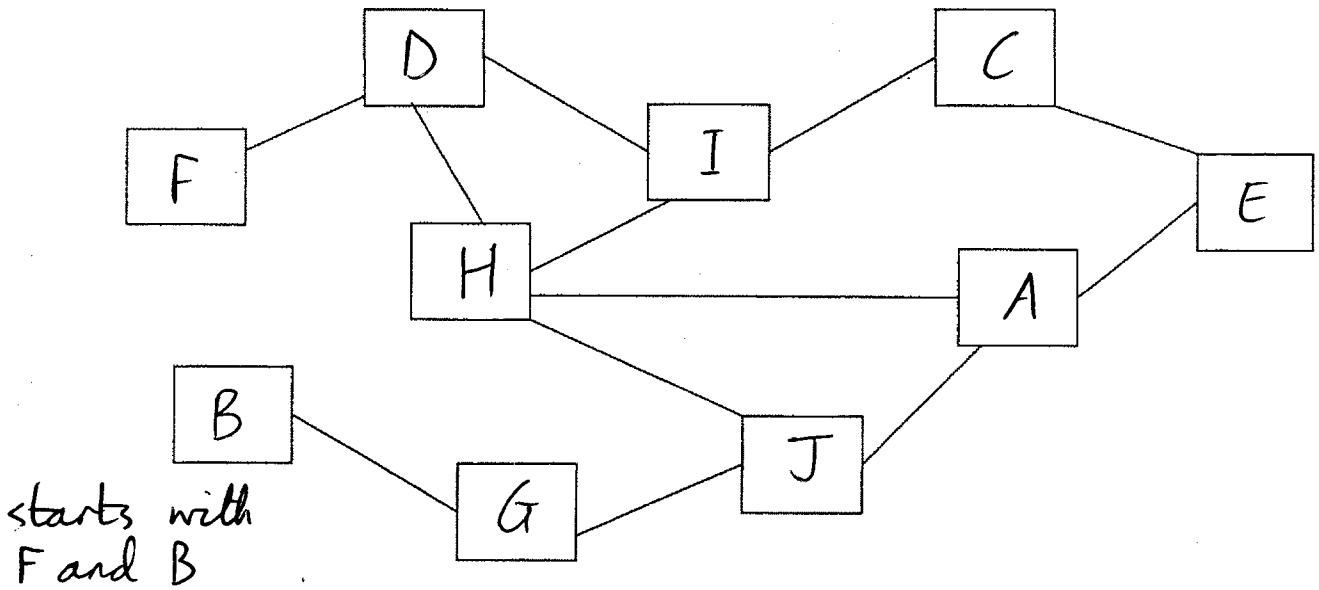
The boxes on the diagram represent the girls' houses.

The lines joining the houses show that the two girls from these houses have met.

A - E, J, H
E - A, C

The girls that have met are:

1 Ella and Alison 1
1 Dee and Fiona 1
1 Gita and Bella 1
2 Alison and Justyna 1
1 Crystal and Ingrid 1
2 Ingrid and Dee 2
1 Hiba and Justyna 2
3 Justyna and Gita 2
2 Ingrid and Hiba 2
3 Hiba and Alison 3
3 Dee and Hiba 4
2 Crystal and Ella 2



starts with F and B

Put the first letter of the girl's name in the correct house.

38. (a) A school gate can be opened using the correct combination of digits in the correct order.

When 418 is tried, one digit is wrong.
When 238 is tried, one digit is wrong.
When 437 is tried, one digit is still wrong.

What is the correct combination?

418 ← one wrong
238 ← changed first 2, one wrong → 8 correct
437 ← changed 4, 8. one wrong → 4 + 3 correct

Answer: 438

(b) Another school gate needs the correct combination of four digits in the correct order.

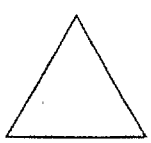
3 6 4 9

When ~~3648~~ is tried, two digits are wrong
When ~~3628~~ is tried, two digits are wrong
When ~~3147~~ is tried, two digits are wrong
When ~~3629~~ is tried, two digits are still wrong
When 1258 is tried, *all* the digits are wrong.

What is the correct combination of digits?

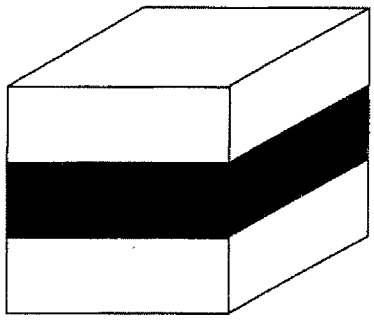
5648 ← 2 wrong
3628

Answer: 3649



39. A sweet is in the shape of a cube. It is made up of three layers of equal thickness, as shown in the diagram.

What fraction of the outside is black?



6 sides

4 sides lost a third

$6 \times 3 = 18$

$4 \times 1 = 4$ $\quad 4/18$

$= 2/9$

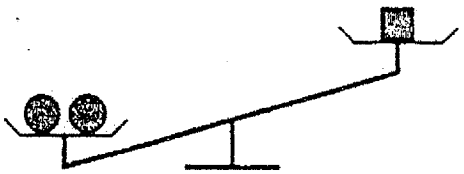
Answer: 2/9

40. Jane is trying to work out the weights of some shapes. She knows that the weights are whole numbers less than 10kg. The pictures show what Jane finds out. For example, picture (1) shows that the square is heavier than the circle.

(1) 

(2) 

(3) 

(4) 

(a) What does picture (2) show?

Answer: Traigle heavier than two circles

(b) Is the square heavier than the triangle? (2 vs 4)

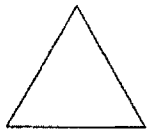
Answer: NO

(c) What are the weights of the shapes?

 4

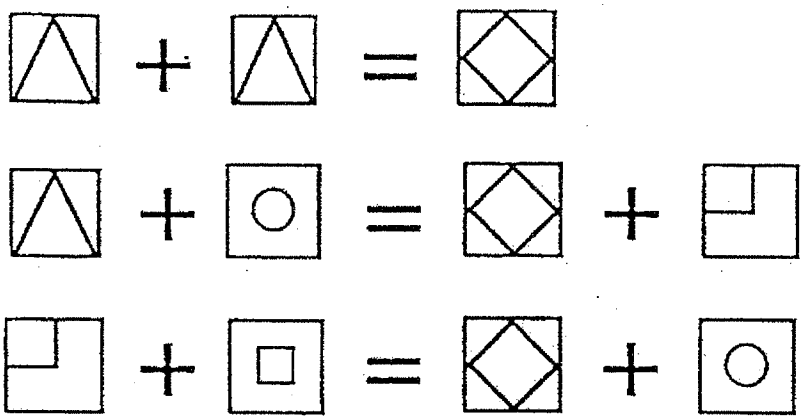
 7

 9



41. On the island of Mathia the people use patterns instead of numbers like ours.

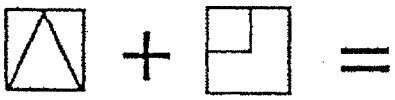
Here are some facts about Mathian numbers.



Now answer these questions (Each answer is one Mathian number).

a) 

Answer: _____  _____

b) 

Answer: _____  _____

c) 

Answer: _____  _____