3 points

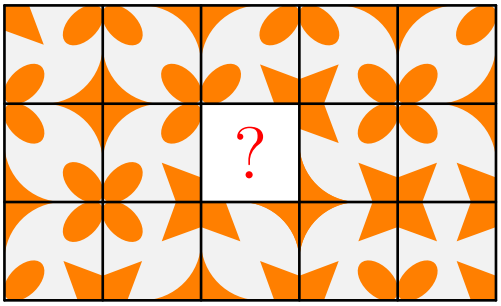
 # 1. A mushroom grows every day. Mary takes a picture of the mushroom each day from Monday to Friday. Which of these pictures was taken on Tuesday?

蘑菇每一天都在成长，小丽从星期一到星期五每天都会给蘑菇拍照，以下哪张照片是在星期二拍摄的?

(A)  (B)  (C)  (D)  (E) 

 # 2. Which piece completes the pattern?

以下哪一块拼图能够拼成完整的图案?

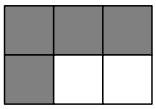
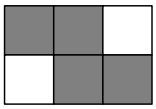
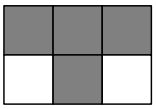
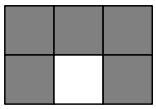
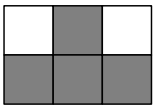


(A)  (B)  (C)  (D)  (E) 

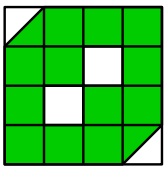
 # 3. Tim shades all the squares in the grid where the result is 20. Which pattern does he get?

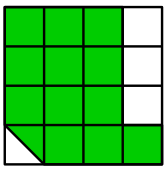
如图显示，小庭将答案为20的格子涂上阴影。以下哪一个是他的答案?

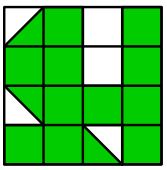
$16+4$	$19+1$	$28-8$
2×10	$16-4$	7×3

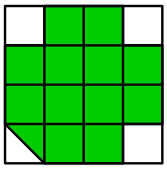
(A)  (B)  (C)  (D)  (E) 

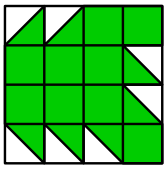
 # 4. Which of the following figures has the largest shaded area?
如图显示，以下哪个图的阴影面积最大?

(A) 

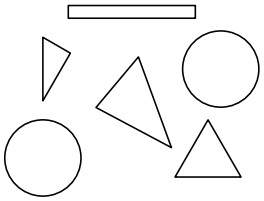
(B) 

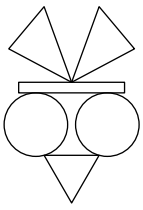
(C) 

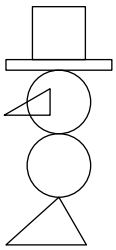
(D) 

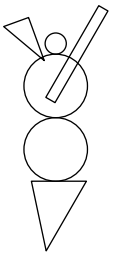
(E) 

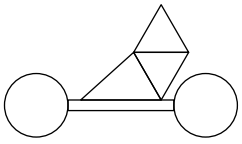
 # 5. Which one of the figures below can you make with these pieces?
如图所示，用以下的图形碎片可以制作出哪个选项中的图形?

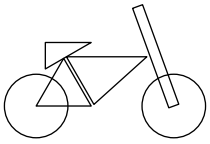


(A) 

(B) 

(C) 

(D) 

(E) 

 # 6. Elli draws this square with chalk on the pavement. She starts jumping from number 1. Each time she jumps, she always jumps to a number that is 3 more than the number she is standing on. What is the largest number Elli can jump onto?

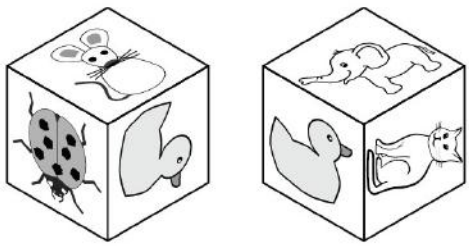
小艾用粉笔在人行道上画了如以下图片中的大正方形。她从数字1开始跳跃。每当她跳跃时，她总是跳到比她之前站立的数字多3的位置。请问小艾可以跳到的最大数字是多少?

1	5	8	11
4	7	10	14
24	23	13	18
21	19	16	20

(**A**) 11 (**B**) 14 (**C**) 18 (**D**) 19 (**E**) 24

 # 7. Jorge glues these 6 stickers to the faces of a cube. The pictures shows the cube in two positions. Which sticker is on the opposite face to the duck?

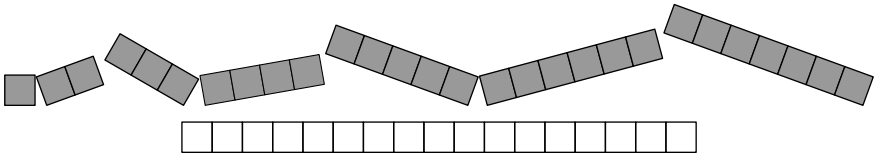
小乔将6个贴纸分别各自粘贴到一个立方体的表面。如图显示的是该立方体在两个不同的位置时的情况。请问哪个贴纸的图案会在鸭子贴纸的对面?



(**A**)  (**B**)  (**C**)  (**D**)  (**E**) 

 # 8. Casper has the following 7 shaded pieces. He uses some of these pieces to fully cover this white grid without overlap. He uses as many different pieces as possible. How many pieces does Casper use?

小贾有以下7个阴影碎片。他将在不重叠的情况下用其中一些阴影碎片把所有的白色网格完全覆盖。他用了尽可能多的不同的碎片。请问小贾将会用到多少块阴影部分的碎片?

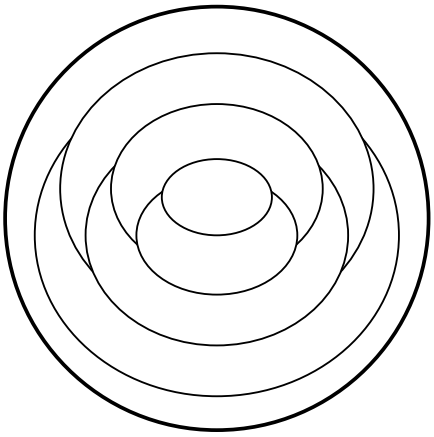


(**A**) 3 (**B**) 4 (**C**) 5 (**D**) 6 (**E**) 7

4 points

 # 9. Cindy colours each region on the pattern either red, blue or yellow. The regions that touch each other have different colours. The outer region of the pattern is coloured red. How many regions is coloured red?

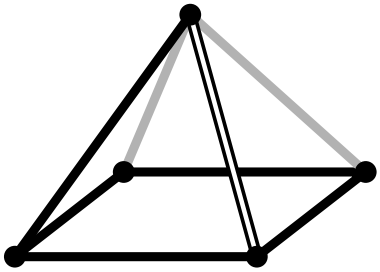
小迪将图案上的每个区域都分别涂上红色，蓝色或者黄色，且相邻的区域颜色不同，她将图案的外圈（区域）涂上红色。请问有多少个区域被涂上红色?

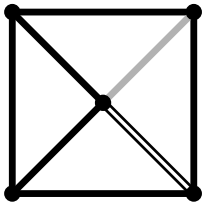


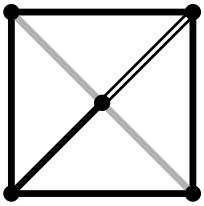
(**A**) 1 (**B**) 2 (**C**) 3 (**D**) 4 (**E**) 5

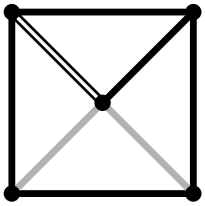
 # 10. Loes looks at the pyramid from above. What does Loes see?

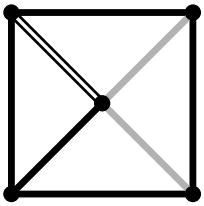
小卢从金字塔的上方往下看，她会看到什么？

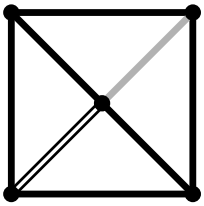


(**A**) 

(**B**) 

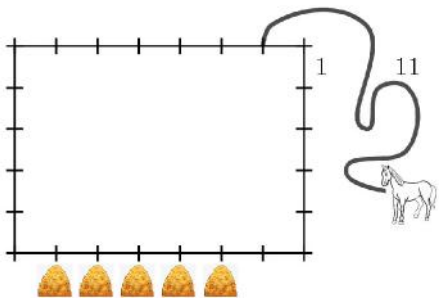
(**C**) 

(**D**) 

(**E**) 

 # 11. Dennis ties a horse 1 meter from a corner of a 7 meter by 5 meter house, using a rope with length 11 meter. Dennis places 5 piles of dry grasses as shown below. How many of the piles could the horse reach?

如图所示，小妮使用一根11米长的绳子将一匹马绑在7米x5米的小屋外，并且置放了5堆干草准备喂食马儿。捆绑着马儿的地方与小屋的角落之间的距离为1米。请问这匹马能够吃到多少堆的草?

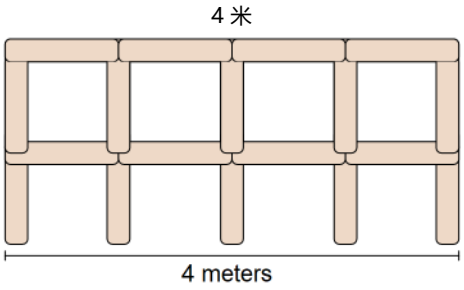


(**A**) 1 (**B**) 2 (**C**) 3 (**D**) 4 (**E**) 5

 # 12. Lonneke builds a fence using poles  with length 1 meter. The picture shows a fence with length 4 meter. How many poles does Lonneke need to build a fence with length 10 meter?

小罗用1米长的杆来搭建围栏，如右侧所示： 

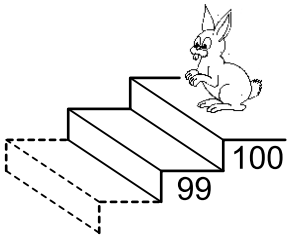
下图显示的是一个4米长的围栏。请问小罗要搭建一个10米长的围栏需要多少根杆?

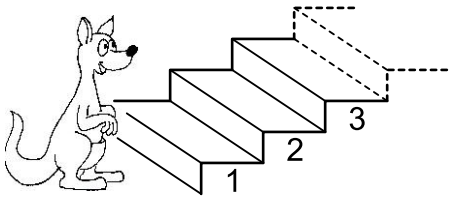


(**A**) 22 (**B**) 30 (**C**) 33 (**D**) 40 (**E**) 42

 # 13. Every time the kangaroo goes up 7 steps, the rabbit goes down 3 steps.

图中的袋鼠每向上跳7层楼梯，兔子就会往下跳3层。





On which step do they meet?

请问它们会在哪一层见面?

(**A**) 53 (**B**) 60 (**C**) 63 (**D**) 70 (**E**) 73

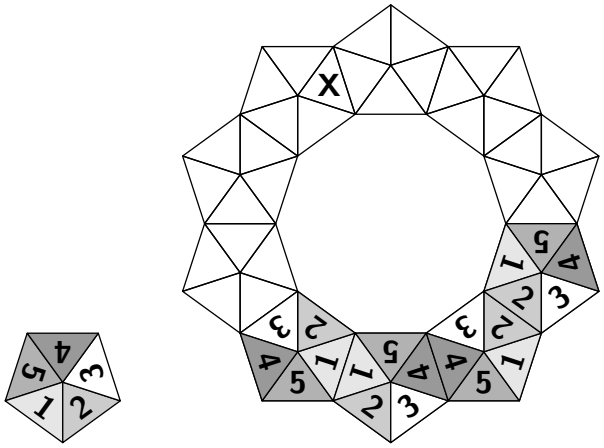
 # 14. The sum of three numbers is 50. Karin subtracts a secret number from each of these three numbers. She gets 24, 13 and 7 as the results. Which one of the following is one of the original three numbers?

有三个数字的总和是50。小凯用这三个数字分别减去了一个神秘的数字，得到的结果分别是24， 13和7。以下哪一个数字是原本三个数字中的其中之一?

(**A**) 9 (**B**) 11 (**C**) 13 (**D**) 17 (**E**) 23

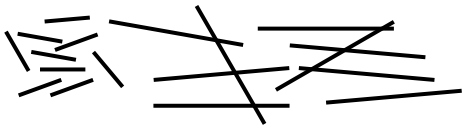
 # 15. Amelie wants to build the following figure using 10 of these given shapes. When two shapes share a side, the corresponding numbers match. Four shapes have already been placed. Which number goes in the triangle marked with X?

小米想用10个如下图左侧显示的五边形来拼成右侧的图形。当两个五边形共享同一边时，其相对应的数字是相同的。如图所示，已经有4个五边形摆放进图形里了。请问三角形中的X将会是数字几?



(**A**) 1 (**B**) 2 (**C**) 3 (**D**) 4 (**E**) 5

 # 16. Farid has two types of sticks: short ones, measuring 1 cm and long ones, measuring 3 cm.



With which of the combinations below can he make a square, without breaking or overlapping the sticks?

小瑞有两种不同的棍子：短棍是1cm，长棍是3cm。在不折断棍子，也不重叠的情况下，他能用下列哪一种组合摆出一个正方形?

(**A**) 5 short and 2 long
5根短棍和2根长棍

(**B**) 3 short and 3 long
3根短棍和3根长棍

(**C**) 6 short
6根短棍

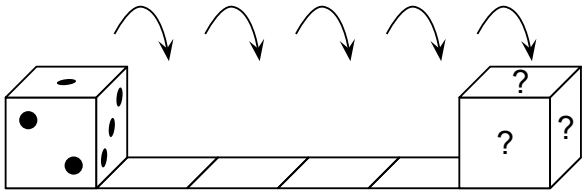
(**D**) 4 short and 2 long
4根短棍和2根长棍

(**E**) 6 long
6根长棍

5 points

 # 17. A standard dice has 7 as the sum of the dots on opposite faces. The dice is put on the first square as shown and then rolls towards the right. When the dice gets to the last square, what is the total number of dots on the three faces marked with the question marks?

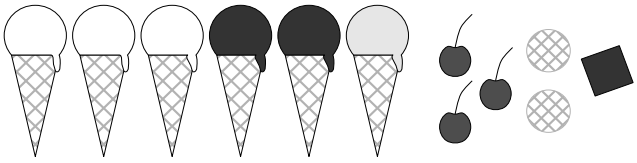
一颗标准骰子的相对面点数的总和为7。如图显示，骰子被放在第一个正方形的上面，然后再依着次序向右滚动。当骰子被滚动到最后一个正方形的上面时，请问该骰子被标上问号的点数总和是多少?



(**A**) 6 (**B**) 7 (**C**) 9 (**D**) 11 (**E**) 12

 # 18. 6 people each order one scoop of ice cream. They order 3 scoops of vanilla, 2 scoops of chocolate and 1 scoop of lemon. They top the ice creams with 3 cherries, 2 wafers and 1 chocolate chip. They use one topping on each scoop, such that no two ice creams are alike. Which of the following combinations is **not** possible?

6个人每人要买一勺冰淇淋。他们点了3勺香草，2勺巧克力和一勺柠檬。他们想在冰淇淋上搭配3个樱桃、2个华夫饼和1个巧克力碎。为了使冰淇淋两两互不相同，他们需要在每勺冰淇淋上搭配一种配料。请问以下哪一个组合是**不**可能的?



(**A**) chocolate with a cherry
巧克力冰淇淋和一个樱桃

(**B**) vanilla with cherry
香草冰淇淋和一个樱桃

(**C**) lemon with a wafer
柠檬冰淇淋和一个华夫饼

(**D**) chocolate with a wafer
巧克力冰淇淋和一个华夫饼

(**E**) vanilla with a chocolate chip
香草冰淇淋和巧克力碎

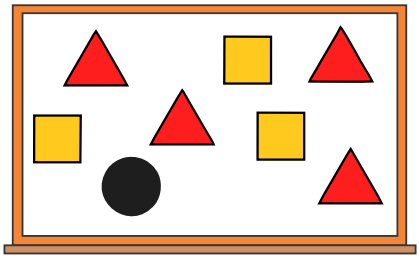
 # 19. The Queen tries to find out the three names of Rumpelstiltskin's wife. She asks her:
"Are you called Adele Lilly Cleo?"
"Are you called Adele Laura Cora?"
"Are you called Abbey Laura Cleo?"
Each time exactly one name and its position was right.
What is the name of Rumpelstiltskin's wife?

王后试图找出侏儒怪妻子的名字（名字有3个组成部分）
王后问她:
"你是叫Adele Lilly Cleo吗?"
"你是叫Adele Laura Cora吗?"
"你是叫Abbey Laura Cleo吗?"
每次只有一个部分和它的位置是正确的。请问侏儒怪的妻子叫什么名字?

(A) Abbey Lilly Cora (B) Abbey Laura Cora (C) Adele Laura Cleo
(D) Adele Lilly Cora (E) Abbey Laura Cleo

 # 20. A teacher writes the numbers from 1 to 8 on a board. The teacher then covers the numbers with triangles, squares and a circle. If you add the four numbers covered by the triangles, the sum is 10. If you add the three numbers covered by the squares, the sum is 20. Which number is covered by the circle?

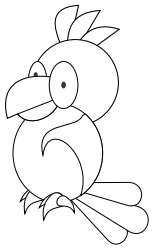
老师在黑板上写下了1到8的数字。然后老师分别用三角形，正方形和圆形来遮盖这些数字。如果你把4个被三角形所遮盖的数字相加时，所得到的数字总和是10。如果你将3个被正方形所遮盖的数字相加时，所得到的数字总和是20。请问被圆形所遮盖的数字是多少?



(**A**) 3 (**B**) 4 (**C**) 5 (**D**) 6 (**E**) 7

 # 21. Jane has some pictures of parrots. She wants to colour only the head, tail and wings of each parrot either red, blue or green so that all three colours are used on each picture. She colours one parrot's head red, its wings green and its tail blue. How many more parrots can she colour so that all the parrots are coloured differently?

小珍有一个绘画本，里面有一些鹦鹉的图片。她想要将每一只鹦鹉的头，尾巴和翅膀都分别涂上红色，蓝色或者绿色，以便绘画本中每张鹦鹉图片都有这三种颜色。她先将一张鹦鹉图片中的鹦鹉的头涂上红色，将翅膀涂上绿色，将尾巴涂上蓝色。请问她还可以为多少只鹦鹉涂上颜色，以便让所有的鹦鹉都有不同的颜色?



(**A**) 1 (**B**) 2 (**C**) 4 (**D**) 5 (**E**) 9

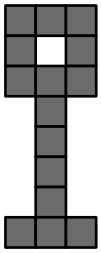
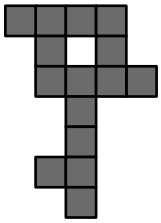
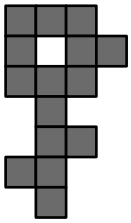
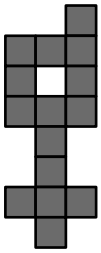
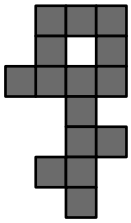
 # 22. Several teams came to the summer Kangaroo camp. Each team has 5 or 6 members. There are 43 people in total. How many teams are at this camp?

有几支队伍来到了袋鼠夏令营。每支队伍会有5或6名队员。如果他们一共有43人。请问袋鼠夏令营里将会有多少支队伍?

(**A**) 4 (**B**) 6 (**C**) 7 (**D**) 8 (**E**) 9

 # 23. Which key would it be impossible to cut into three different figures of five shaded squares?

以下哪个选项不能被切成三个不同形状，且每个形状包含五个阴影正方形?

(**A**)  (**B**)  (**C**)  (**D**)  (**E**) 

 # 24. Ann replaces letters in the calculation KAN − ROO + GA with numbers from 1 to 9 and then calculates the result. The same letters are replaced by the same numbers. Different letters are replaced by different numbers. What is the largest possible result she could get?

小安用1到9的数字来替换KAN − ROO + GA中的字母，然后计算结果。相同的字母将会被相同的数字所替换，不相同的字母将会被不相同的数字所替换。她可能得到的最大结果是什么?

(**A**) 925 (**B**) 933 (**C**) 939 (**D**) 942 (**E**) 948

END OF PAPER

-Scratch Paper-

草稿纸

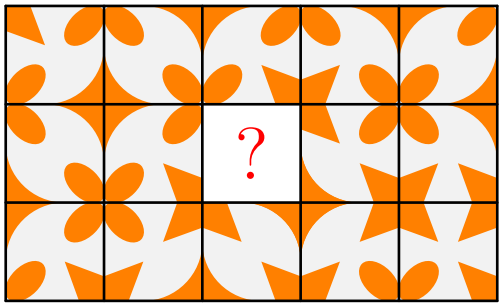
3 points

 # 1. A mushroom grows every day. Mary takes a picture of the mushroom each day from Monday to Friday. Which of these pictures was taken on Tuesday?

(A)  **(B)**  **(C)**  **(D)**  **(E)** 

SOLUTION:

 # 2. Which piece completes the pattern?

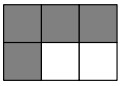


(A)  **(B)**  **(C)**  **(D)**  **(E)** 

SOLUTION:

 # 3. Tysger shades all the squares in the grid where the result is 20. Which shape does he get?

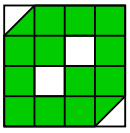
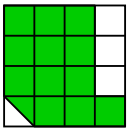
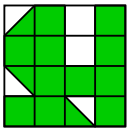
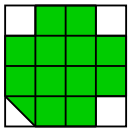
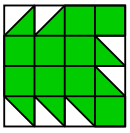
$16+4$	$19+1$	$28-8$
2×10	$16-4$	7×3

(A)  **(B)**  **(C)**  **(D)**  **(E)** 

$16+4$	$19+1$	$28-8$
$2\cdot 10$	$16-4$	$7\cdot 3$

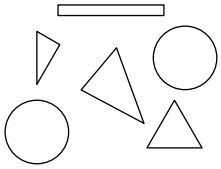
SOLUTION: Instead of $19 + 1$ some countries might prefer $40 : 2$. You can also replace $19 + 1$ by the answer 20 instead. In that you also reduce the number of calculations. Note that in that case the formulation must also be different because 20 is then not an answer.

 # 4. Which of the following figures has the largest part shaded?

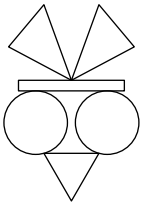
(A)  **(B)**  **(C)**  **(D)**  **(E)** 

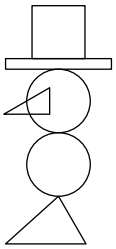
SOLUTION: You can use garden instead of figures

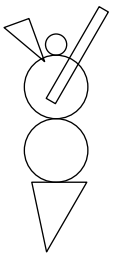
 # 5. You can make different figures by using these pieces:

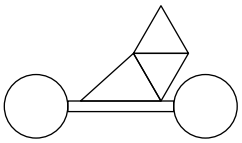


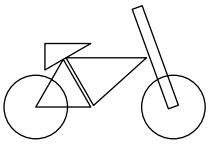
Which one of the figures below can you make with these pieces?

(**A**) 

(**B**) 

(**C**) 

(**D**) 

(**E**) 

SOLUTION:

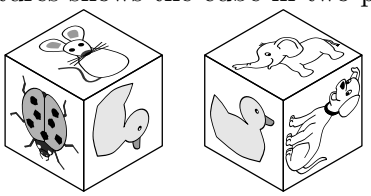
 # 6. Elli draws the big square with chalk on the pavement. She starts jumping from number 1. Each time she jumps, she always jumps to a number that is 3 more than the number she is standing on. What is the largest number Elli can jump onto?

1	5	8	11
4	7	10	14
24	23	13	18
21	19	16	20

(**A**) 11 (**B**) 14 (**C**) 18 (**D**) 19 (**E**) 24

SOLUTION:

 # 7. Jorge glues these 6 stickers to the faces of a cube:  The pictures shows the cube in two positions. Which sticker is on the opposite face to the duck?



(**A**) 

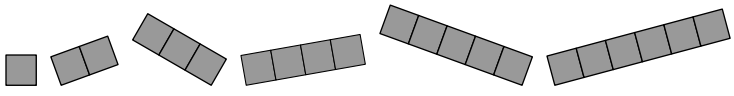
(**B**) 

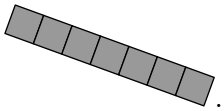
(**C**) 

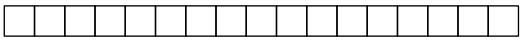
(**D**) 

(**E**) 

SOLUTION:

 # 8. Casper has the following 7 pieces: 

 .

He uses some of these pieces to fully cover this grid  without overlap. He uses as many different pieces as possible.

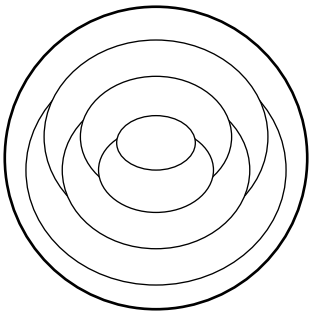
How many pieces does Casper use?

(**A**) 3 (**B**) 4 (**C**) 5 (**D**) 6 (**E**) 7

SOLUTION: Some countries might want to state that the grid is 17 squares long.

4 points

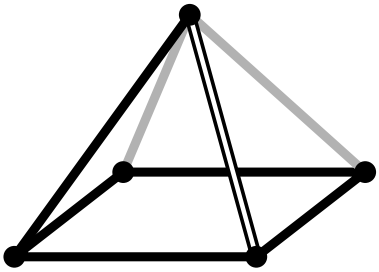
 # 9. Cindy colours each region on the pattern either red, blue or yellow. She colours regions that touch each other with different colours. She colours the outer ring (region) of the pattern red. How many regions does Cindy colour red?

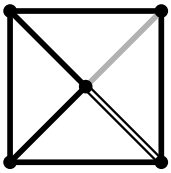
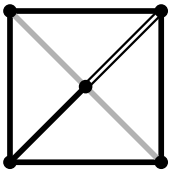
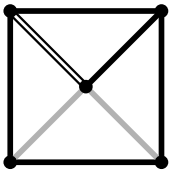
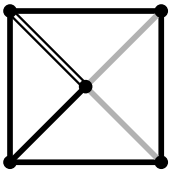
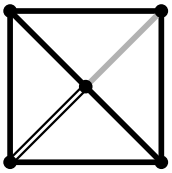


(**A**) 1 (**B**) 2 (**C**) 3 (**D**) 4 (**E**) 5

SOLUTION:

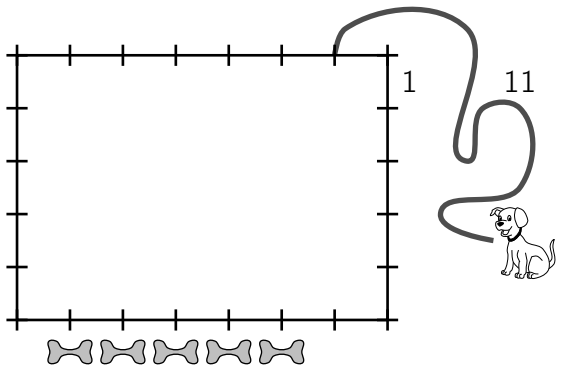
 # 10. Loes looks at the pyramid from above. What does Loes see?



(**A**)  (**B**)  (**C**)  (**D**)  (**E**) 

SOLUTION: Mathematicians might prefer: What does the picture of the pyramid look like when taken from above?

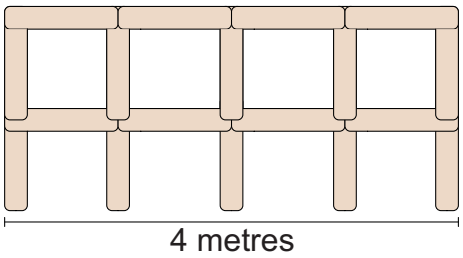
 # 11. Dennis ties a dog 1 metre from a corner of a 7 metres by 5 metres hut as shown in the picture using an 11 metres long leash. Dennis places 5 treats as shown. How many of the treats could the dog reach?



(**A**) 1 (**B**) 2 (**C**) 3 (**D**) 4 (**E**) 5

Solution: Note that the dog is in perspective and the hut is not.

 # 12. Lonneke builds a fence using 1 metre long poles.  The picture shows a 4 metres

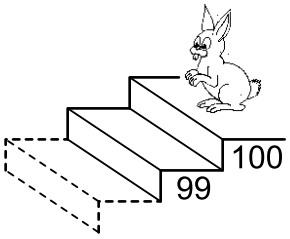


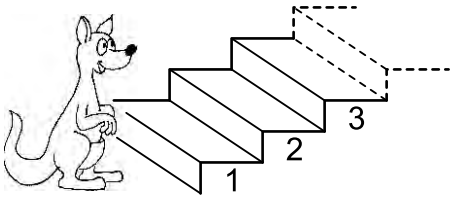
long fence. How many poles does Lonneke need to build a 10 metres long fence?

(**A**) 22 (**B**) 30 (**C**) 33 (**D**) 40 (**E**) 42

Solution:

 # 13. Every time the kangaroo goes up 7 steps, the rabbit goes down 3 steps.





On which step do they meet?

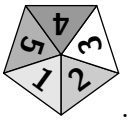
(**A**) 53 (**B**) 60 (**C**) 63 (**D**) 70 (**E**) 73

Solution:

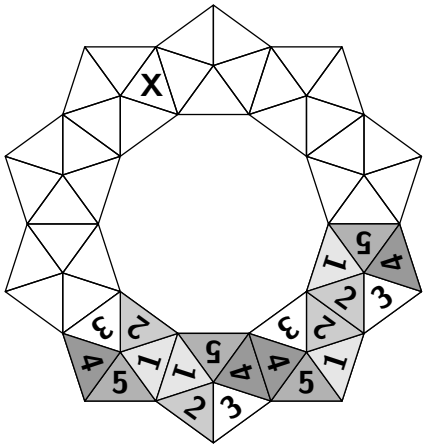
 # 14. The sum of three numbers is 50. Karin subtracts a secret number from each of these three numbers. She gets 24, 13 and 7 as the results. Which one of the following is one of the original three numbers?

(**A**) 9 (**B**) 11 (**C**) 13 (**D**) 17 (**E**) 23

Solution: 24+13+7= 44. 50-44=6 6:3=2. So the numbers are 24+2=26, 13+2=15 and 7+2=9.

 # 15. Amelie wants to build a crown using 10 copies of this token 

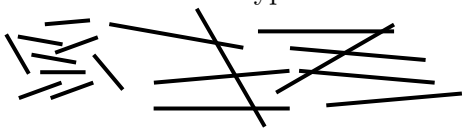
. When two tokens share a side, the corresponding numbers match. Four tokens have already been placed. Which number goes in the triangle marked with an X?



(**A**) 1 (**B**) 2 (**C**) 3 (**D**) 4 (**E**) 5

Solution:

 # 16. Farid has two types of sticks: short ones, measuring 1 cm and long ones, measuring 3 cm.



With which of the combinations below can he make a square, without breaking or overlapping the sticks?

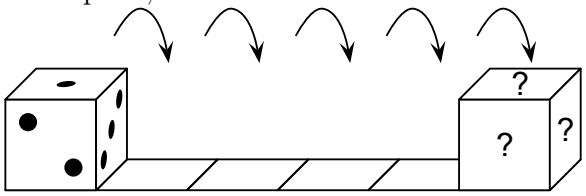
(**A**) 5 short and 2 long (**B**) 3 short and 3 long (**C**) 6 short
(**D**) 4 short and 2 long (**E**) 6 long

Solution:

5 points

 # 17. A standard dice has 7 as the sum of the dots on opposite faces.

The dice is put on the first square as shown and then rolls towards the right. When the dice gets to the last square, what is the total number of dots on the three faces marked with the question marks?

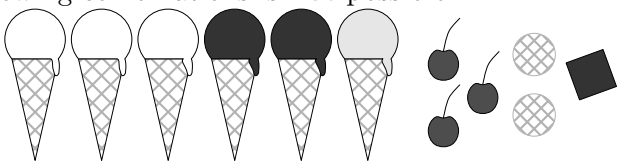


(**A**) 6 (**B**) 7 (**C**) 9 (**D**) 11 (**E**) 12

Solution:

 # 18. 6 people each order one scoop of ice cream. They order 3 scoops of vanilla, 2 scoops of chocolate and 1 scoop of lemon. They top the ice creams with 3 cherries, 2 wafers and 1 chocolate

chip. They use one topping on each scoop, such that no two ice creams are alike. Which of the following combinations is **not** possible?



(**A**) chocolate with a cherry (**B**) vanilla with cherry (**C**) lemon with a wafer
(**D**) chocolate with a wafer (**E**) vanilla with a chocolate chip

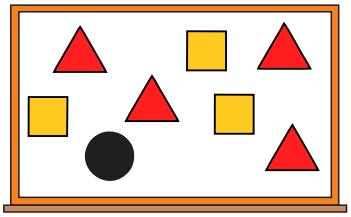
Solution:

 # 19. The Queen tries to find out the three names of Rumpelstiltskin's wife.
She asks her:
"Are you called Adele Lilly Cleo?"
"Are you called Adele Laura Cora?"
"Are you called Abbey Laura Cleo?"
Each time exactly one name and its position was right.
What is the name of Rumpelstiltskin's wife?

(**A**) Abbey Lilly Cora (**B**) Abbey Laura Cora (**C**) Adele Laura Cleo
(**D**) Adele Lilly Cora (**E**) Abbey Laura Cleo

Solution:

 # 20. The teacher writes the numbers from 1 to 8 on the board. The teacher then covers the numbers with triangles, squares and a circle. If you add the four numbers covered by the triangles, the sum is 10. If you add the three numbers covered by the squares, the sum is 20. Which number is covered by the circle?



(**A**) 3 (**B**) 4 (**C**) 5 (**D**) 6 (**E**) 7

Solution: The sum of all eight numbers is 1+2+...+8=36. The sum of those covered by squares and triangles is 10+20=30. So the remaining number is 36-30=6. One way to materialize this is 2,3,5, 1,4,7,8, 6.

 # 21. Jane has some pictures of parrots  . She wants to colour only the head, tail and wings of each parrot either red, blue or green so that all three colours are used on each picture. She colours one parrot's head red, its wings green and its tail blue. How many more parrots can she colour so that all the parrots are coloured differently?

(**A**) 1 (**B**) 2 (**C**) 4 (**D**) 5 (**E**) 9

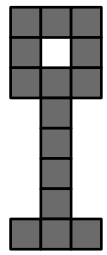
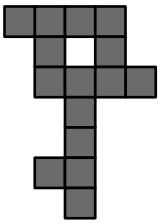
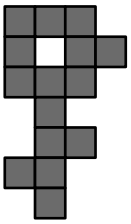
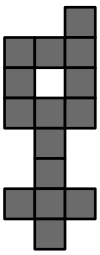
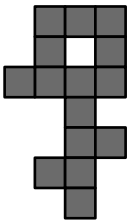
Solution:

 # 22. Several teams came to the summer Kangaroo camp. Each team has 5 or 6 members. There are 43 people in total. How many teams are at this camp?

(**A**) 4 (**B**) 6 (**C**) 7 (**D**) 8 (**E**) 9

Solution:

 # 23. Which key would it be impossible to cut into three different figures of five shaded squares?

(**A**)  (**B**)  (**C**)  (**D**)  (**E**) 

Solution:

 # 24. Ann replaces letters in the calculation KAN − ROO + GA with numbers from 1 to 9 and then calculates the result. The same letters are replaced by the same numbers and different letters by different numbers. What is the largest possible result she could get?

(**A**) 925 (**B**) 933 (**C**) 939 (**D**) 942 (**E**) 948

Solution: The expression equals to $100 \cdot \mathrm{K} + 11 \cdot \mathrm{A} + 10 \cdot \mathrm{G} + \mathrm{N} - 100 \cdot \mathrm{R} - 11 \cdot \mathrm{O}$. To make KAN + GA maximal Ann should successively choose maximal K = 9, then A = 8, G = 7 and finally N = 6. At the same time the minimal possible value of ROO is 122. Therefore Ann's maximal result equals $986 - 122 + 78 = 942$.

You can also use digits from 1-8 and then change the answers. You can also use KAN + GA - ROO (which we did not take as then the answer of KAN + GA > 1000).

Instead of the given answer, the following answers can be used: A 511, C 941. This is based on what we expect as often chosen wrong strategies: A - taking all numbers as high as possible (so also for ROO), B - switch the number for A and N // Another solution closer to Ecolier students: The number ROO that is subtracted should be as small as possible, so it must be 122. From the numbers KAN, GA added, the only hundreds digit is K so it should be K=9. The next largest numbers are the tens digits A and G so they should be either A=8 and G =7 or the other way round (we decide later), namely A=7, G=8. Next we look at the units, N and A. The second one is A for which at this stage we have two choices but N should be the largest available digit, so N=6. Using these conclusions we have two options, a) KAN+GA = 986+78= 1064 or b) KAN+GA = 976+87=1063. We prefer the first one as larger, so we now have KAN+GA - ROO= 986+78 -122= 942.