Pre-Ecolier

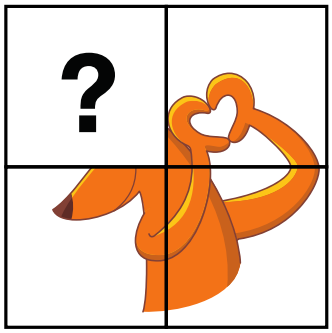
3 points

1. Pablo has 6 balloons. He gives away 4 of the balloons. How many balloons will Pablo then have?

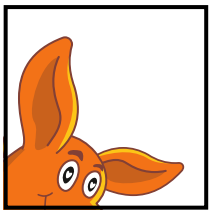
(**A**) 2 (**B**) 3 (**C**) 4 (**D**) 5 (**E**) 6

SOLUTION: After giving away 4 balloons,
Pablo will have $6 - 4 = 2$ balloons left.

2. Which of these puzzle pieces completes the picture?

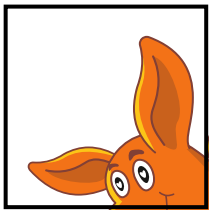


(**A**) 

(**B**) 

(**C**) 

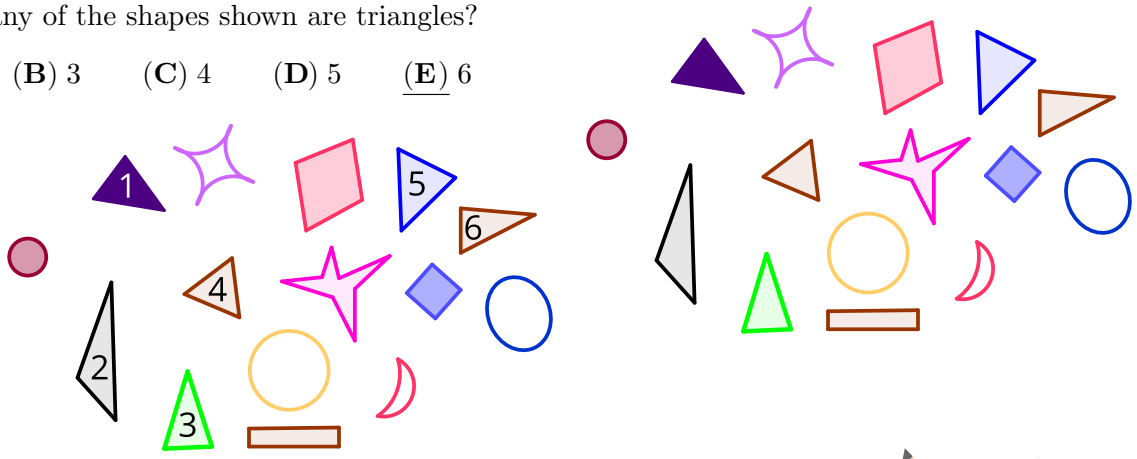
(**D**) 

(**E**) 

SOLUTION: By substituting each option, we find that only piece E fits correctly.

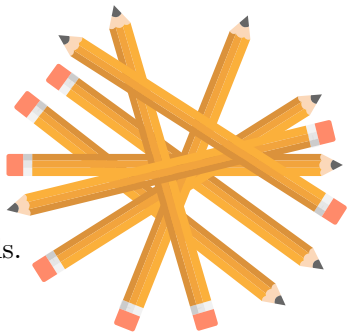
3. How many of the shapes shown are triangles?

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



SOLUTION:

4. How many pencils are shown in the picture?

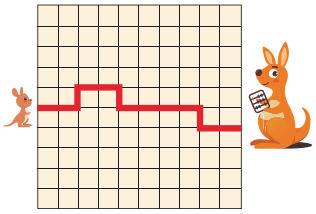


(**A**) 7 (**B**) 8 (**C**) 9 (**D**) 14 (**E**) 16

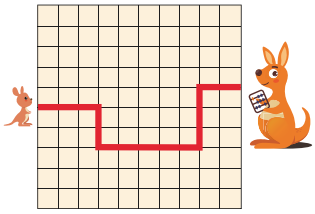
SOLUTION: There are 8 tips (and 8 erasers). Therefore, there are 8 pencils.

5. 5 baby kangaroos are hopping to their mothers along the paths shown below. Which path is the shortest?

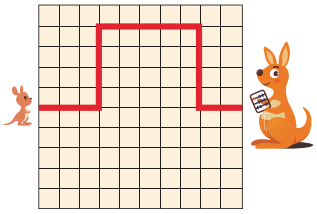
(**A**)



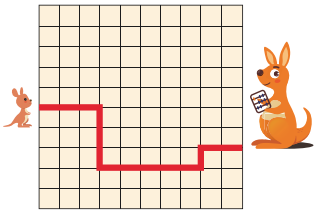
(**B**)



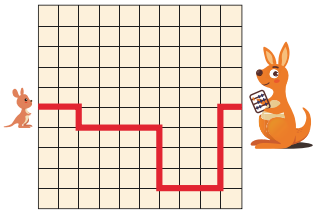
(**C**)



(**D**)



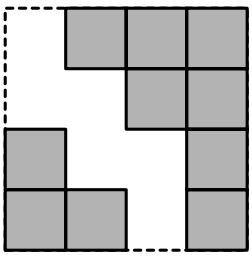
(**E**)



SOLUTION: Solution 1: Each path has only horizontal and vertical segments. The total length of the horizontal segments is the same for each path. So it is enough to compare the total length of the vertical segments. Option A has the shortest path.

Solution 2: Count the length of each path.

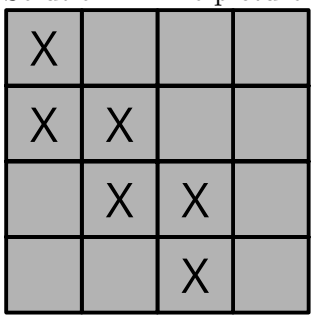
6. A large square is formed from 16 small squares of the same size. Then some of the small squares are removed. How many small squares are missing?



(**A**) 4 (**B**) 5
(**C**) 6 (**D**) 7
(**E**) 8

SOLUTION:

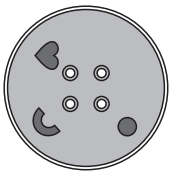
Solution 1: The picture can be completed by adding 6 small squares in the places marked X.



Solution 2: There are 10 small squares in the picture so there are $16 - 10 = 6$ missing.

7. All the buttons on Carola's sweater look like this.

Which one of these buttons could be from her sweater?

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

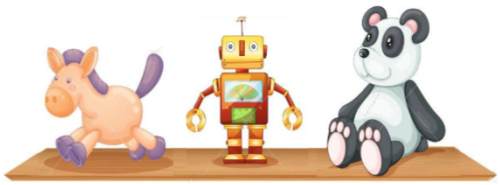
SOLUTION: Only option E matches the button from Carola's sweater. We can see this by rotating option E clockwise by a quarter turn. None of the other options can be rotated to match the button from the sweater.

8. On Michael's toy shelf, there are no dogs, no rabbits and no turtles. Which of these shelves could be Michael's shelf?

(**A**) 

(**B**) 

(**C**) 

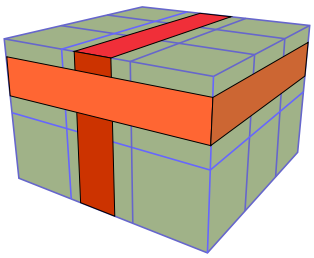
(**D**) 

(**E**) 

SOLUTION: Because there are no dogs on Michael's shelf, options A and B cannot be correct. Because there are no rabbits on his shelf, option A cannot be correct. Because there are no turtles on his shelf, options C and E cannot be correct. Therefore, only option D could be Michael's shelf.

4 points

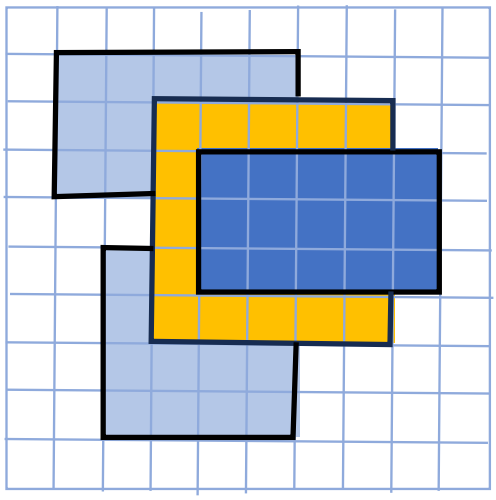
9. Two rubber bands are placed around a stack of 18 cubes. How many of the cubes are touching a rubber band?



(**A**) 6
(**B**) 8
(**C**) 9
(**D**) 10
(**E**) 12

SOLUTION: The stack has a total of 18 cubes. One band touches 6 cubes, the other band touches 8 cubes, with exactly 2 cubes touched by both. Hence, the total of cubes touched by the bands is $6 + 8 - 2 = 12$.

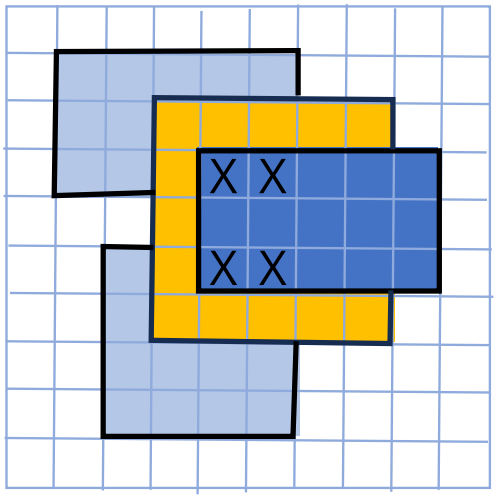
10. A floor is covered in square tiles. There are 4 rectangular mats on the floor.



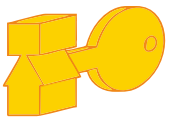
In total, how many tiles have 3 mats on top of them?

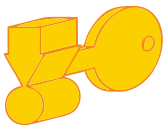
(**A**) 0 (**B**) 1 (**C**) 2 (**D**) 3 (**E**) 4

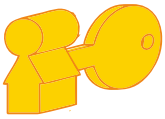
SOLUTION: Only the tiles marked with an X are covered by 3 mats.

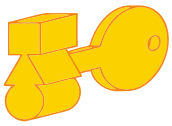


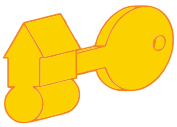
11. Which of these keys fits the lock shown in the picture?

(**A**) 

(**B**) 

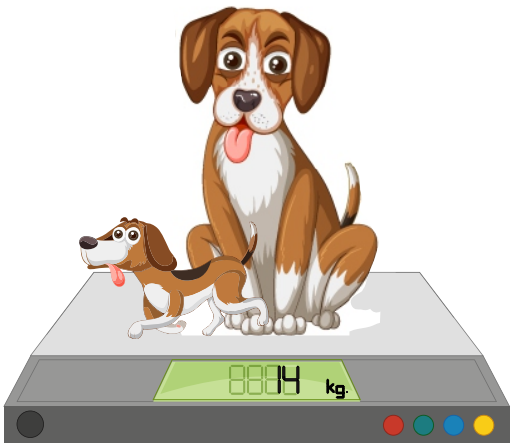
(**C**) 

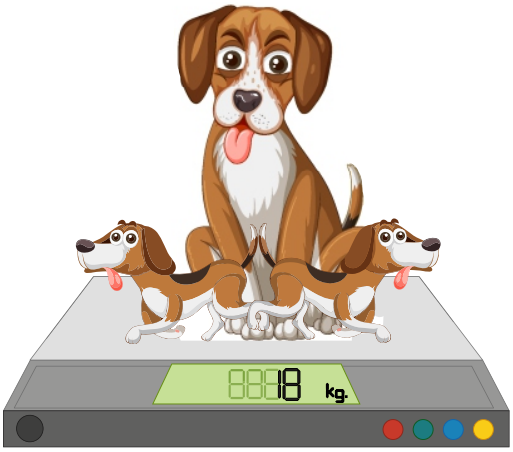
(**D**) 

(**E**) 

SOLUTION: The key must have shape  or  . Only option D matches.

12. A dog has 2 puppies that weigh the same. The first picture shows that the dog and 1 puppy together weigh 14 kilograms. The second picture shows that the dog and both puppies together weigh 18 kilograms.





How much does the dog weigh?

(**A**) 9 kilograms (**B**) 10 kilograms (**C**) 11 kilograms (**D**) 12 kilograms (**E**) 13 kilograms

SOLUTION: Together, the dog and 2 puppies weigh 18 kilograms. Together, the dog and 1 puppy weigh 14 kilograms. Therefore a puppy weighs 4 kilograms. The dog weighs $14 - 4 = 10$ kilograms.

13. There were 12 pieces of fruit on the table. Vera removed 2 pears, 4 apples and half of the oranges. Now there are only oranges left on the table. How many oranges are left?

(**A**) 1 (**B**) 2 (**C**) 3 (**D**) 4 (**E**) 6

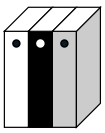
SOLUTION: Because only oranges are left on the table, Vera must have removed all of the pears and apples. Therefore, at the start, there were 2 pears, 4 apples and 6 oranges. Because Vera removed half of the oranges, there must be 3 left on the table.

14. There are 12 students in a line. Counting from the left, Warren is fifth in the line. Counting from the right, Victor is fourth in the line. How many students are between Warren and Victor?

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

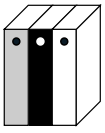
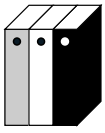
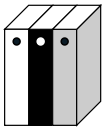
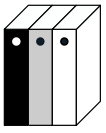
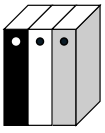
SOLUTION: Counting from the left, Warren is fifth in the line. Counting from the right, Victor is fourth in the line. Counting the students between Warren and Victor, we see there are 3.

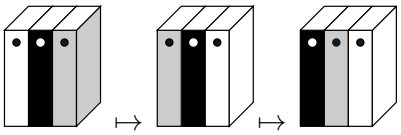
15. There were three books on Mary's shelf, as shown in the picture.



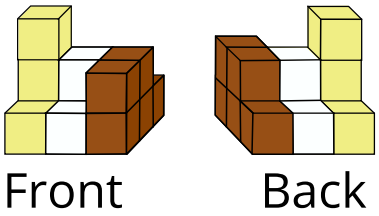
- First, Mary swapped the white book and the grey book.
- Then Mary swapped the grey book and the black book.

How are her books arranged now?

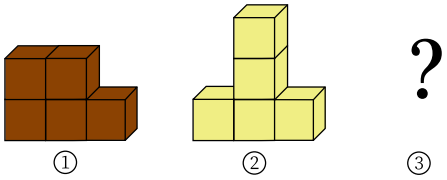
(**A**)  (**B**)  (**C**)  (**D**)  (**E**) 

SOLUTION: 

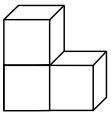
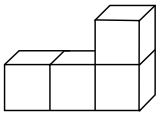
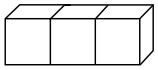
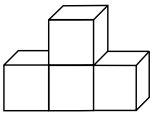
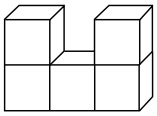
16. The pictures below show the front and back of an object built from coloured cubes.



The object is broken into three pieces. Two of the pieces are shown below.



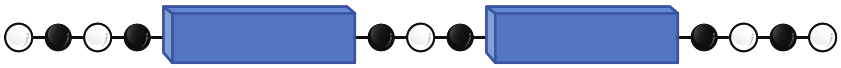
Which of these is the third piece?

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

SOLUTION: Looking from the front, piece 1 is on the left and piece 2 is on the right. The third piece is between piece 1 and piece 2. Comparing the front and back view, the third piece should have four small cubes: one row of three cubes with one stacked in the middle of the row.

5 points

17. The beads on a string alternate between black and white.



Each block hides five beads. How many white beads are hidden in total?

(**A**) 5 (**B**) 6 (**C**) 7 (**D**) 9 (**E**) 10

SOLUTION: The beads hidden by each box are: white-black-white-black-white. In total, 6 white beads are hidden.

18. Ann buys 3 chocolate bars. Tom buys 5 chocolate bars. Tom paid 8 euro more than Ann. What is the cost of 1 chocolate bar?

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

SOLUTION: [Note: you may wish to include this picture in the question.]

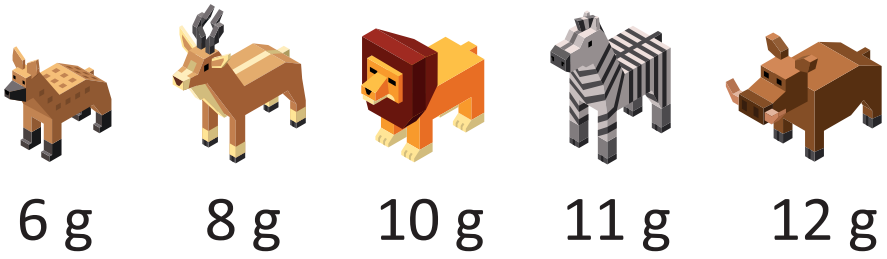
Tom paid 8 euro more than Ann for 2 more chocolate bars. $8 : 2 = 4$. So each chocolate bar must cost 4 euro.

19. 3 years ago, the sum of Ana's age and Ben's age was 6 years. Ana is currently 5 years old. How old is Ben now?

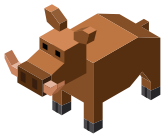
(**A**) 1 year (**B**) 5 years (**C**) 6 years (**D**) 7 years (**E**) 11 years

SOLUTION: Ana is currently 5 years old, so 3 years ago she was $5 - 3 = 2$ years old. At that time, the sum of Ana's and Ben's ages was 6 and so Ben was 4 years old. Ben's current age is $4 + 3 = 7$.

20. Charles has 5 wooden toys, as shown in the picture.

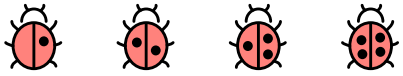


He picks 2 pairs of toys so that the pairs weigh the same. Which toy was not picked?

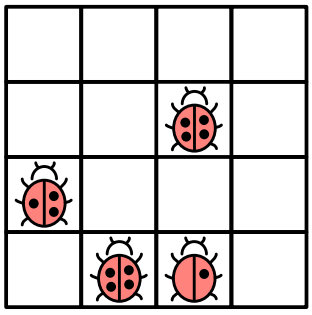
(**A**)  (**B**)  (**C**)  (**D**)  (**E**) 

SOLUTION: First notice that the sum of two even numbers is always even, and the sum of an even number and an odd number is always odd. Because there is only one odd weight, this toy must be left out, otherwise one pair would have an odd weight. It is possible to make pairs with the same weight: $8 + 10 = 18 = 6 + 12$.

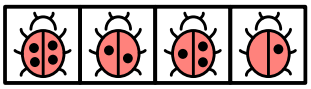
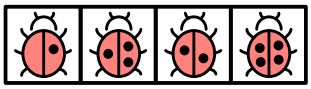
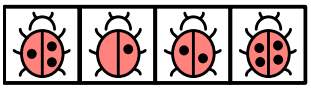
21. Each ladybird sticker has 1, 2, 3 or 4 dots.

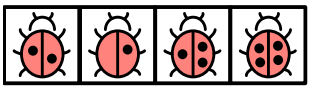
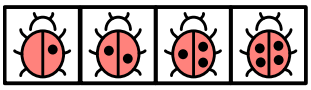


Amit wants to fill the grid with stickers so that in each row and in each column there are ladybirds with different numbers of dots.

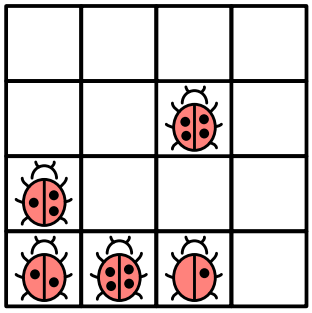


When Amit is finished, what will the top row of the grid look like?

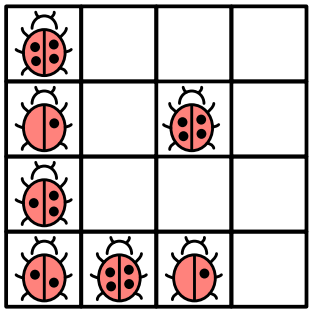
(**A**)  (**B**)  (**C**) 

(**D**)  (**E**) 

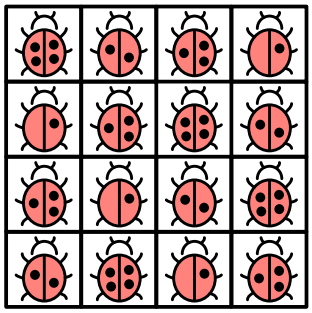
SOLUTION: To start, think about the first column: the bottom square must have 2 dots (since there are already ladybirds with 1 and 4 dots in that row and a ladybird with 3 dots in that column).



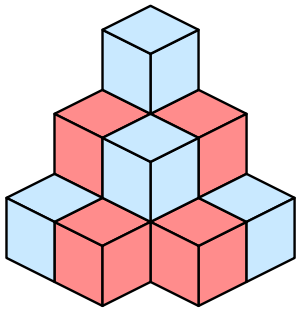
Still in the first column, the ladybird in the second row must have 1 dot. Then the first column is completed by adding a ladybird with 4 dots in the top row.



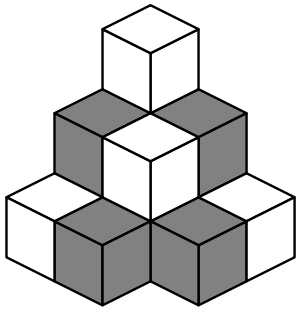
From the options, only A is possible. The grid can be completed as follows.



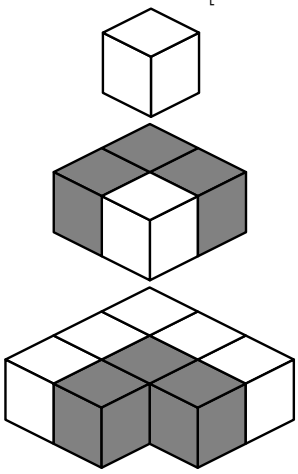
22. There are 13 cubes stacked in the corner of a room. Each is coloured red or blue. Directly below each red cube is a blue cube, and directly below each blue cube is a red cube. How many blue cubes are in the stack?



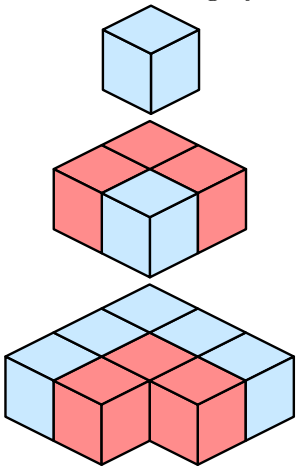
(**A**) 4
(**B**) 6
(**C**) 7
(**D**) 8
(**E**) 9



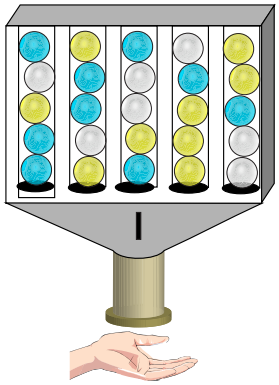
SOLUTION: [Note there are greyscale versions of the figures



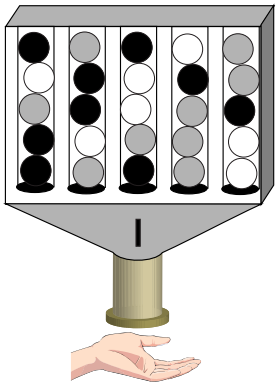
If used, the question should be changed to "There are 13 cubes stacked in the corner of a room. Each is coloured grey or white. Directly below each grey cube is a white cube, and directly below each white cube is a grey cube. How many white cubes are in the stack?"]



23. Each time a coin is put in the machine, a ball falls at random from the bottom row. What is the smallest number of coins Bahar must have to be sure that she will get a white ball?

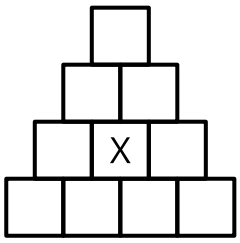


(**A**) 6
(**B**) 10
(**C**) 11
(**D**) 12
(**E**) 15



SOLUTION: Note: Greyscale version of the picture:
It is possible that the machine will give 10 non-white balls before a white ball must fall. Therefore Bahar must have 11 coins to be sure she will get a white ball.

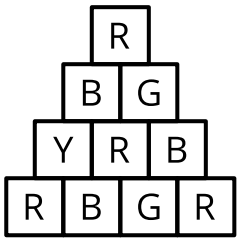
24. Ingrid decides to paint each square in the shape below so that squares painted the same colour do not touch.



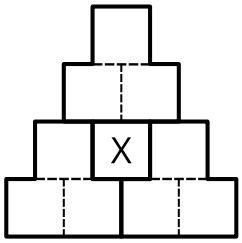
She paints 4 squares red, 3 squares blue, 2 squares green and 1 square yellow. Which colour did she paint the square marked with the X?

(**A**) Red (**B**) Blue (**C**) Green (**D**) Yellow
(**E**) Impossible to know

SOLUTION: First we notice that if we use Red for the box marked X, we can use Red in the corner boxes of the triangular shape, and the shape can be painted as described in the question.



Is it possible to have a solution with box X not painted Red? Think of the shape as being made of three pieces, each made of three squares as shown below, plus the box marked X.



Because each piece is made of 3 touching squares, each piece can have at most 1 Red square. Since 4 squares must be painted Red, the square marked X must be painted Red.