

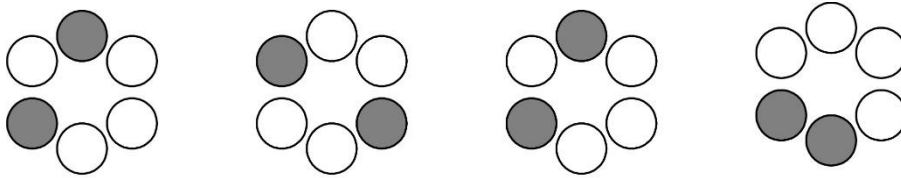
# MATHCOUNTS<sup>®</sup> Problem of the Week Archive

**Logic – January 27, 2025**

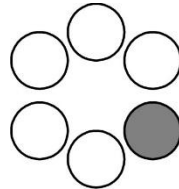
## Problems & Solutions

The following problems deal with logic. There are multiple ways to solve these problems, and for some of them, there may be more than one right answer. As long as your logic is accurate, alternate solutions are acceptable. Enjoy!

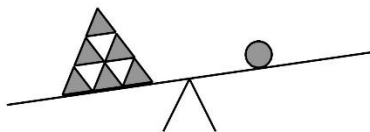
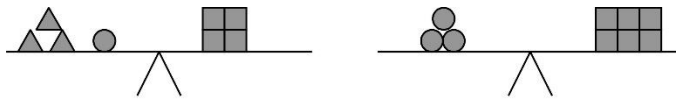
Draw the next figure in the pattern.



The top shaded circle in the first image moves one space counter-clockwise each time you move to the next figure. The shaded circle in the lower half of the first image moves counter-clockwise two spaces each time you move to the next figure. So, the next figure in the pattern would look like this:



How many squares would balance the third scale? (Ignore distance from the middle of the scale.)



On the second scale, we see that 3 circles = 6 squares, so we know that 1 circle = 2 squares. If we apply that information to the first scale, we see that the 1 circle is equal to 2 of the 4 squares, leaving 2 squares to balance the 3 triangles.

Since 3 triangles and 1 circle both equal 2 squares, 3 triangles must also equal 1 circle. Applying this information to the unbalanced scale, we see that the 1 circle balances 3 of the 6 triangles, so we only have 3 triangles left to consider.

From the first scale, we determined that 3 triangles is equal to 2 squares, so adding 2 squares to the right side of the third scale would balance it.

What are the next two terms in the sequence below?

A, 2, C, 3, F, 5, K, 7, \_\_\_\_, \_\_\_\_...

In this sequence, there are two "sub-sequences". They are indicated below by underlines:

A, 2, C, 3, F, 5, K, 7, \_\_\_\_, \_\_\_\_ ... and

A, 2, C, 3, F, 5, K, 7, \_\_\_\_, \_\_\_\_ ...

The first sequence is just a list of prime numbers. This tells us that the second blank would be 11. The second sequence is dependent on the first. If  $A = 1$ ,  $B = 2$ , etc., you can add the number value of the letter to the number that follows it in the sequence to get the number value of the next letter. Since  $A = 1$ ,  $A + 2 = 3$ , and  $C = 3$ . So, since  $K = 11$ , the next letter blank should be R. ( $11 + 7 = 18$ , and  $R = 18$ .)

Therefore, the next two terms are **R** and **11**.

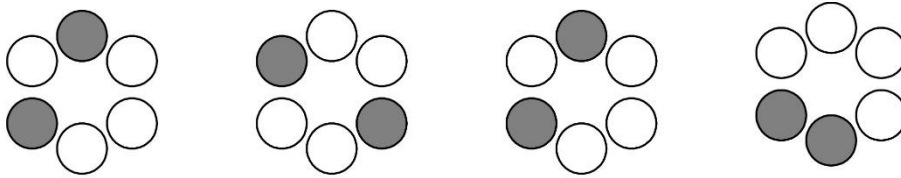
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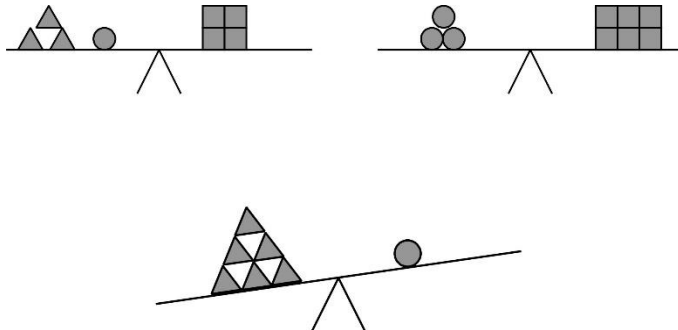
### Problems

The following problems deal with logic. There are multiple ways to solve these problems, and for some of them, there may be more than one right answer. As long as your logic is accurate, alternate solutions are acceptable. Enjoy!

Draw the next figure in the pattern.



How many squares would balance the third scale? (Ignore distance from the middle of the scale.)



What are the next two terms in the sequence below?

A, 2, C, 3, F, 5, K, 7, \_\_\_\_, \_\_\_\_...