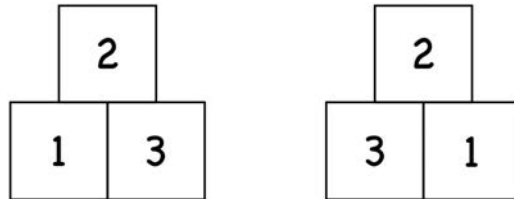


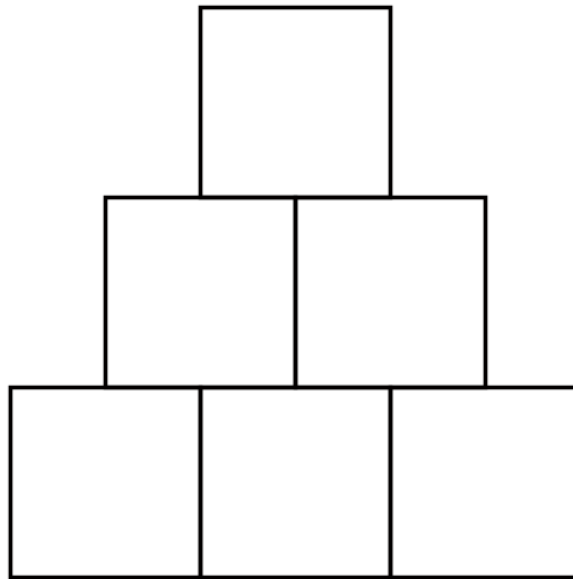
Puzzle of the Week

Difference Pyramids – 1

These pyramids are called *Difference Pyramids*. The number on top is the difference of the two numbers below.



THE CHALLENGE: Place the numbers from 1 to 6 to make a Difference Pyramid.



1 **2** **3** **4** **5** **6**

EXPLORATION: Find different ways this can be done. Are some of these essentially the same?

Puzzle of the Week

Difference Pyramids – 1 – Notes

THE CHALLENGE & EXPLORATION: A good start is to realize that because 6 cannot be the difference of two cards, it must go on the bottom row.

Next, the only way 5 can be the difference is if it is above the 6 and the 1. So, either 5 goes directly above the 6 (with the 1 next to the 6), or 5 is in the bottom row.

At this point it is useful to consider what makes solutions different. Because the mirror image of any solution is also a solution, it makes sense to ignore those. Ignoring mirror images will reduce the number of solutions to consider by half.

For example, we can assume that not only is the 6 in the bottom row, but it is either in the middle or the right side of the bottom row - if it were on the left side, we could take the mirror image of the whole puzzle and put it on the right side.

Using this thinking, the bottom row can have five possible layouts (up to using mirror images): 5 X 6, X 5 6, X 6 5, X 1 6, X 6 1.

At this point, it is a matter of working through the various possibilities. The only 5 X 6 that works is 5 2 6. It turns out X 5 6 never works. The only X 6 5 is 2 6 5. The only X 1 6 is 4 1 6, and the only X 6 1 is 4 6 1.

So, ignoring mirror images, there are four solutions:

