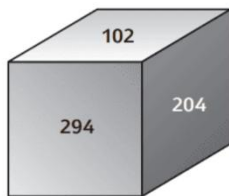


Mountain Adventure

These Teacher Notes have been developed to enable you to get the best from Krackem games. They are designed for the more challenging level of each game and only cover questions where a mathematical teaching point is usefully reinforced. Our aim in the Notes is to provide useful preparatory and extension material to encourage mathematical thinking in students who play the games. You don't need to use them for the students to have a great experience using Krackem games, but we hope that you find them useful if you do.

Question 2

In this problem, it is given that for each of the three visible faces, the number inscribed on it is three times the number inscribed on the opposite face (which is hidden). The task is to find the sum of the three numbers on the hidden faces.



Ask the students how they solved the problem. Listen to their methods. Below are three possible methods worth discussing:

Method A – Dividing each number by 3 separately, without looking for a connection between the problems.

Using this method, you take the large number and divide it by 3—either by applying the distributive property or using long division—and then add the three resulting numbers together. The hidden numbers are 34, 68, and 98, and their sum is 200.

Method B – Dividing each number by 3 using the relationships between the problems.

Suppose we divide 102 by 3 and get 34. Since 204 is twice 102, dividing it by 3 will yield a result twice as large as the previous one—namely, 68. 294 is greater than 204 by 90; therefore, the result of dividing it by 3 is 30 greater than the result of dividing 204 by 3—namely, 98.

Note: We could also approach the division of 294 by 3 by considering the calculation $300 \div 3 = 100$.

Method C – Relying on the distributive property

You can simply add the three visible numbers and divide the sum by 3. We deliberately chose a convenient sum for the visible numbers—600—so the sum of the hidden numbers is 200.

Here, we relied on the distributive property: $(102 + 204 + 294) \div 3 = 102 \div 3 + 204 \div 3 + 294 \div 3$. After all, this is how students perform division using the distributive property. For example:

$$24 = 4 + 20 = 3 \div 12 + 3 \div 60 = 3 \div 72$$

Note: This question teaches us that it is not always best to immediately "pounce" on a problem using familiar algorithms. Sometimes, it is worth pausing to examine the numbers and the relationships between them, and to see if the answer can be reached via a shorter, simpler, and more efficient method.