

## Calculation and Operation

### Discussion questions

1. In the Mushroom Kingdom,  $a \uparrow b = a^2(b - a)$ , evaluate  $4 \uparrow (5 \uparrow 9)$ .

2. The first 9 positive odd integers are placed in the magic square so that the sum of the numbers in each row, column and diagonal are equal. Find the value of  $A * E$ .

$A$	1	$B$
5	$C$	13
$D$	$E$	3

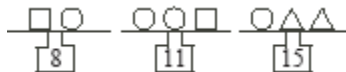
3. In the diagram, all rows, columns and diagonals have the sum 12. What is the sum of the four corner numbers?

		4
	4	
	3	

4. The digits 1, 2, 3, 4, 5, and 6 are each placed in one of the boxes so that the resulting product is correct. If each of the six digits is used exactly once, the digit represented by “?” is

	×	?

5. In the diagram, each scale shows the total mass of the shapes on that scale. What is the mass of a  $\Delta$ ?



6. What is the smallest natural number value of  $k$  if  $176k$  is a perfect square?

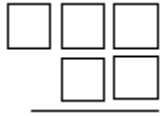
7. In the square shown, the numbers in each row, column, and diagonal multiply to give the same result. What is the sum of the two missing numbers?

12	1	18
9	6	4
		3

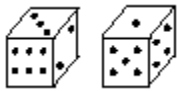
### Practice questions

1. In the Acorn Kingdom,  $a \blacksquare b = \frac{ab-a}{ab+b}$ , evaluate  $1 \blacksquare (2 \blacksquare 4)$ .

2. Each of the digits 3, 5, 6, 7, and 8 is placed one to a box in the diagram. If the two-digit number is subtracted from the three-digit number, what is the smallest difference?



3. The numbers on opposite sides of a die total 7. What is the sum of the numbers on the unseen faces of the two dice shown?



4. What is the smallest natural number value of  $k$  if  $176k$  is a perfect cube?

5. How many different combinations of pennies, nickels, dimes and quarters use 48 coins to total \$1.00? We don't need to use all four types of coins.