

# Prime Factor Form

- 1 Suppose I have a pack of smarties which, after my best friend Ludwig has scoffed most of them, contains only six smarties: 1 red smartie, 2 green smarties, and 3 blue smarties. Now it's my turn! There are several ways in which I can eat some (or all, or possibly none) of the remaining smarties. For example, I can eat the red smartie, no green smarties, and two blue smarties. Or I can eat the red smartie, one green smartie, and no blue smarties. (The order in which I eat the smarties is not important.) In how many ways can I eat some (or all, or possibly none) of the remaining six smarties?
- 2 The number 2250 is equal to  $2^1 \times 3^2 \times 5^3$ . How many factors does it have? (Hint: This is just like question 1! But why?)
- 3 The number 1960 is equal to  $5^1 \times 7^2 \times 2^3$ . How many factors does it have?
- 4 What if the pack of smarties contained 3 red smarties, 4 green smarties, and 5 blue smarties?
- 5 What if it contained  $a$  red smarties,  $b$  green smarties, and  $c$  blue smarties?
- 6 How many factors does the number  $2^a \times 3^b \times 5^c$  have?