



**Age 14+ Level ★★**  
**Worksheet 2**

**1. Which Power**

Which power of 16 is equal to  $64^6$ ?

**2. Cube Factors**

How many factors of  $9^9$  are perfect cubes?

**3. Powerful Order**

List the following three numbers in increasing order:

$$2^{25} \quad 8^8 \quad 3^{11}$$

**4. Two in a Million**

What is the highest power of 2 that divides exactly into 1 000 000?

**5. Root Estimation**

Without using a calculator, work out which of the following is the best approximation for

$$\sqrt{\frac{2001}{10000}}$$

0.4      0.42      0.45      0.47

**6. Powerful Expression**

Put these expressions in order from smallest to largest:

- a)  $2^7 + 2$
- b)  $2(4^3) - 2$
- c)  $8^2 + 4^3$
- d)  $8 \times 4 \times 2$

**7. The Power of  $x$**

Find the value of  $x$ , where

$$2^{x+1} - 2^{x-1} = 12$$

*These problems are adapted from UKMT ([ukmt.org.uk](http://ukmt.org.uk)) and WMC ([competition.ac](http://competition.ac)) problems.*