Age 14+ Level ★★★
Worksheet 1

1. **Squeezed In**
   What integer x makes $\frac{x}{9}$ lie between $\frac{71}{7}$ and $\frac{113}{11}$?

2. **Elephants and Geese**
   Yesterday, at Ulaanbaatar market, a white elephant cost the same amount as 99 wild geese.

   Overnight, the price of a white elephant fell by 10% and the price of a wild goose rose by 10%.

   How many wild geese cost the same amount as a white elephant today?

3. **Antiques Roadshow**
   On the television programme *Antiques Roadshow*, a painting was said to be worth £15 000 although the painting originally cost only 50p.

   As a percentage of the original price, what would be the approximate profit if the painting were to be sold for £15 000?

4. **Producing an Integer**
   For which values of n is the product

   $$\left(1 + \frac{1}{2}\right)\left(1 + \frac{1}{3}\right)\left(1 + \frac{1}{4}\right)\dots\left(1 + \frac{1}{n}\right)$$

   equal to an integer?

5. **The Property Market**
   A property developer sells two houses, each for £252 000.

   Based on the prices he paid, he made a 20% loss on one and a profit of 20% on the other.

   Overall, did he make a profit or a loss? Of how much?

These problems are adapted from UKMT (ukmt.org.uk) and WMC (competition.ac) problems.