



Problem Sheet 1 – Number I

1	<p>What number, when multiplied by itself, is equal to 27×147?</p>	
2	<p>The average of three numbers is 8. Two of the numbers are 5 and 13. What is the other number?</p>	
3	<p>$5!$ means $5 \times 4 \times 3 \times 2 \times 1$. In general $n!$ means $n \times (n - 1) \times (n - 2) \times \dots \times 2 \times 1$.</p> <p>What is $101!$ divided by $99!$?</p>	
4	<p>What is the smallest number divisible by 1, 2, 3, 4, 5, 6, 7, 8 and 9?</p>	
5	<p>What is the value of the following expression?</p> $\frac{(101^4 - 4)(101^4 - 1)}{(101^2 - 2)(101^2 - 1)} \cdot \frac{(101^4 - 4)(101^4 - 1)}{(101^2 - 2)(101^2 + 1)}$ <p><i>This problem was set by the United Kingdom Mathematics Trust for the Senior Team Mathematics Challenge. Other questions from the challenge are available http://www.furthermaths.org.uk/stmchallengepast.php</i></p>	 www.ukmt.org.uk/
6	<p>Simplify the following expression giving your answer as a number</p> $\frac{(10! + 9!)(8! + 7!)(6! + 5!)(4! + 3!)(2! + 1!)}{(10! - 9!)(8! - 7!)(6! - 5!)(4! - 3!)(2! - 1!)}$ <p><i>This problem was set by the United Kingdom Mathematics Trust for the Senior Team Mathematics Challenge. Other questions from the challenge are available http://www.furthermaths.org.uk/stmchallengepast.php</i></p>	 www.ukmt.org.uk/

7	A set of five numbers has: a mode of 24 a median of 21 a mean of 20 What could the numbers be?	
8	Over the course of numbering every page in a book, 2,929 individual digits were printed. If the first page is numbered 1, how many pages the book must have?	