1. The sum of two numbers is 14 and their product is 48. What is the sum of the squares of the numbers?

2. Find the value of $N$ so that the equation $(x - 10)(x + 15) = N$ has exactly one solution.

3. Find all integer pairs $x$ and $y$, with $x < y$, such that $xy = x + y + 25$.

4. If the even integers 2, 4, 6, 8, . . . are arranged in increasing order, the 40th occurrence of the digit 3 is in what number?

5. What is the units digit of the product $9^{34} \times 8^{21}$?

6. A sequence of squares is formed as shown in the diagram. The first two squares have area 1. Each succeeding square is added to the longer side of the previous rectangle to form a new rectangle. (A number in a square is the order in which it is added to the diagram, not the area of the square.) What are the dimensions and area of the rectangle formed when the configuration has 12 squares?

7. I purchase an item for $4.69 and give the clerk a $5 bill, how many ways can the clerk make change using pennies, nickels, dimes and quarters?

8. The sides of square ABCD have length 4. If $AW = BX = CY = DZ = 1$, compute the area of the shaded square.