1. Determine the integer \( n \) for which \( n^2 + 19n + 92 \) is a square.

2. Find all real numbers \( x \) and \( y \) such that \( x^2 + 2y^2 + \frac{1}{2} \leq x (2y + 1) \).

3. A man purchases cows less than 30 in number. The number of cows becomes twice after every one year. He sells the same number of cows after one, two, three, and four years, and no cow remains after four years. Find the number of cows he had purchased.

4. Find three consecutive positive integers such that the sum of their square is 2215.

5. If \( x^3 + \frac{1}{x^3} = 2 \), then find the values of \( x^{2019} - \frac{1}{x^{2019}} \) and \( x^{2020} + \frac{1}{x^{2020}} \).

6. In how many different ways faces of three cubes can be coloured in 18 different colours?

7. The vertices of a triangle \( ABC \) are \((2, 4), (1, 5)\), and \((6, 1)\). Find the centre of the circle which touches the side \( BC \) internally and the sides \( AB \) and \( AC \) externally.

8. Solve the equation \((x + 1)^3 + (x - 1)^3 - 2x^3 = 144\).

9. Find the number \( a \) and \( b \) if the polynomial \( x^5 + 2x^4 + ax^3 + bx^2 - 67x + 66 \) is divisible by \( x^2 - 5x + 6 \).

10. Two sets \( A \) and \( B \) have \( m \) and \( n \) elements respectively. \( m < n \). How many different one-one and onto functions can be formed from \( A \) to \( B \)?