1) \[ \sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6} \] for all integers \( n \geq 1 \)

2) \( 5^n - 1 \) is evenly divisible by 4 for all integers \( n \geq 1 \)

3) Using only 3lb and 5lb weights, you can make any integer weight 8lbs or larger

4) \[ 1 \cdot 2 + 2 \cdot 3 + 3 \cdot 4 + \ldots + n \cdot (n+1) = \sum_{i=1}^{n} i(i+1) = \frac{n(n+1)(n+2)}{3} \]

5) \[ \sum_{i=1}^{n} i^3 = \frac{n^2(n+1)^2}{4} \] for all integers \( n \geq 1 \)

6) \[ \sum_{i=0}^{n} 2^i = 2^{n+1} - 1 \] for all integers \( n \geq 0 \)

7) \[ \sum_{i=0}^{n} ar^i = \frac{a(r^{n+1} - 1)}{r - 1} \] for all integers \( n \geq 0 \)

8) \( n! \geq 2^n \) for all integers \( n \geq 3 \)

9) \( n! \geq 3^n \) for all integers \( n \geq 6 \)

10) \( n^2 \geq 50n \) for all integers \( n \geq 49 \)

11) \( \text{Fib}(n) > n^2 \) for all integers \( n \geq 49 \)

12) \( 7^n - 1 \) is evenly divisible by 6 for all integers \( n \geq 1 \)

13) \( 11^n - 6 \) is evenly divisible by 5 for all integers \( n \geq 1 \)

14) The Towers of Hanoi problem with \( n \) discs can be solved in \( 2^n - 1 \) steps

15) For any \( n \)-team round robin tournament, there exists an ordering of teams \( t_1, t_2, t_3, \ldots t_n \) such that \( t_i \) beat \( t_{i+1} \) for all \( 0 < i < n \).

16) Any postage amount of 24 cents or greater can be made using only 5 cent and 7 cent stamps.

17) Any postage amount of 18 cents or greater can be made using only 4 cent and 7 cent stamps.