1. Prove that for $a, b \in \mathbb{R}$ we have $|a| - |b| \leq |a + b|$.

2. Use the Geometric Sum Formula to find a simplified formula for

$$\frac{1}{1+x^2} + \frac{1}{(1+x^2)^2} + \frac{1}{(1+x^2)^3} + ...$$

3. Use a truncated version of the Binomial Theorem to show that for $n \in \mathbb{N}$ and $b \in \mathbb{R}^+$ we have $(1+b)^n \geq 1 + nb + \frac{n(n-1)}{2}b^2$.

4. Find the coefficient of x^2y^5 in $(x+y)^7$.

5. For $n \in \mathbb{N}$ and $a, b \in \mathbb{R}^+$ use the Difference of Powers Formula to show that

$$a \leq b \text{ iff } a^n \leq b^n$$