Worksheet *J*

Beginning Sets
and
Analytic Claims

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11. Prove or Disprove (More Analytic Claims)

For all claims herein let $U = \mathbb{R}$.

Claim 11.1. *Let $x \in \mathbb{R} \wedge x > x^2$ It is the case that $x < 1$.*
Prove or disprove the claim.

Claim 11.2. *Let $x, y \in \mathbb{R} \wedge x > y$ It is the case that $x^2 > y^2$.*
Prove or disprove the claim.

Claim 11.3. *Let $x, y \in \mathbb{R} \wedge x > y$ It is the case that $x^3 > y^3$.*
Prove or disprove the claim.

Claim 11.4. *Let $x, y \in \mathbb{R} \wedge 0 < x < y$ It is the case that $x^2 < y^3$.*
Prove or disprove the claim.

Claims to Come (other methods of proof [Mathematical Induction for one]):

Claim 11.5. *$U = \mathbb{R}$ and consider $n \in \mathbb{N}$.* $\sum_{k=1}^{n}(k) = \frac{n(n+1)}{2}$

Claim 11.6. *$U = \mathbb{R}$ and consider $n \in \mathbb{N}$.* $\sum_{k=1}^{n}(k^2) = \left(\frac{n(n+1)}{2}\right)^2$

Claim 11.7. *$U = \mathbb{R}$ and consider $n \in \mathbb{N}$.* $\sum_{k=1}^{n}(k^3) = \left(\frac{n(n+1)}{2}\right)^2$

Claim 11.8. *$U = \mathbb{R}$ and consider $n \in \mathbb{N}$.* $2^{(n+2)} + 3^{(2n+1)}$ *is divisible by 7.*

Claim 11.9. *$U = \mathbb{R}$ and consider $n \in \mathbb{N}$.* $4^{(2n+1)} + 3^{(n+2)}$ *is divisible by 13.*

Claim 11.10. *$U = \mathbb{R}$ and consider $n \in \mathbb{N}$.* $\forall n \geq 4, \quad n^3 < 3^n$.

Comment: "∞" is not a real number.