B3 (Continued from the previous page).

Mutiplying out, we obtain:

$$(z+1)(2^{z+1})(2^{z}-1) > z\cdot 2^{z}(2^{z+1}-1)$$

$$(z+1)(2^{2z+1}-2^{z+1}) > z\cdot(2^{2z+1}-2^{z})$$

$$\cancel{z\cdot 2^{2z+1}} - z\cdot 2^{z+1} + 2^{2z+1} - 2^{z+1} > \cancel{z\cdot 2^{2z+1}} - z\cdot 2^{z}$$

So,

$$2^{2z+1} > z\cdot 2^{z+1} + 2^{z+1} - z\cdot 2^{z}$$

$$2^{2z+1} > (2z-z)\cdot 2^{z} + 2^{z+1}$$

$$2^{2z+1} > z\cdot 2^{z} + 2^{z+1}$$

$$2^{2z+1} > 2^{z}(z+2).$$

$$2^{2z+1-z} > (z+2)$$

$$2^{z+1} > z+2$$

Which is trivially true for all positive integers $z \geq 1$.

QED - Property 1

This implies that our original inequality $K_{i+1} > K_i$ is true. for all positive integers $z = m_i \geq 1$.

Now we deduce a second property for our K_j's and m_j's.

* Property 2 :

$$2^{m_i} = \frac{K_i}{(K_i - m_i)}.$$