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$n = k+1$

$$1 + (k+1)a \stackrel{?}{\leq} a^{k+1} + k+1$$

$$1 + ka + a \stackrel{?}{\leq} a \cdot \underbrace{a^k}_{k+1} + k+1$$

$$1 + ka + a \stackrel{?}{\leq} a(1 + ka - k) + k+1$$

$$1 + ka + a \stackrel{?}{\leq} a + ka^2 - ka + k+1$$

$$0 \stackrel{?}{\leq} k(a^2 - 2a + 1)$$

$$k > 0$$

$$(a-1)^2 \geq 0$$

if  $a > 0$  then



$$0 \leq$$