Problem 1 :

Give an example of a sequence {*an*} satisfying all of the following:

{*an*} is monotonic

0 < *an* < 1 for all *n* and no two terms are equal

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Problem 2:

Let *k* > 0 be a constant and consider the important sequence {*kn*}. It’s behaviour as *n* → ∞ will depend on the value of *k*.

(i) State the behaviour of the sequence as *n* → ∞ when *k* = 1 and when *k* = 0.

(ii) Prove that if *k* > 1 then *kn* → ∞ as *n* → ∞

(hint: let *k* = 1 + *t* where *t* > 0 and use the fact that (1 + *t*)*n* > 1 + *nt*.

1. Prove that if 0 < *k* < 1 then *kn* → 0 as *n* → ∞ .