Assignment 2
Analysis I
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Due by 15:00 hour on Monday 20 October.

1. State which of the following properties:

increasing, strictly increasing, decreasing, strictly decreasing, non-monotonic, bounded above, bounded below, bounded

each of the following sequences has.

a. $a_n = \frac{1}{n+12}$

b. $b_n = \frac{(n+1)^3}{n^2+1}$

c. $c_n = \frac{n-6}{n+8}$

d. $d_n = \cos n$

e. $e_n = \frac{1}{2^n}$

f. $f_n = 3^{\sin(n\pi)}$

g. $g_n = \cos \frac{1}{n}$

h. $h_n = (-1)^n n^2$

2. Consider the sequence

$$a_1 = \frac{1}{2}, \quad a_{n+1} = \frac{1}{2 + a_n}.$$

Write down the first 5 terms of this sequence. Is this sequence bounded? increasing? decreasing?

3. In each of the following cases give an example of a sequence (a_n) with stated properties

(i) Strictly increasing and bounded above

(ii) Not bounded above and not bounded below

(iii) Increasing and decreasing

(iv) Non-monotonic and bounded

(v) Not increasing and not bounded

(vi) Bounded above and not decreasing