**Limit**

**Evaluate:**

**1.**

**2.**

**3.**

**4.**

**5.**

**6.**

**7.**

**8.**

**9.**

**1.**

**2.**

**3.**

**4.**

 **(a)** When ,

 **(b)** When ,

 **(i)** When a = b,

 **(ii)** When a = -b,

 The sequence oscillates between . The limit does not exist.

 **(c)** When ,

**5.** **Method 1**

 Let

 Then

 As

 Hence

 **Method 2** Put

 As

**6.**

 Since

 By Sandwich Theorem,

**7.**

**8.**

 Let

**9.** Prove by induction,

 Let P(n):

 For P(1),

 Assume P(k) is true for some , that is, …. (\*)

 For P(k+1),

 since

 Therefore P(k+1) is true.

 By the Principle of Mathematical Induction, P(n) is true for all

 Hence, we have

 By Sandwich Theorem,

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