9. [12 points] For each of the following sequences, defined for integers $n \geq 1$, decide whether the sequence is monotone increasing, monotone decreasing, or not monotone, and whether it is bounded or unbounded. Circle your answers. No justification is required.

(i) $a_n = (-1)^n \left(1 + \dfrac{1}{n}\right)$

*Circle **all** that apply:*

Monotone Increasing   Monotone Decreasing $\boxed{\text{Not Monotone}}$

         $\boxed{\text{Bounded}}$ Unbounded

(ii) $b_n = \dfrac{1}{1 + \ln(n)}$

*Circle **all** that apply:*

Monotone Increasing $\boxed{\text{Monotone Decreasing}}$ Not Monotone

         $\boxed{\text{Bounded}}$ Unbounded

(iii) $c_n = \displaystyle\sum_{k=1}^{n} \dfrac{(-3)^k}{5^k}$

*Circle **all** that apply:*

Monotone Increasing   Monotone Decreasing $\boxed{\text{Not Monotone}}$

         $\boxed{\text{Bounded}}$ Unbounded

(iv) $r_n = \displaystyle\sum_{k=1}^{n} \left(1 + \dfrac{1}{k}\right)$

*Circle **all** that apply:*

$\boxed{\text{Monotone Increasing}}$ Monotone Decreasing   Not Monotone

         Bounded $\boxed{\text{Unbounded}}$

(v) $s_n = \displaystyle\int_{1/2^n}^{1} \dfrac{1}{\sqrt{x}}\, dx$

*Circle **all** that apply:*

$\boxed{\text{Monotone Increasing}}$ Monotone Decreasing   Not Monotone

         $\boxed{\text{Bounded}}$ Unbounded

(vi) $t_n = \displaystyle\sum_{k=2}^{n+1} \dfrac{1}{k \ln k}$

*Circle **all** that apply:*

$\boxed{\text{Monotone Increasing}}$ Monotone Decreasing   Not Monotone

         Bounded $\boxed{\text{Unbounded}}$