Answer on Question #79263 – Math – Algebra

Question

1. Show that 1+1/$\sqrt{2}$+...+1/$\sqrt{n}$ $\geq \sqrt{\{2(n-1)\}}$ for $n \in N$, n >1. (Solve using inequalities).

Solution

Consider the right-hand side of the inequality:

$$\sqrt{\{2(n-1)\}}$$

Fractional part of the number by definition:

$$\{2(n-1)\} = 2(n-1) - [2(n-1)]$$

$$0 \leq \{2(n-1)\} < 1$$

$$0 \leq \{2n-2\} < 1$$

2 is an integer, so:

$$\{2n-2\} = \{2n\}$$

$$0 \leq \{2n\} < 1$$

By condition $n \in N$ and n >1. We know that $N \in Z => 2n \in Z => \{2n\} = 0$

So:

$$\sqrt{\{2(n-1)\}} = 0$$

$$\frac{1}{\sqrt{1}} + \frac{1}{\sqrt{2}} + \cdots + \frac{1}{\sqrt{n}} = \sum_{n=2}^{\infty} \frac{1}{\sqrt{n}}$$

When n=2 (it's minimal value of n):

$$\frac{1}{\sqrt{1}} + \frac{1}{\sqrt{2}} > 0$$

Proved.

Answer provided by https://www.AsignmentExpert.com