

ANSWER on Question #79245 – Math – Differential Equations

QUESTION

If

$$U_{xx} + U_{yy} = 0 \text{ in } x^2 + y^2 = 1, \text{ and } U(x, y) = 3 + x + y$$

Find

$$U\left(\frac{1}{2}, \frac{1}{2}\right)$$

Variants of answer:

$$A) U\left(\frac{1}{2}, \frac{1}{2}\right) = 0$$

$$B) U\left(\frac{1}{2}, \frac{1}{2}\right) = 2$$

$$C) U\left(\frac{1}{2}, \frac{1}{2}\right) = 3$$

$$D) U\left(\frac{1}{2}, \frac{1}{2}\right) = 4$$

SOLUTION

Hint: The question looks strange, since the explicit form of the function $U(x, y)$ is specified. That is, the first condition: a partial differential equation is not used in any way to solve this problem.

In our case,

$$U(x, y) = 3 + x + y \rightarrow U\left(\frac{1}{2}, \frac{1}{2}\right) = 3 + \frac{1}{2} + \frac{1}{2} = 3 + 0.5 + 0.5 = 4$$

Conclusion,

$$U(x, y) = 3 + x + y \rightarrow U\left(\frac{1}{2}, \frac{1}{2}\right) = 4$$

ANSWER: D) $U\left(\frac{1}{2}, \frac{1}{2}\right) = 4$