Answer on Question #73311 – Math - Algebra

Question

Question #33200.The sum of the squares of two digits of a positive integral number is 65 and the number is 9 times the sum of its digits. Find the number.
In the solution of Question #33200 you said the possible range is 1 to 8.. I don't understand this possible range.. And in other solutions there is written the number is 10x+y. How does the number is 10x+y.? Please solve this query for me. I'll be waiting for your kind response

Solution

Let the first digit be x and the second digit be y.

Therefore, the number would be 10x+ y as the x is the tens digit and y is the ones digit. For example, if the first digit is 5 and the second digit is 9, the number would be 59 which is calculated as

$$5 \cdot 10 + 9 = 59.$$

Sum of the squares of the digits = x^2 + y^2

$$65 = x^2 + y^2 \text{----------(1)}$$

The number is 9 times the sum of its digits:

$9 (x + y) = 10x + y$

$9x + 9y = 10x + y$

$x = 8y$

Plugging x= 8y in the equation (1), we get:

$65 = (8y)^2 + y^2$

$65 = 65y^2$

$y = 1$

And x would be x= 8y

$$x = 8 \cdot 1 = 8$$

Therefore, the number would be $8 \cdot 10 + 1 = 81$.