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AI1110 Assignment 1

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Q11 (b): The product of two consecutive natural numbers which are multiples of 3 is equal to 810. Find the two numbers.

Solution:

Let the two consecutive natural numbers which are multiples of 3 be 3n and 3n + 3 $\exists n \in \mathbb{N}$

According to the question:

$$3n(3n+3) = 810\tag{1}$$

$$\Rightarrow \qquad 9n(n+1) = 810 \tag{2}$$

$$\Rightarrow \qquad n(n+1) = 90 \tag{3}$$

$$\Rightarrow \qquad n^2 + n - 90 = 0 \tag{4}$$

$$\Rightarrow \qquad (n+10)(n-9) = 0 \tag{5}$$

$$\Rightarrow \qquad n = -10 \quad or \quad n = 9 \quad (6)$$

discarding n = -10 as $n \in \mathbb{N}$

$$\Rightarrow \qquad \qquad n = 9 \tag{7}$$

$$\Rightarrow \qquad 3n = 27 \tag{8}$$

$$\Rightarrow \qquad 3n+3=30 \tag{9}$$

The two numbers are: $\boxed{27,30}$

Plot of $eq^n(4)$ is:

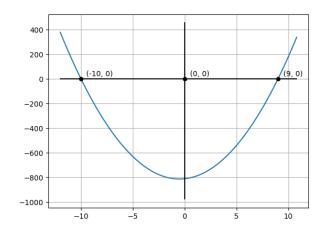


Fig. 1. Plot showing the polynomial in $eq^n(4)$

It can be easily verified by observing the plot that the roots of $eq^n(4)$ are 9 and -10.

The output of the program used to find and verify these numbers is:

Fig. 2. Output of the python program