

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 $3n + 3 \quad \exists n \in \mathbb{N}$

According to the question:

$$\begin{aligned}
 &3n(3n + 3) = 810 \\
 \Rightarrow &9n(n + 1) = 810 \\
 \Rightarrow &n(n + 1) = 90 \\
 \Rightarrow &n^2 + n - 90 = 0 \quad - (1) \\
 \Rightarrow &(n + 10)(n - 9) = 0 \\
 \Rightarrow &n = -10 \quad \text{or} \quad n = 9
 \end{aligned}$$

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

$$\begin{aligned}
 \Rightarrow &n = 9 \\
 \Rightarrow &3n = 27 \\
 \Rightarrow &3n + 3 = 30
 \end{aligned}$$

The two numbers are: 27, 30

Plot of $eq^n(1)$ is:

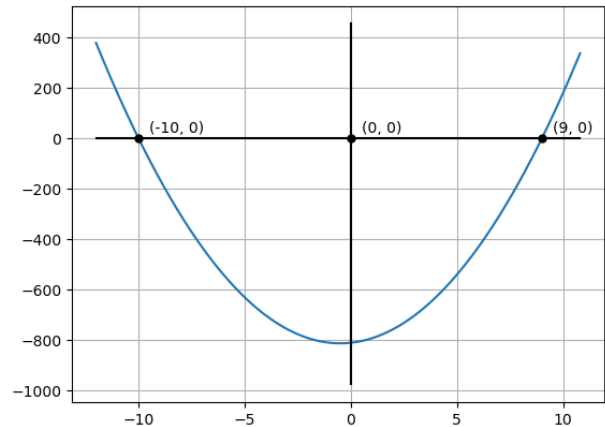


Fig. 1. Plot showing the polynomial in $eq^n(1)$

It can be easily verified by observing the plot that the roots of $eq^n(1)$ are 9 and -10.

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

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$ python find_nums.py
The consecutive natural numbers n1 and n2 s.t.
n1 % 3 == 0 and n2 % 3 == 0 and n1*n2 == 810 are:
n1=27 n2=30

```

Fig. 2. Output of the python program