AI1110 Assignment 1

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30 March, 2022

Paper 2018

Q4 (c)

Solve $x^2 + 7x = 7$ and give your answer correct to two decimals.

Solution

Given,
To Find the roots of $x^2 + 7x - 7 = 0$.

We know that for the quadratic equation of form $ax^2 + bx + c = 0$, the roots are

$$\frac{-b + \sqrt{b^2 - 4ac}}{2a}, \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

$\Rightarrow$ The roots are $\frac{-7 + \sqrt{49 - 4(1)(-7)}}{2(1)}, \frac{-7 - \sqrt{49 - 4(1)(-7)}}{2(1)}$

$\Rightarrow$ The roots are $\frac{-7 + \sqrt{77}}{2}, \frac{-7 - \sqrt{77}}{2}$

$\Rightarrow$ The roots are $\frac{-7 + 8.7749}{2}, \frac{-7 - 8.7749}{2}$
($\sqrt{77}$ can be found by long division method up to four decimals)

$\Rightarrow$ The roots are -7.8874, 0.8874

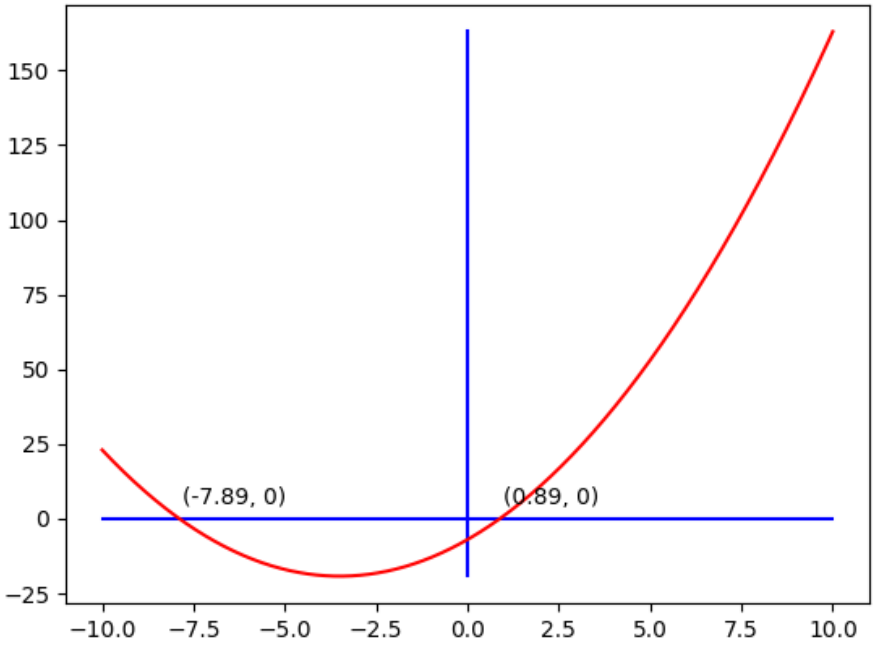

Figure 1: Plot showing the polynomial in $x^2 + 7x - 7 = 0$

On rounding them off to 2 decimal places we get the roots as -7.89 and 0.89.

$\therefore$ The solutions of $x^2 + 7x = 7$ are $x = -7.89$ and $x = 0.89$.