AI1110 Assignment 1(Paper 2018)

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Q4 (c)

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

Solution

Given, To Find the roots of

$$x^2+7x-7=0 \tag{1}$$

We know that for the quadratic equation of form

$$ax^2+bx+c=0 \tag{2}$$

the roots are

$$\frac{-b+\sqrt{b^2-4ac}}{2a}, \frac{-b-\sqrt{b^2-4ac}}{2a} \tag{3}$$

$$\implies \frac{-7+\sqrt{49-4(-7)}}{2(1)}, \frac{-7-\sqrt{49-4(-7)}}{2(1)} \tag{4}$$

$$\implies \frac{-7+\sqrt{77}}{2}, \frac{-7-\sqrt{77}}{2} \tag{5}$$

$$\implies \frac{-7+8.7749}{2}, \frac{-7-8.7749}{2} \tag{6}$$

$$\implies -7.8874, 0.8874 \tag{7}$$

($\sqrt{77}$ can be found by long division method up to four decimals)

$$\implies \text{The roots are} -7.8874, 0.8874 \tag{8}$$

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

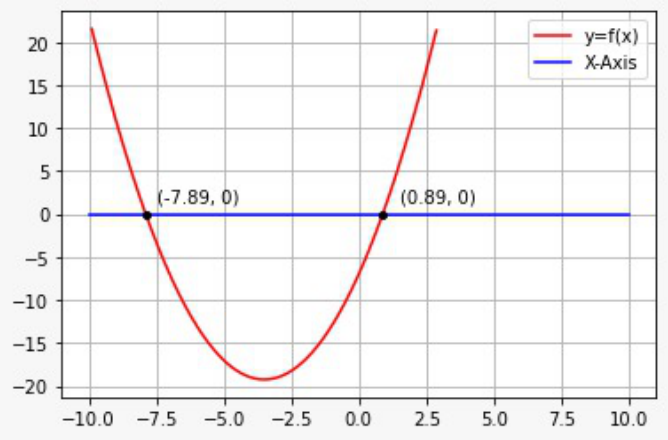

Figure 1: Plot of $x^2+7x-7=0$

$\therefore$ The solutions of

$$x^2+7x=7 \tag{9}$$

are

$$x=-7.89 \tag{10}$$

$$x=0.89 \tag{11}$$