

A very simple latex document

Quadratic equation

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1 Problem

Given three real numbers a, b, c , solve the equation:

$$ax^2 + bx + c = 0. \tag{1}$$

2 Solution

We consider two cases:

1. $a = 0$.

- If $b = 0, c = 0 \Rightarrow$ solution is $x \in R$
- If $b = 0, c \neq 0 \Rightarrow$ there no x satisfying equation (1).
- If $b \neq 0 \Rightarrow x = -\frac{c}{b}$

2. $a \neq 0$. Let $\Delta = b^2 - 4ac$.

$$x = \begin{cases} \frac{-b \pm \sqrt{\Delta}}{2a} & \text{if } \Delta > 0. \\ \frac{-b}{2a} & \text{if } \Delta = 0 \\ 0 & \text{other wise} \end{cases} \tag{2}$$

3 Example

Find x -intercepts of the graph $y = x^2 - x - 2$.

1. Using graph shown in Figure 1.
The solution is $x \in \{1, 2\}$

2. Using (2). We need to solve the following quadratic equation:

$$x^2 - x - 2 = 0. \tag{3}$$

\Rightarrow solution $x \in \{-1, 2\}$.

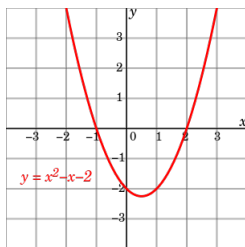


Figure 1: Caption is here

4 More examples

Given a, b, c , find x :

Table 1: My caption

| a | b | c | x_1 | x_2 |
|-----|-----|-----|-------|-------|
| 1 | -4 | 3 | 1 | 3 |
| 1 | -2 | 1 | 1 | 1 |

5 Citations

[1]

References

- [1] T. H. Vu, H. S. Mousavi, V. Monga, U. A. Rao, and G. Rao, “Dfdl: Discriminative feature-oriented dictionary learning for histopathological image classification,” in *2015 IEEE 12th International Symposium on Biomedical Imaging (ISBI)*. IEEE, 2015, pp. 990–994.