

Indrajeet's Rule for Quadratic Equation

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Abstract

Step 1: Find the value of $a \cdot c$.

Step 2: Find the divisors of the value of $a \cdot c$, where not required all divisors of the value of $a \cdot c$, if you feel find all divisors, then you can find.

Step 3: Choose two numbers from divisors of the value of $a \cdot c$ of which multiplication should be equal to the value of $a \cdot c$, and sum or difference should be equal to the value of b .

Step 4: Change the sign of both chosen numbers.

Step 5: Divide the both numbers by the value of a .

I. Introduction

A quadratic equation in the variable x is an equation of the form $ax^2 + bx + c = 0$, $a \neq 0$, where a, b, c are real numbers. In fact, any equation of the form $p(x)=0$, where $p(x)$ is a polynomial of degree 2, is a quadratic equation, but when we write the terms of $p(x)$ in descending order of their degrees, then we get the standard form of the equation that is $ax^2 + bx + c = 0$, $a \neq 0$ is called the standard form of a quadratic equation. I have developed a new rule for solve the quadratic equation which is a short cut method. This method will be a time saving method for the students, teachers and more. We know already much method to solve the quadratic equation. "Indrajeet's rule for quadratic equation" is a most important method, because this method is easy to solve the quadratic equation. "Indrajeet's rule for quadratic equation" is a unique method to solve the quadratic equation, before it we had not any method like this method. I used coefficients of x^2 , coefficients of x and divisors of the value of multiplication of coefficient of x^2 and constant, which are very important for this unique method. I developed "Indrajeet's rule for quadratic equation" in steps and only in language, so that it will be easy. This method is a time saving method, so I hope my method will like.

II. Indrajeet's Rule For Quadratic Equation

Rule in steps:

Step 1: Find the value of $a \cdot c$.

Step 2: Find the divisors of the value of $a \cdot c$, where not required all divisors of the value of $a \cdot c$, if you feel find all divisors, then you can find.

Step 3: Choose two numbers from divisors of the value of $a \cdot c$ of which multiplication should be equal to the value of $a \cdot c$, and sum or difference should be equal to the value of b .

Step 4: Change the sign of both chosen numbers.

Step 5: Divide the both numbers by the value of a .

Keywords: Divisors and coefficients

Notes: 1: When $b^2 - 4ac < 0$, then you should use another (or other) method to solve the quadratic equation, because in this case Indrajeet's rule may be difficult.

2: When you feel difficult to solve any question of quadratic equation by using Indrajeet's rule, then you can use SHREEDHARACHARYA'S rule.

III. Examples

Example 1: Find the roots of the quadratic equation $x^2 - 3x - 10 = 0$.

Solution : Given equation is $x^2 - 3x - 10 = 0$

Here, $a = 1, b = -3$ and $c = -10$

On using step 1: $a \cdot c = 1 \times (-10) = -10$

On using step2: 1, 2, 5, 10; -1, -2, -5, -10

On using step3: 2, -5

On using step4: -2, 5

On using step5: $\frac{-2}{1}, \frac{5}{1}$ i.e. -2, 5

Now, we have -2 and 5 which are roots of the given quadratic equation.

Example2: Find the roots of the equation $2x^2 - 5x + 3 = 0$.

Solution: Given equation is $2x^2 - 5x + 3 = 0$

Here, $a = 2$, $b = -5$ and $c = 3$

On using step1: $a \cdot c = 2 \times 3 = 6$

On using step2: 1, 2, 3, 6; -1, -2, -3, -6

On using step3: -2, -3

On using step4: 2, 3

On using step5: $\frac{2}{2}$, $\frac{3}{2}$

Thus, $\{1, \frac{3}{2}\}$ are roots of the equation.

Example3: Find two consecutive odd positive integers, sum of whose squares is 290.

Solution:

Let the smaller of the two consecutive odd positive integers be x , then the second integer will be $x + 2$

According to question-

i.e. $x^2 + (x + 2)^2 = 290$

or $x^2 + x^2 + 4x + 4 = 290$

or $2x^2 + 4x - 286 = 0$

or $x^2 + 2x - 143 = 0$

which is in the form of quadratic equation in x .

Here, $a = 1$, $b = 2$ and $c = -143$

On using step1: $a \cdot c = 1 \times (-143) = -143$

On using step2: 1, 11, 13, 143; -1, -11, -13, -143

On using step3: -11, 13

On using step4: 11, -13

On using step5: $\frac{11}{1}$, $\frac{-13}{1}$

i.e. 11, -13

but, x is given to be an odd positive integer

therefore, $x \neq -13$, $x = 11$

Thus, the two consecutive odd integers are 11 and 13.

IV. Conclusion

“Indrajeet’s rule for quadratic equation” is a unique method and time saving method, so this method is a good method for solve the quadratic equation easily. This method will be a good method for students, because students want easy rule for solve the any problem, so this method will be a good method for quadratic equation, when we solve any question of quadratic equation by factorization, then we lost more time in remembering two numbers which will be applicable, but in “Indrajeet’s rule for quadratic equation” I used divisors of the value of multiplication of coefficient of x^2 and constant, which proof this method is a time saving method, use of coefficient of x^2 and coefficient of x are also good in making time saving method, use of steps and use of language also make it easy.

We can solve the quadratic equation by factorization, by completing the square, by SHREEDHARACHARYA’S rule or $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ and by graph. These all method are good, but I feel that “Indrajeet’s rule for quadratic equation” is a very good method for quadratic equation in the sense of saving of time.

References

Books

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Chapters in books

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