

### Answer on Question #53969 – Math – Algebra

Solve  $x^3 + x - 24 = 0$  you cannot use an iterative method or Newton - Raphson method. Graphical method can be used but clear explanation of how the solution is obtained is needed.

#### Solution

Polynomial equations, particularly of high degree, are difficult to solve unless they take a particularly simple form. A useful guide to the approximate values of the solutions can be obtained by sketching the polynomial, and discovering where the curve crosses the x-axis. The real roots of the polynomial equation  $P(x) = 0$  are given by the values of the intercepts of the function  $y = P(x)$  with the x-axis because on the x-axis  $y = P(x)$ , is zero. An important feature of the graph of a polynomial is that it is continuous. There are never any gaps or jumps in the curve.

In a given case, we can use the tools of computer program Maple in order to represent the graph of the function. The information is provided in Figure 1.

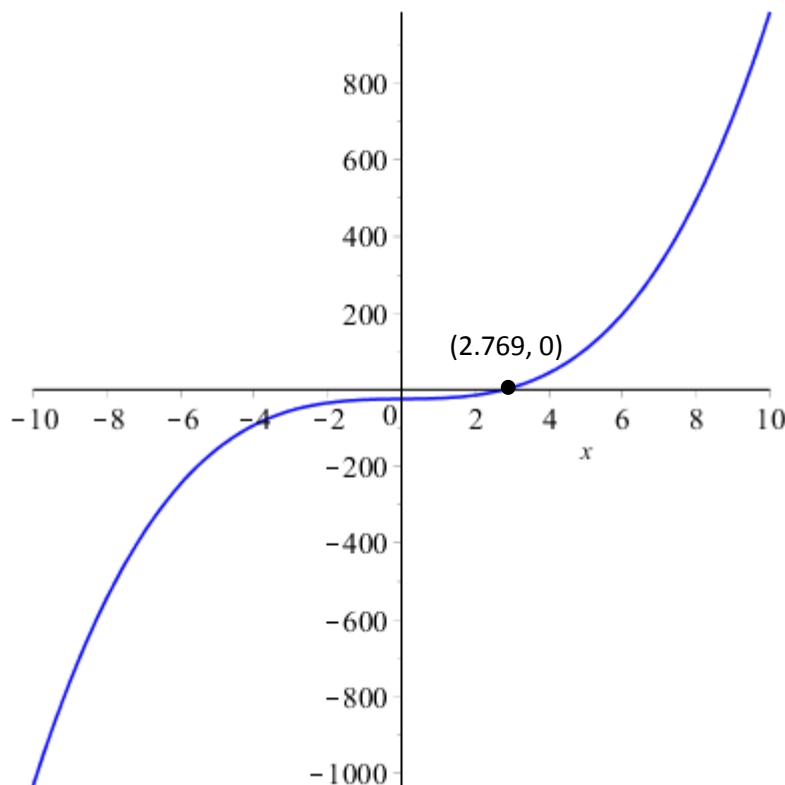


Figure 1 The graph of  $y = x^3 + x - 24$  via Maple

From the Figure 1, it can be seen that a polynomial function  $y = x^3 + x - 24$  crosses the x-axis at the point where  $x$  is approximately equal to 2.769003523.

We also can use the tools of Excel in order to solve the original equation. The information is provided in Figure 2.

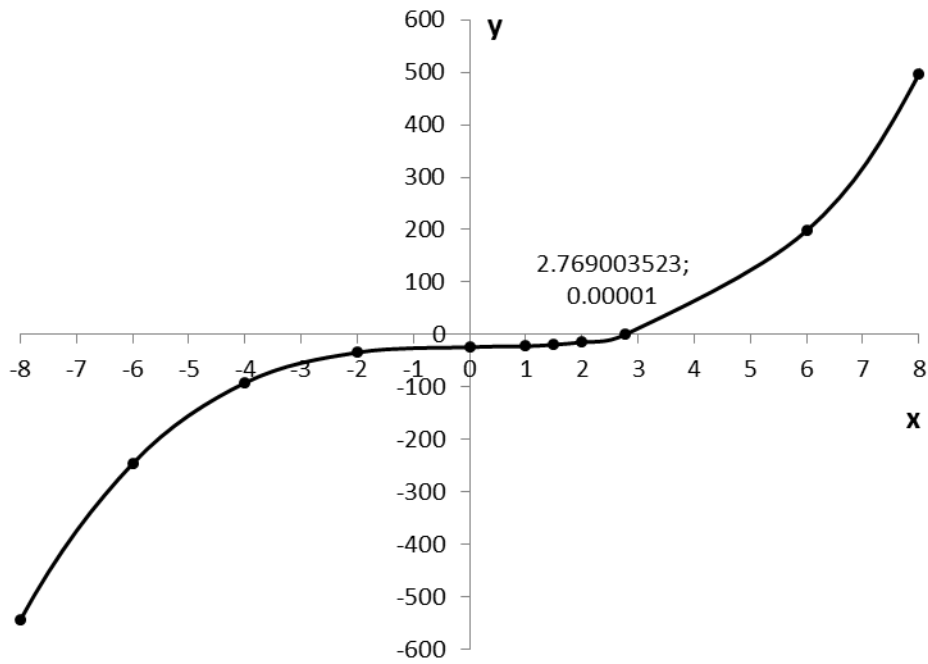


Figure 2 The graph of  $y=x^3 + x - 24$  via Excel.

Based on the information in figure 2 we can mark the point of the x-axis intersection has the same value, which is approximately equal to 2.769003523.

The solution of the equation is found by looking for the points where the graph crosses the horizontal axis. In this case we have the point with coordinates (2.769003523; 0.00001).