Answer on Question #42528 – Math - Calculus

Using the given zero, find one other zero of f(x). Explain the process you used to find your solution.

Explain this to me please help i'm having problem please show me an example

Answer.

Generally, If you have found a zero x_1 of $f(x)$, then you can divide $f(x)$ by $(x - x_1)$ and find zeros of the new function.

A few special cases.

1. **If given root is complex i.e. $x_1 = a + bi$, so, since complex roots always appear in pairs, the other root must be its conjugate i.e. $x_2 = a - bi$.**
   For example, $x_1 = 2 + 5i$ then $x_2 = 2 - 5i$.
2. **If $f(x)$ is the quadratic function: $f(x) = ax^2 + bx + c$ and x_1, x_2 are the roots, then $f(x) = a(x - x_1)(x - x_2)$ so, $x_1 + x_2 = -\frac{b}{a}$, $x_1 x_2 = \frac{c}{a}$**
   Therefore, if we know one root x_1, we can find another: $x_2 = -\frac{b}{a} - x_1$ or $x_2 = \frac{c}{ax_1}$.
   For example, $x_1 = 1$, $f(x) = 2x^2 - 6x + 4$, then $x_2 = \frac{6}{2} - 1 = 2$ or $x_2 = \frac{4}{2} = 2$
3. **If $f(x)$ is the cubic function: $f(x) = ax^3 + bx^2 + cx + d$ and x_1 is the root, then $f(x) = a(x - x_1)(x^2 + px + q)$ where $p = \frac{b + ax_1}{a}$, $q = -\frac{d}{ax_1}$.**
   Therefore, if we know one root x_1, we can find 2 others from the quadratic equation: $x^2 + px + q = 0$.
   For example, $x_1 = 1$, $f(x) = x^3 + 2x^2 - x - 1$, $p = 3, q = 2$ and from the quadratic equation $x^2 + 3x + 2$ we have $x_2 = -1$, $x_3 = -2$.