Roots of Polynomials

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Wahoo!

- 1. The Certain Rabbit wants to create a quintic equation with roots 1, 2, 3, 4, and 5. Help him!
- 2. Given that the roots follow an arithmetic distribution, solve $x^4 2x^3 21x^2 + 22x + 40 = 0$.
- 3. Given that one root is twice the other, solve $\begin{bmatrix} x^3 & -4x^2 & -11x & -14i \end{bmatrix} \begin{bmatrix} 1 \\ 5 \\ -7 \\ -7i \end{bmatrix} = \begin{bmatrix} 0 \end{bmatrix}$
- 4. (a) Construct a duodecic equation with roots the first 12 terms of the fibonacci sequence.
 - (b) Given that the equation from part (i) is f(x), find $\frac{d^9f}{dx^9}$

Solutions

1.
$$x^5 - 15x^4 + 85x^3 - 225x^2 + 274x - 120 = 0$$

2.
$$x = -4, x = -1, x = 2, x = 5$$

3.
$$x = -2, x = 7, x = 14$$

(b)
$$\frac{d^9f}{dx^9} = \frac{12!}{3!}x^3 + \frac{11!}{2!}x^2 + 10!x + 9!$$