

Answer on Question #42989, Math, Calculus

Write a polynomial function of minimum degree with real coefficients whose zeros include those listed. Write the polynomial in standard form.

4, -8, and $2 + 3i$

Solution. If a is a zero of the given polynomial then $(x-a)$ is a factor of this polynomial. Also if the complex number is a zero of the polynomial then its conjugate is also the zero of this polynomial. Therefore we get

$$\begin{aligned} & (x - 4)(x + 8)(x - (2 + 3i))(x - (2 - 3i)) \\ & \quad = (x^2 + 4x - 32)(x^2 - (2 - 3i)x - (2 + 3i)x + (2 + 3i)(2 - 3i)) = \\ & = (x^2 + 4x - 32)(x^2 - 4x + 13) \\ & \quad = x^4 - 4x^3 + 13x^2 + 4x^3 - 16x^2 + 52x - 32x^2 + 128x - 416 = \\ & = x^4 - 35x^2 + 180x - 416 \end{aligned}$$

Answer: $x^4 - 35x^2 + 180x - 416$.