

Extra Example Sec 3-6

Oct. 16

Write the simplest polynomial function with integer coefficients that has the zeros $-\sqrt{2}$, $3i$, and $-2/3$.

$$\begin{aligned}
 p(x) &= (x + \sqrt{2})(x - \sqrt{2})(x - 3i)(x + 3i)(3x + 2) \\
 &= (x^2 - 2)(x^2 - 9i^2)(3x + 2) \\
 &= (x^2 - 2)(x^2 + 9)(3x + 2) \\
 &= (x^4 + 7x^2 - 18)(3x + 2) = 3x^5 + 2x^4 + 21x^3 + 14x^2 - 54x - 36
 \end{aligned}$$

$x = -\frac{2}{3}$
 $3x = -2$
 $3x + 2 = 0$