1. Find a polynomial of degree 3 that has zeros at \(-3i, 3i, 4\) and \(f(-1) = 25\).

\[
f(x) = k(x + 3i)(x - 3i)(x - 4) = k(x^2 + 9)(x - 4)
\]

\[
f(-1) = k(10)(-5) = -50k = 25 \rightarrow k = \frac{-1}{2}
\]

\[
f(x) = \frac{1}{2}(x^2 + 9)(x - 4)
\]

2. Find a polynomial of degree 7 such that \(-2\) and \(2\) are both zeros of multiplicity 2, \(1\) is a zero of multiplicity 3 and \(f(0) = 12\). Sketch the graph of \(f\).

\[
f(x) = k(x + 2)^2(x - 2)^2(x - 1)^3.
\]

\[
f(0) = k(4)(4)(-1) = -16k = 12 \rightarrow k = \frac{-3}{4}.
\]

\[
f(x) = \frac{-3}{4}(x + 2)^2(x - 2)^2(x - 1)^3
\]

3. Find a polynomial of degree 4 with real coefficients and leading coefficient 1 that has zeros at \(-1, 0, 3 + i\).

\[
f(x) = (x + 1)x[(x - 3)^2 + 1]
\]

\[
f(x) = x(x + 1)(x^2 - 6x + 10)
\]