Exercises: In the following exercises you should use synthetic division whenever possible.

(1) Given that \( x = 5 \) is a solution to the following equation
\[
x^3 - 7x^2 + 15x - 25 = 0
\]
find all solutions.

(2) Given that \( x = -2 \) is a solution to the following equation:
\[
x^4 - 5x^3 + x^2 + 5x - 50 = 0
\]
solve the equation completely.

(3) \( x = 3 \) is a solution to the equation
\[
x^3 - 9x^2 + 27x - 27 = 0
\]
Solve the equation completely.

(4) One of the numbers 1, -2, 3, 4 is a solution to the equation
\[
x^3 - 3x^2 - 10x + 24 = 0
\]
Solve the equation.

(5) Given that \( 2 + 5i \) is a solution of the equation:
\[
x^4 - 3x^3 + 19x^2 + 53x - 174 = 0
\]
solve this equation completely.

(6) Find a cubic polynomial with zeros at \( x = -1, x = 3 \) and \( x = 2 \).

(7) Find a fourth degree polynomial with real coefficients and zeros at \( x = 3i, x = 2 \), and \( x = 0 \).

(8) Extra Credit: Given that \( 1 - \sqrt{5} \) is a solution to the equation
\[
x^4 + 3x^3 - 8x^2 - 32x - 24 = 0
\]
solve the equation completely.