

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.