Practice Exam 2

1. Find all rational roots of the polynomial $p(x) = x^3 - 3x + 2$.

2. Find all real and complex roots of the polynomial $p(x) = x^3 + 2x^2 + 2x + 1$.

3. Find the horizontal and vertical asymptotes of the function $f(x) = \dfrac{x^2 - x - 6}{x^2 + 2x - 3}$, as well as the x-intercepts and the y-intercept. Finally, sketch a graph of the function (plotting a few more points if necessary) and check your answer using GeoGebra or an equivalent graphing tool.

4. Repeat the previous problem with $f(x) = \dfrac{3x - 6}{x^2 - 8x + 16}$.

5. Find the standard form of the quadratic function which has a vertex at $(1, 4)$ and passes through $(2, 7)$.

6. Determine whether the quadratic function $f(x) = -3x^2 + 12x - 7$ has a minimum or maximum value (*hint:* find the vertex form and sketch the graph), and compute that value. Also, find the range of f.

7. Find the factor form, the vertex form, and the standard form of the quadratic function that has y-intercept $(0, 6)$ and x-intercepts $(0, 1)$ and $(0, 3)$.