MATH 2301 GW20: Using the Graphing Strategy to Graph a Polynomial

The goal is to graph the function $f(x) = -x^4 + 4x^3 = -x^3(x - 4)$

The instructions are organized into the Four Steps of **Reference R05: Graphing Strategy**

Step 1. Analyze $f(x)$.

- Find the y-intercept and the x-intercepts.
- Determine the end-behavior.
- Make a sign chart for f and use it to determine where f is positive, negative, or zero.

Step 2. Analyze $f'(x)$.

- Find $f'(x)$, factor it, and then find the partition numbers for $f'(x)$.
- Construct a sign chart for $f'(x)$ and use it to determine the intervals on which f is increasing and decreasing, and to find the x coordinates of all relative maxima and minima.
- Find the y coordinates of all relative maxima and minima.

Step 3. Analyze $f''(x)$.

- Find $f''(x)$, factor it, and then find the partition numbers for $f''(x)$.
- Construct a sign chart for $f''(x)$ and use it to determine the intervals on which f is concave up and concave down, and to find the x coordinates of all inflection points.
- Find the y coordinates of all inflection points.

Step 4: Sketch the graph of f.

- Plot the axis intercepts, relative maxima and minima, and inflection points, and label them with their (x, y) coordinates.
- Using the other information from steps 1, 2, and 3, draw the graph.

.