Show all work for full credit.

1. Given the following graph of $f(x)$, sketch the graph of $f'(x)$ on the same set of axes.

2. Given the following graph of $f'(x)$, determine the intervals over which $f(x)$ is increasing, decreasing, concave up, and concave down.
3. Find the critical points of \( f(x) \). Identify each as the location of a local maximum, local minimum, or neither.

\[
f(x) = (x + 4)^3(x - 3)^4
\]

4. Find the critical points of \( f(x) \). Identify each as the location of a local maximum, local minimum, or neither.

\[
f(x) = x^{3/8}(4 - x)
\]
5. Determine the absolute maximum and absolute minimum of \( f(x) \) over the given interval.

\[
f(x) = x^4 - 2x^2 + 3 \quad \text{over } [-2, 3]
\]

6. Determine the absolute maximum and absolute minimum of \( f(x) \) over the given interval.

\[
f(x) = 3x^4 - 4x^3 - 12x^2 + 5 \quad \text{over } [-2, 3]
\]